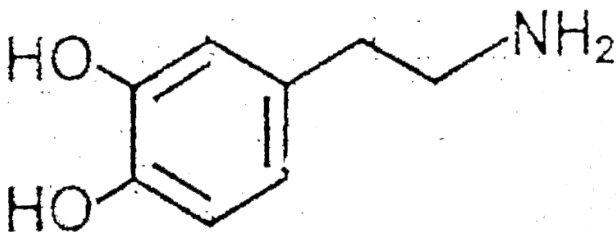# CHEMISTRY

PHYSICAL, INORGANIC, AND ORGANIC CHEMISTRY

TEST PAPERS

CHEMISTRY

1. Dopamine works as an important neurotransmitter in brain. Its IUPAC name is 4-(2-aminoethyl)benzene-1,2-diol and its structure is

51 g of dopamine will not contain as may carbon atom as there are total C-atoms in :

A. $\dfrac{800}{3}gCaCO_3$

B. $80gCH_3COOH$

C. $\dfrac{104}{3}gC_6H_6$

D. $60gC_6H_{12}O_6$

Answer: B

▶ Watch Video Solution

2. $1.6 g of CH_4$ contains same number of electrons as in :

A. $4.48L$ of $CH_4 at NTP$

B. 6.02×10^{22} molecules of CH_4

C. $1 mol of Na$

D. $2.24L$ of $O_2 at STP$

Answer: C

3. At $27\,°C$ and 3.0 atm pressure, the density of propene gas is :

    A. $10.1gL^{-1}$

    B. $4.03gL^{-1}$

    C. $5.12gL^{-1}$

    D. $0.506gL^{-1}$

Answer: C

4. $8g of O^{2-}$ ion has amount of charge equal to :
$$\left(N_A = 6.02 \times 10^{23}, e = -1.6 \times 10^{-19}C\right)$$

    A. $5N_A eC$

B. $2N_A eC$

C. $N_A eC$

D. $\dfrac{1}{2}N_A eC$

Answer: C

5. $5.85 g NaCI$ is dissolved in 1 litre water. The total number of ions of Na^+ and CI^- in 1 mL of this solution will be :

A. 6.02×10^{19}

B. 1.2×10^{22}

C. 1.2×10^{20}

D. 6.02×10^{20}

Answer: C

6. Which one of the following sets of ions represents the collection of isoelectronic species?

A. $K^+, Cr, Mg^{2+}, Sc^{3+}$

B. $Na^+, Ca^{2+}, Sc^{3+}, F^-$

C. $K^+, Ca^{2+}, Sc^{3+}, CI^-$

D. $Na^+, Mg^{2+}, AI^{3+}, CI^-$
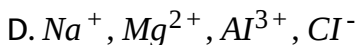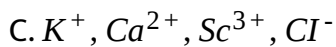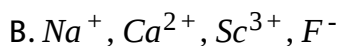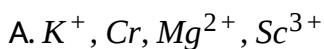
Answer: C

7. If the atomic weight of an element is 23 times that of the lightest element and it has 11 protons, then it contains.

A. 11 protons, 23 neutrons, 11 electrons

B. 11 protons, 11 neutrons, 11 electrons

C. 11 protons, 12 neutrons, 11 electrons

D. 11 protons, 11 neutrons, 23 electrons

Answer: C

▶ **Watch Video Solution**

8. When a certain metal was irradiated with light of frequency $3.2 \times 10^{16} s^{-1}$ the photoelectrons emitted had twice the KE as did photoelectrons emitted when the same metal was irradiated with light of frequency $2.0 \times 10^{16} s^{-1}$. Calculate the thereshold frequency of the metal.

A. $1.6 \times 10^{18} Hz$

B. $0.8 \times 10^{15} Hz$

C. $8 \times 10^{15} Hz$

D. $8 \times 10^{16} Hz$

Answer: C

▶ **Watch Video Solution**

9. energy of one mol of photons whose frequency is $5 \times 10^{14} Hz$ is approximately equal to :

A. $199 kJmol^{-1}$

B. $174 kJmol^{-1}$

C. $150 kJmol^{-1}$

D. $300 kJmol^{-1}$

Answer: A

▶ **Watch Video Solution**

10. A 100 watt buble emits monochromatic light of wavelength 400 nm. Then the number of photons emitted per seccond by the buble is nearly -

A. 2×10^{20}

B. 2×10^{18}

C. 2×10^{16}

D. 2×10^{22}

Answer: A

▶ **Watch Video Solution**

11. M gram of a substance when vapourised occupies of 5.6 litre at NTP. The molar mass (in g/mol) of the substance will be :

A. $2M$

B. $4M$

C. 8M

D. 16M

12. The work function for a metal is 4eV. To emit a photoelectron of zero velocity from the surface of the metal, the wavelength of incident light should be :

A. 2700Å

B. 1700Å

C. 5900Å

D. 3100Å

13. Which of the following is not the basic postulates of Dalton's atomic theory ?

A. Each element is composed of extremely small particles called atoms

B. Atoms are neither created nor destroyed in a chemical reaction.

C. Atoms of all elements are alike, including their masses.

D. None of these

Answer: C

▶ **Watch Video Solution**

14. In photoelectric effect, the number of photoelectrons emitted is proportional to :

A. intensity of incident beam

B. frequency of incident beam

C. wavelength of incident beam

D. all of these

Answer: A

▶ **Watch Video Solution**

15. When α particle are sent through a this metal foil, most of them go straight through the foil because

A. *alpah* - particles are not much heavier than electrons.

B. α - particles are positively charged.

C. Most part of the atom is empty space.

D. *alpah* - particles move with slow speed.

Answer: C

16. What is the correct IUPAC name of the followsing compound ?
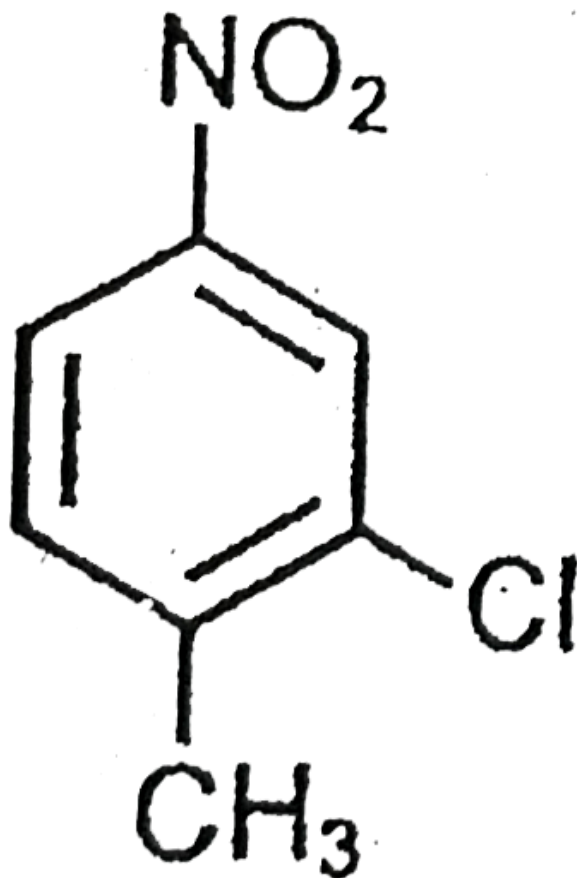
A. 2 - Chloro-1-methyl-4-nitrobenzene

B. 1-Chloro-2-methyl-5-nitrobenzene

C. 1-Chloro-6-methyl-3-nitrobenzene

D. 3-Chloro-4-methyl-1-nitrobenzene

Answer: A

▶ Watch Video Solution

---

17. What is the correct IUAC name of the following compound ?

$$CH_3{-}CH_2{-}N{\Large\langle}\begin{smallmatrix}H\\CHO\end{smallmatrix}$$
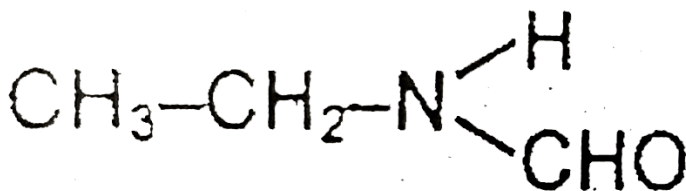
A. N-aldoethanamine

B. N-formylethanamine

C. N-ethylaminomathanal

D. N-ethylmethanamide

Answer: D

▶ **Watch Video Solution**

18. Which group is always used as substitudent in the IUPAC nomeclature ?

A. $-NH_2$

B. $-NO_2$

C. $-CN$

D. $-C| = O$

Answer: B

▶ **Watch Video Solution**

19. What is thecorrect IUPAC nasme of acetonitrille ?

A. Ethanenitrile

B. Cyanomethane

C. Methanenitrile

D. Cyanoethane

Answer: B

▶ **Watch Video Solution**

20. How many tetriary alcohols of formula $C_5H_{12}O$ are possible ?

A. 2

B. 1

C. 4

D. 5

Answer: B

21. Minimum number of carbon atoms required in an alkene to exhibit isomerism is

A. 2

B. 3

C. 4

D. 5

Answer: B

22. Esters are functional isomers of :

A. Carboxylic acid

B. Ketones

C. Diketones

D. Diols

Answer: A

▶ **Watch Video Solution**

---

23. An organic compound has molecular formula C_9H_{18}. It is a saturated hydrocarbon and its all hydrogen atoms are identical. Its structural formula can be :

(1) $CH_3 - CH_2 - CH - CH - CH_2 - CH_3$

A.

(2)

B.

C.

(4)

D.
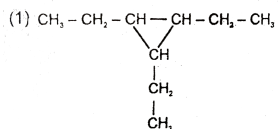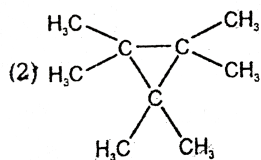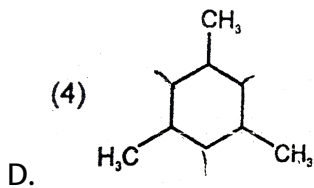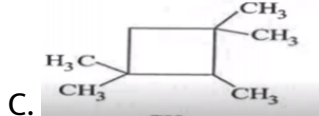
Answer: B

▶ **Watch Video Solution**

---

24. What is the relation in between o-cresol and anisol :

A. Positional isomer

B. Functional isomer

C. Metamers

D. Chain isomer

Answer: B

▶ Watch Video Solution

25. How many structural isomeric alkane of formula C_6H_{14} are possible

A. 3

B. 2

C. 5

D. 1

Answer: C

26. Which of the following posses allylic H-atom ?

A.

(1)

B.

(2)

C.

Cl
│
(3)
Br

D.

(4)
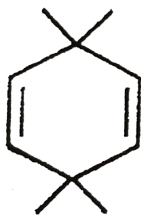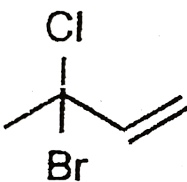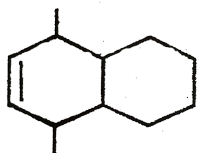
Answer: D

▶ **Watch Video Solution**

27. Which of the following is not isomers of C_8H_8O ?

A.

(1)

$$\overset{O}{\underset{C}{\|}}-CH_3$$

CH_3

B.

(2) CH_2-CHO

C.

(3) $CH=CH_2$

OH

D.

(4) $\overset{O}{\underset{C}{\|}}-H$

CH_3

Answer: A

28.

NH_2

C_2H_5

(I)

NH_2

CH_3

CH_3

(II)

$NH-CH_3$

CH_3

(III)

$H_3C-N-CH_3$
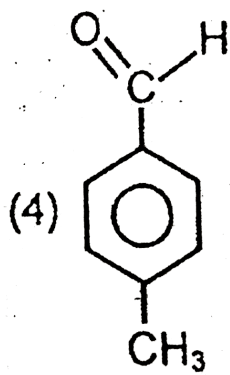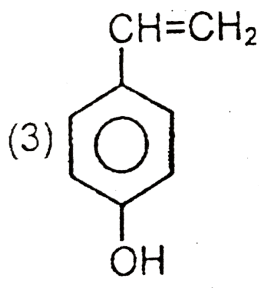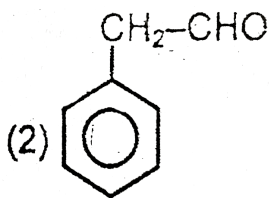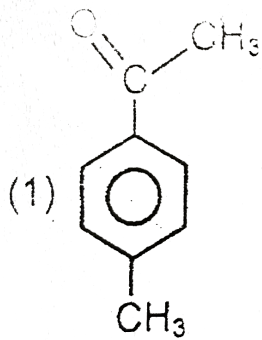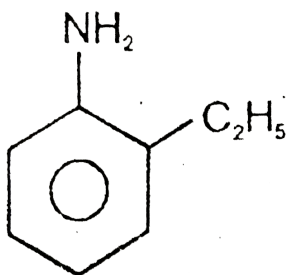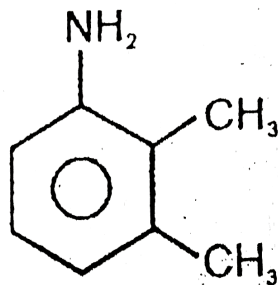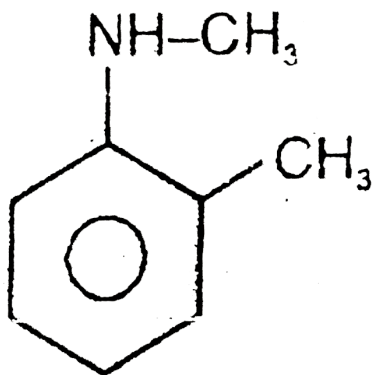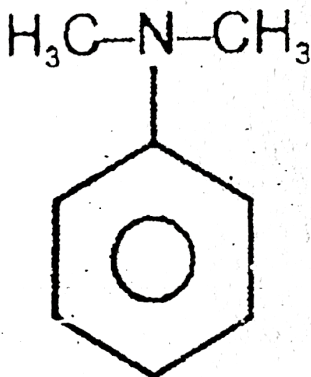
(IV)

(A) I & II are chain isomers

(B) I & III are functional isomers

(C) III & IV are metamers

(D) III & IV are functional isomers
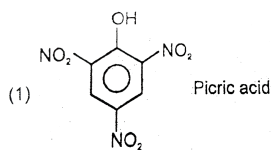
Incorrect statement is :

A. Only A & B

B. Only C

C. Only C & D

D. Only A & C

Answer: B

▶ Watch Video Solution

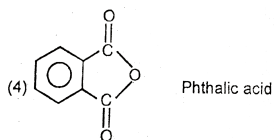**29.** Which of the following compound has incorrect common name ?

A.

(1) Picric acid

B.

(2) Trinitro toluene (TNT)

C. $CH_3 - COOH$ acetic acd

D.

(4) Phthalic acid

Answer: D

▶ Watch Video Solution

30. If H-atom of $3rd$ carbon is replaced by - COOH group in pentane - 1,5 -dioic acid. What will be the IUPAC name of the new compound ?

A. 3-Carboxy pentane -1,5 -dioic acid

B. Pentane -1,3,5 -trioicadic

C. Propane -1,2,3 -tricarboxylic acid

D. All are correct IUPAC name

Answer: C

▶ Watch Video Solution

31. A mixture of $HCl(g)$, $PCl_3(g)$ and $PCl_5(s)$ each have equal number of Cl-atom then their molar ratio in the mixture is :

   A. $1:3:5$

   B. $1:1:1$

   C. $15:2:3$

   D. $15:5:3$

Answer: D

32. "x" L of methane gas at STP contains 1.5×10^{21} molecules. The number of molecules in "x" L of sulphur diocide at STP will be :

   A. 3×10^{21}

B. 1.5×10^{21}

C. 6×10^{21}

D. 0.15×10^{21}

Answer: B

▶ Watch Video Solution

---

33. In a gasseous mixture, if alkane $\left(C_xH_{2x+2}\right)$ and alaene $\left(C_yH_{2y}\right)$ are taken in $2:1$ mole ratio, the average molecular weight of mixture is observed to be 20. If the same alkane and alkene are taken in $1:2$ mole ratio, the average molecular weight of mixture of mixture is observed to be 24. Then, the valule of 'x' and 'y' and respectively :

A. 2, 1

B. 1, 2

C. 2, 3

D. 3, 2

Answer: B

▶ **Watch Video Solution**

---

34. A gaseous mixture of H_2 and CO_2 gas contains 88 % by mass of CO_2. The vapour density of the mixture is :

A. 19.48

B. 11.5

C. 6.25

D. Cannot be determined

Answer: C

▶ **Watch Video Solution**

35. A graph is plotted for gas 'C' , by putting its weight (in gm) on X-axis and the Volume (L) of gas at NTP on Y-axis. Select the correct statement :

$\theta = \tan^{-1}(11.2)$
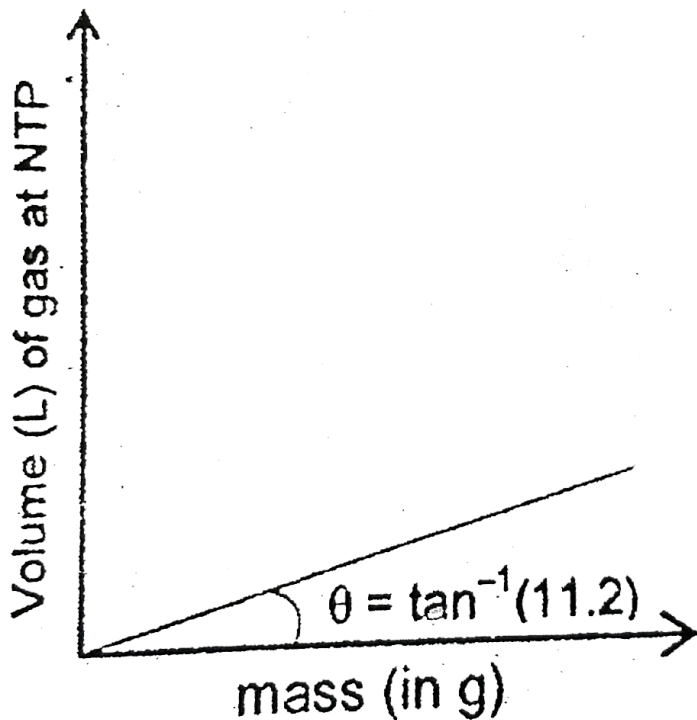
A. Atomic mass of gas is 2 amu.

B. Atomic mass of gas is 4 amu.

C. At NTP 5.6 L of gas will have mass equal to its molar mass.

D. At NTP 11.2 L of gas will have mass equal to its molar mass.

Answer: A

36. Given the visible green light has a wavelength of 510 nm then corresponding frequency and wave number are respectively $\left(C = 3 \times 10^8 ms^{-1}\right)$:

A. $5.8 \times 10^{14} Hz, 0.001 nm$

B. $6 \times 10^{16} Hz, 0.004 nm^{-1}$

C. $5.8 \times 10^{14} Hz, 0.001 nm^{-1}$

D. $5 \times 10^{12} Hz, 0.008 nm$

Answer: C

37. A blube emits light of $\lambda = 4500\text{Å}$. The bulb is rated as 150 watt and 8% of the energy is emitted as light. Number of photons emitted by bulb per second is : [Take$hc = 12400eV\text{Å}$]

A. 4.5×10^{19}

B. 5.4×10^{19}

C. 1.5×10^{19}

D. 2.7×10^{19}

Answer: D

▶ Watch Video Solution

38. In which of the following cases, the potential energy of the given particles decreases (under the given condition)

A. two proton are moving towards each other

B. one proton and one electron are moving away from each other

C. one proton and one electron move towards each other

D. two electrons are moving towards each other

Answer: C

▶ **Watch Video Solution**

39. 32 amu of Helium contains :

A. 8 mol of He atoms.

B. 5 He atoms.

C. 5 mol of He atoms.

D. 8 He atoms.

Answer: D

▶ **Watch Video Solution**

40. Identify the correct option for the order of specific charge of the given particles.

A. $n < \alpha < p < e$ (considering sign of charged particle)

B. $n < \alpha < p < e$ (not considering sign of charged particle)

C. $e < n < p < \alpha$ (considering sign of charged particle)

D. $n < e < \alpha < p$ (considering sign of chatged particle)

Answer: B

▶ Watch Video Solution

41. From a container having 64 g Oxygen, $11.2L$ Oxygen gas at STP and 6.022×10^{23} Oxygen atoms are removed. Find the mass of the oxygen gas left :

A. zero

B. 32 g

C. 16 g

D. none

Answer: B

▶ Watch Video Solution

---

42. Which of the following does not contain 32 g of oxygen ?

A. 2 mol of H_2O

B. 60 g of $C_6H_{12}O_6$

C. N_A molecules of CO_2

D. 60 g of urea, $NH_2 - C||O - NH_2$

Answer: D

▶ Watch Video Solution

43. A bulb of 1 watt power on working for 1 second emitted 2.0×10^{16} photons. The wavelength photons is nearly :

$\left(h = 6.62 \times 10^{-34} Js, c = 3 \times 10^8 ms^{-1}\right)$

    A. $2 \pm$

    B. $4nm$

    C. $9 \pm$

    D. $12nm$

Answer: B

▶ **Watch Video Solution**

---

44. Correct order is :

    A. X-rays $<$ UV rays $<$ Radio waves (energy)

B. Radio waves < Micro waves < Infra red rays (wave number)

C. Cosmic rays < γ- rays < X-rays (frequwncy)

D. All are correct

Answer: B

▶ Watch Video Solution

45. The maximum volume at STP is occupied by

A. 12.8 gram SO_2

B. 0.5 mole of NO_2

C. 6.023 × 10^{22} molecules of CH_4

D. 1gram molecules of CO_2

Answer: D

▶ Watch Video Solution

46. In which of the following pair of compounds having same general formula ?

A.

and

B.

and

C. $CH_3 - C \equiv C - CH_3$ and $CH_2 = CH - CH = CH - CH = CH_2$

D.

and
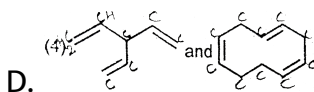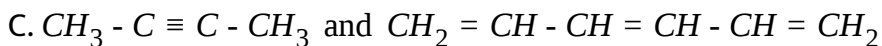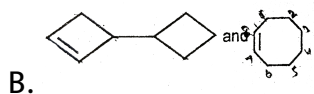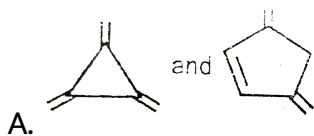
Answer: A

▶ **Watch Video Solution**

---

47. Which of the following has correct numering ?

A.

B.

(3)

(4)

C.

D.
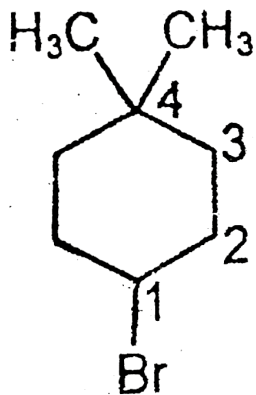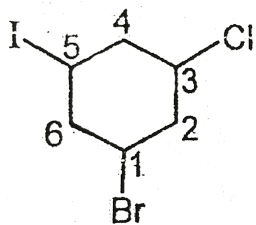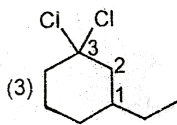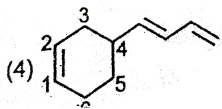
Answer: B

▶ Watch Video Solution

48. Which is correct IUPAC name of the following ?

A.
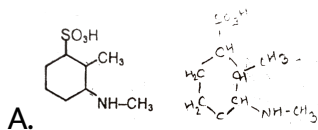
2-(-N-Methlamino)-2- methylcyclohexanesulphonic acid

B.

3-(2-Hydroxyethyl)cyclohexanol

C. $CH_3 - C \mid EtH - \overset{\overset{O}{\mid\mid}}{C} - C \mid CH_3H - NH_2$
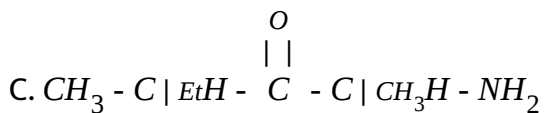
2-Amino-4-ethyl pentan-3-one

D.
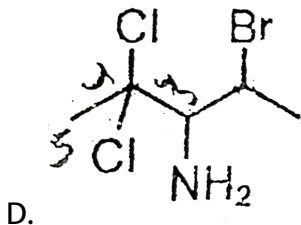
2-Bromo-4,4-dichloropentan-3-amine

Answer: B

49. Hex-2-en-4ynioic acid is :

A. $CH_3 - C \equiv C - CH_2 - CH = CH - \overset{\overset{O}{||}}{C} - OH$

B. $HC \equiv C - CH_2 - CH = CH - \overset{\overset{O}{||}}{C} - OH$

C. $CH_3 - C \equiv C - CH = CH - CH_2 - \overset{\overset{O}{||}}{C} - OH$

D. $CH_3 - C \equiv C - CH = CH - \overset{\overset{O}{||}}{C} - OH$
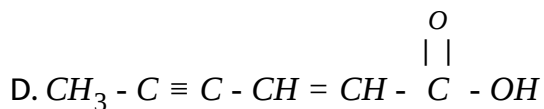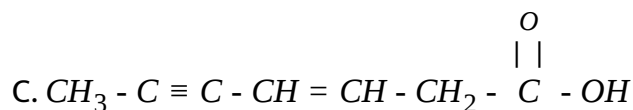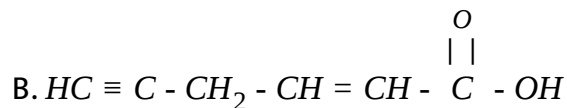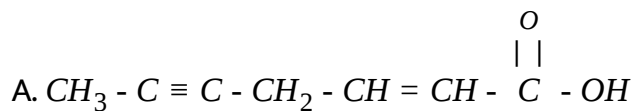
Answer: D

50. Which of the following common name incorrect ?

A. $CH_3 - \overset{\overset{O}{||}}{C} - CH_3$ (Acentone)

B. $Ph - CH = CH - COOH$ (Cinnamic acid)

C. $Ph - \overset{\overset{O}{||}}{C} - Ph$ (Benzoketone)

D. $Ph - \overset{\overset{O}{||}}{C} CH_3$ (Acetophenone)
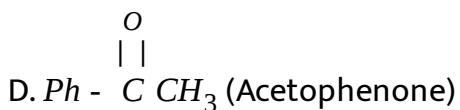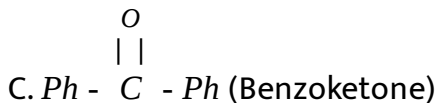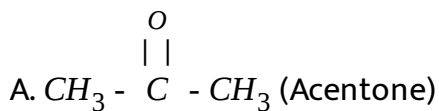
Answer: C

▶ **Watch Video Solution**

---

51. Which of the following IUPAC name correctly matched ?

A. - Benzenamide

B. - N-Dimethyl ethanamide

C. - Benzenoyl chloride

D. - Cyclopentane carbaldehyde
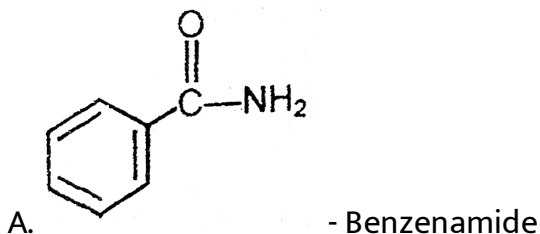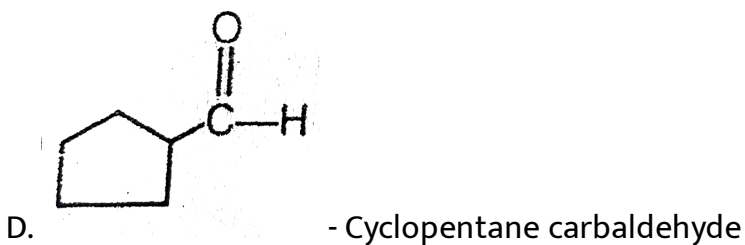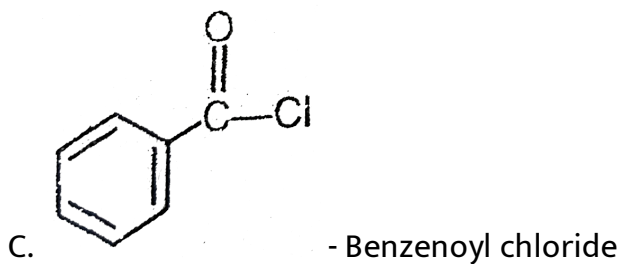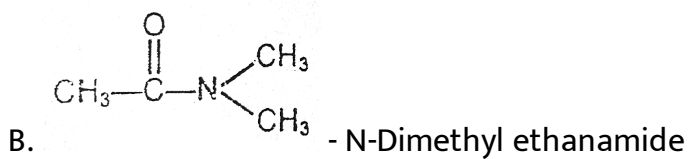
Answer: D

▶ **Watch Video Solution**

---

52. Which of the following IUPAC name is incorrectly matched ?

A. $CH_3 - \overset{\overset{O}{||}}{C} - CH_2 - \overset{\overset{O}{||}}{C} - OH$

3-Oxobutanoic acid

B. $CH_3 - C | CH_3H - CH_2 - CH_2 - CHO$

4-Methylpentanal

C. $HO - \overset{\overset{O}{||}}{C} - CH_2 - CH_2 - \overset{\overset{O}{||}}{C} - H$
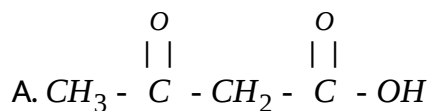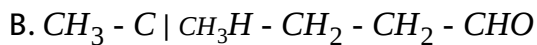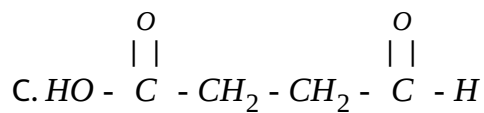
3-Formylpropanoic acid

D. $CH_3 - C | BrH - C | PhH - CH_2 - CN$
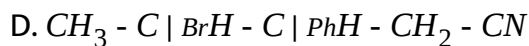
3-Phenyl-4-bromopentaniteile

Answer: D

▶ Watch Video Solution

53. What is the IUPAC name of
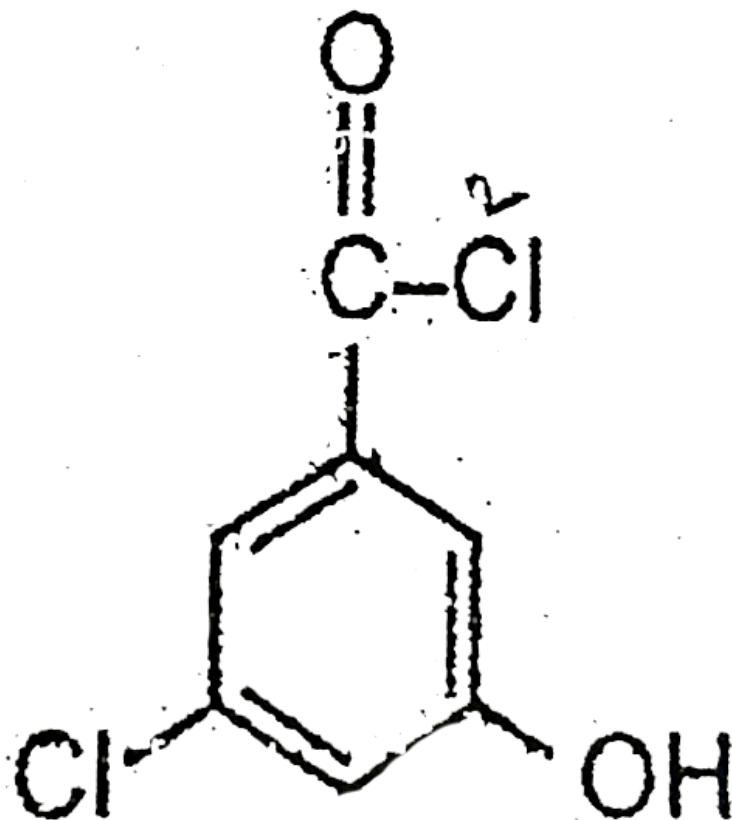
A. 5-Chloro-3-hydroxybenzencarbonyl chloride

B. 3-Hydroxy-5-chlorobenzenecarbonyl chloride

C. 3-Chloro-5-hydroxybenzenecarbonyl chloride

D. 1-Chlorocarbonyl-3-chlorobenzene-1-ol.

Answer: C

---

54. Which of the following is vinylic bromide ?

A. $CH_2 = CH - CH_2 - Br$

B. $CH_2 = CH - Br$

C. $CH_2 = CH - C|_{Br}H - CH_3$

D.

Answer: B

---
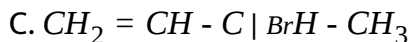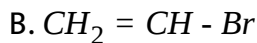
55. IUPAC name of name of the given compound is :

$$H - \overset{O}{\overset{||}{C}} - CH_2 - C|_{CH_2}|_{CH_3}H - C \equiv N$$
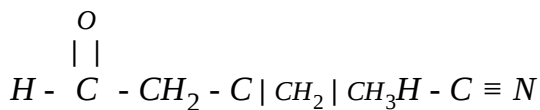
A. 3-Carbonitrile-3-ethylbutanal

B. 3-fromyl-2-ethylpropanenitrile

C. 3-Cyano-3-ethylbutanal

D. 2-Ethyl-4-oxobutanenitrile

Answer: D

▶ Watch Video Solution

56. Which functionai group is absent in the given compound ?
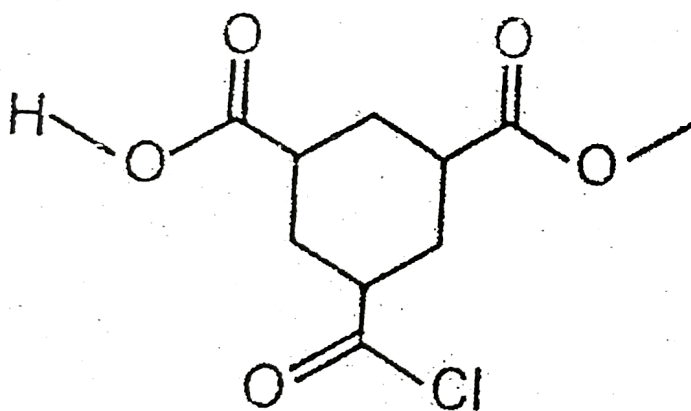
A. Ester

B. Acid halide

C. Ketone

D. Carboxylic acid

Answer: C

▶ **Watch Video Solution**

---

57. The correct IUPAC name of the compound is :
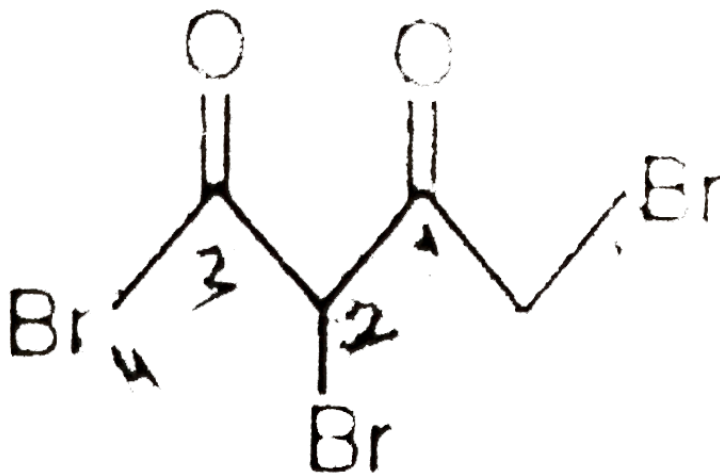
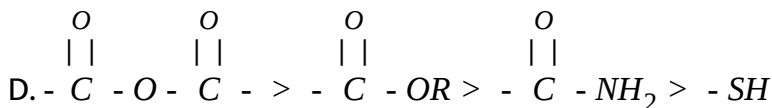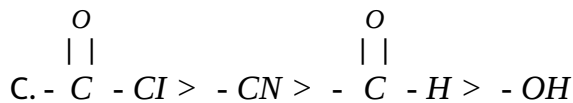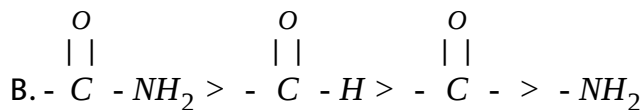A. 1,2,3-Tribromobutane-1,3-dione
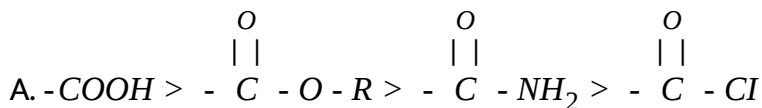
B. `2,4-Dibromo-3-oxobutanamide

C. 1,3-Dioxobutane-1,2,4-tribromo

D. 1,3,4-Triaminobutane-2,4-dione

Answer: B

▶ Watch Video Solution
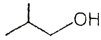
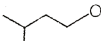58. Which of the following is incorrect priority order of functional groups ?

A. $-COOH > \overset{\overset{O}{||}}{-\ C}\ -O-R > \overset{\overset{O}{||}}{-\ C}\ -NH_2 > \overset{\overset{O}{||}}{-\ C}\ -CI$

B. $-\overset{\overset{O}{||}}{C}\ -NH_2 > -\overset{\overset{O}{||}}{C}\ -H > -\overset{\overset{O}{||}}{C}\ - > -NH_2$

C. $-\overset{\overset{O}{||}}{C}\ -CI > -CN > -\overset{\overset{O}{||}}{C}\ -H > -OH$

D. $-\overset{\overset{O}{||}}{C}\ -O-\overset{\overset{O}{||}}{C}\ - > -\overset{\overset{O}{||}}{C}\ -OR > -\overset{\overset{O}{||}}{C}\ -NH_2 > -SH$

Answer: A

---

59. Which of the following is incorrect common names ?

A. (1) Sec-butyl alcohol. **Sec-butyl alcohol.**
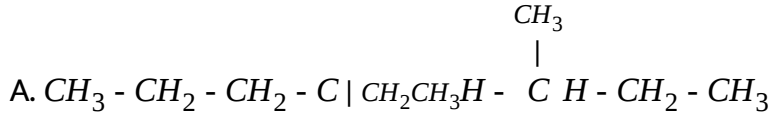
B. (2) Neopentyl amine **Neopentyl amine**

C. (3) Isopentyl alcohol **Isopentyl alcohol**
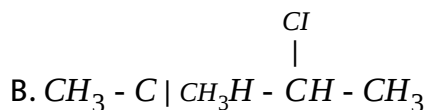
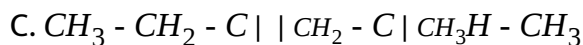D. Ethyl methyl ketone **Ethyl methyl ketone**

Answer: A

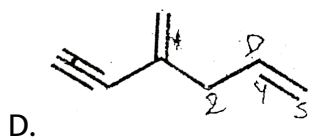60. Name of some compounds are given. Which one is not correct IUPAC name.

A. $CH_3 - CH_2 - CH_2 - C|_{CH_2CH_3}H - \overset{\overset{\displaystyle CH_3}{|}}{C}H - CH_2 - CH_3$

3-Methyl-4-ethyleptane

B. $CH_3 - C|_{CH_3}H - \overset{\overset{\displaystyle CI}{|}}{C}H - CH_3$

2-Chloro-3-methylbutane

C. $CH_3 - CH_2 - C||CH_2 - C|_{CH_3}H - CH_3$

2-Ethyl-3-methylbut-1-ene

D.

4-Methylenehept-1-en-6-yne

Answer: A

▶ Watch Video Solution

61. A sample of C_xO_y having 3×10^{19} molecules is weighing $3.4mg$.

Then the value of x and y is respectively .... $\left(TakeN_A = 6 \times 10^{23} \right)$

A. 1, 2

B. 3, 2

C. 2, 2

D. 5, 2

Answer: B

62. What is the vapour density of SO_3 w.r.t. CH_4?

A. 4

B. 5

C. 8

D. 9

63. An organic compound has

$\% C = 68.85$, $\% H = 4.92$ and $\% O = 26.23$ (by mass). Number of

carbon atoms present in the Empirical Formula of it is ....

A. 5

B. 6

C. 7

D. 2

64. Mn_3O_4 when heated with Al powered, gets reduced to produced Mn metal and AI_2O_3. If at least $612 g of AI_2O_3$ and $825 g of Mn$ are to be produced, the minimum amount of Mn_3O_4 and Al required is respectively :

A. $1030.5g, 324g$

B. $1145g, 360g$

C. $1030.5g, 406.5g$

D. $1145g, 234g$

Answer: B

▶ Watch Video Solution

65. In a hydrogen (H) sample on excitation electron jumps into n^{th} energy level and comes back to its ground energy level giving 6 different spectrum lines. Determine value of n.

A. 4

B. 5

C. 3

D. 2

Answer: A

▶ Watch Video Solution

66. Energy of an emitted photon with wavelength $620nm$ is :

A. $1eV$

B. $2eV$

C. $1.5eV$

D. $2.5eV$

Answer: B

67. In $Se(Z = 34)$ how many electrons are present with $m_l = 2$?

    A. 20

    B. 4

    C. 2

    D. None of these

Answer: C

68. A 2 mg sand particle is blown with a speed of $50 m/\sec$ what is the its de Broglie's wavelength ?

    A. $3.31 \times 10^{-30} m$

B. $3.31 \times 10^{-15} m$

C. $6.62 \times 10^{-30} m$

D. $6.62 \times 10^{-15} m$

Answer: C

▶ Watch Video Solution

69. In the balanced reaction :

$$aNO_3^- + bCI^- + cH^+ \rightarrow dNO + eCI_2 + fH_2O$$
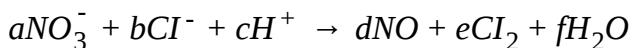
a, b, c, d, e and f are lowest possible integers. The value of $a + b$ is :

A. 6

B. 8

C. 4

D. 10

Answer: B

70. $100 g$ of $90°$ pure sample of $CaCO_3$ on strong heating produces how many litre of CO_2 at NTP ?

A. $22.4L$

B. $20.16L$

C. $19.32L$

D. $21.2L$

Answer: B

71. Which of the following reactions is not a disproportination reaction ?

A. $NaOH + NO_2 \rightarrow NaNO_2 + NaNO_3 + H_2O$

B. $NaOH + Cl_2 \rightarrow NaCl + NaClO_3 + H_2O$

C. $NaOH + S \rightarrow Na_2S + Na_2S_2O_3 + H_2O$

D. $NaOH + F_2 \rightarrow OF_2 + NaF + H_2O$
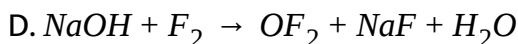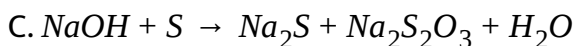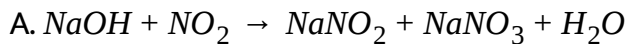
Answer: D

▶ **Watch Video Solution**

---

72. If $500mL$ of a $5M$ solution is diluted to $1500mL$, what will be the molarity of the solution obtained ?

A. $1.5M$

B. $1.66M$

C. $0.017M$

D. $1.59M$

Answer: B

▶ Watch Video Solution

73. 1 M NaOH solution was slowly added in to 1000 mL of 183.75 g impure H_2SO_4 solution and the following plot was obtained. The percentage purity of H_2SO_4 sample and slope of the curve

respectively   are:
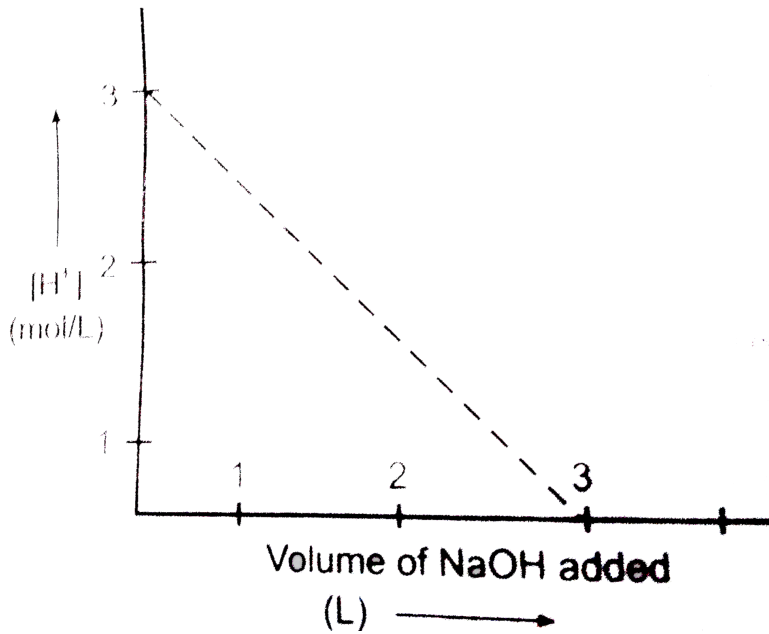
A. 75 %

B. 60 %

C. 80 %

D. None of these

Answer: C

▶ Watch Video Solution

74. What is the increase in volume, when the temperature of $600mL$ of air increases from $27\,^{\circ}C$ to $47\,^{\circ}C$ under constant pressure?

A. $80mL$

B. $40mL$

C. $640mL$

D. $500mL$

Answer: B

▶ Watch Video Solution

---

75. Which of the following graph ploltted between P and V is INCORRECT ?

(1) P

V ⟶

(Constant T,n)

A.

(2) P

T₃
T₂
T₁

V ⟶
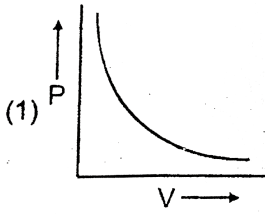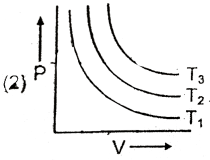
B. $T_1 > T_2 > T_3$ (Constant n)

(3) PV

V ⟶

(Constant T,n)

C.
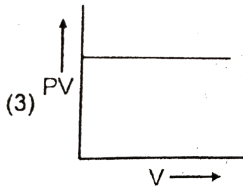
D. None of these

Answer: B

▶ Watch Video Solution

76. In the given structure of diazomethane CH_2N_2 :

$$CH_2N_2.$$

$$\begin{array}{c} H \\ \diagdown \\ H \diagup \end{array} C=N=\overset{\cdot\cdot}{\underset{}{N}}\colon$$
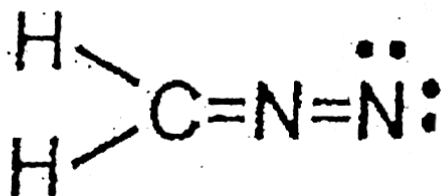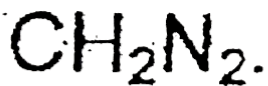
What is the formal charge on central N-atom ?

A. $+1$

B. $+2$

C. $+3$

D. $+4$

Answer: A

▶ Watch Video Solution

77. What is the chemical name of $\left(NH_4\right)_2 PbO_2$?

    A. Ammonium plumbite

    B. Diammonium plumbite

    C. Ammonium plumbate

    D. Diammonium plumbate

Answer: A

▶ **Watch Video Solution**

78. Which of the following name is incorrectly matched ?

    A. H_2O - Dihydrogen monoxide

    B. SO_2 - Sulpur dioxide

    C. $HOCI$ - Chlorous acid

    D. H_3PO_3 - Phosphorous acid

Answer: C

79. Which of the following is correct inceasing order of oxidation number of chlorine in the given compounds ?

I - Sodium chlorite

II - Sodium hypochlorite

III - Sodium perchlorate

IV - Sodium chlorate

    A. $I < II < III < IV$

    B. $I < II < IV < III$

    C. $II < I < III < IV$

    D. $II < I < IV < III$

Answer: D

80. In the correct Lewis dot structure of CO_2, the total number of

lone pairs are :

A. 0

B. 1

C. 2

D. 4

Answer: D

81. Which of the following is endothermic process :

A. $CI(g) + e^- \rightarrow CI^-(g)$

B. $S^-(g) + e^- \rightarrow S^{2-}(g)$

C. $Na^+(g) + e^- \rightarrow Na(g)$

D. $O^{2-}(g) \rightarrow O^- + e^-$
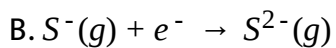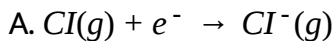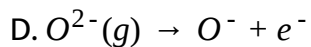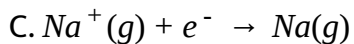
Answer: B

82. Select the matching with respect to bonding :

A. $NaBr$ - Electrovalent bond (Ionic bond)

B. Na_2SO_4 - Electrovalent and covalent bond

C. Sodium amalgum - Matallic bond

D. CH_3 - Br - Electrovalent bond (Ionic bond)

Answer: D

83. What is the correct order of 2nd ionisation energy ?

A. $F < N < C < O$

B. $N < C < F < O$

C. $C < N < F < O$

D. $O < C < F < N$
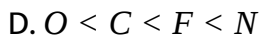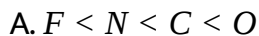
Answer: B

▶ Watch Video Solution

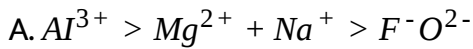**84.** Which of the following oxy anion is metaborate ion ?

A. BO_3^{3-}

B. BO_2^{-}

C. $B_2O_7^{4-}$

D. $B_2O_5^{4-}$
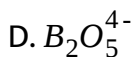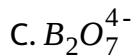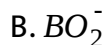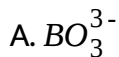
Answer: D

85. The correct sequence which shown decreasiong order of the ionic radii of the elements is :

A. $AI^{3+} > Mg^{2+} + Na^+ > F^-O^{2-}$

B. $Na^+ > Mg^{2+} > AI^{3+} > O^{2-} > F^-$

C. $Na^+ > F^-Mg^{2+} > O_{2-} > AI^{3+}$

D. $O^{2-} > F^-Na^+ > Mg^{2+} > AI^{3+}$
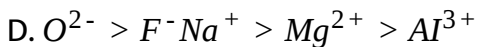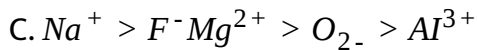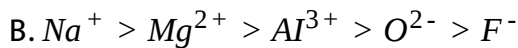
Answer: D

86. The element which shows both positive & negative oxidation state is :

    A. Li

    B. Mg

    C. He

    D. H

Answer: A

▶ Watch Video Solution

---

87. Choose the correct option about following statement.

S_1 : first ionization energy of magesium is less than that aluminium.

S_2 : CIO_3^-, CIO_4^-, MnO_4^{2-}, SO_4^{2-}, ZnO_2^{2-}, BO_3^{3-} all these anions have suffix - 'ate'.

S_3 : Increasing order of negative electron gain enthalpy of 17th group element is $I < Br < F < CI$

A. F T

B. T T

C. FFT

D. FTF

Answer: A

▶ Watch Video Solution

---

88. Which of the following compound is possible :

A. PbI_4

B. AlO_2

C. NaF_2

D. PbO_2

Answer: D

▶ Watch Video Solution

89. Which of the following compound obey octet rule :

A. CO_2

B. SF_6

C. PCl_5

D. SO_3

Answer: A

▶ Watch Video Solution

90. Which has least number of atoms ?

A. $1gmO$

B. $1gmO_2$

C. $1gmO_3$

D. $1gmF_2$

Answer: D

▶ Watch Video Solution

91. The volume of ascetylene at NTP produced by reaction of $50gm$ of CaC_2 with water is : $CaC_2 + H_2O \rightarrow Ca(OH)_2 + C_2H_2$

A. $10L$

B. $17.5L$

C. $26.25L$

D. $35L$

92. What is the ratio of minimum to maximum wavelength of radiation emitted by electron when it jump from as higher state to ground state in Li^{2+} ion ?

A. $\dfrac{1}{4}$

B. $\dfrac{8}{9}$

C. $\dfrac{3}{4}$

D. $\dfrac{1}{9}$

93. Which of the following statement is incorrect ?

A. Two charged particles having the same mass and accelerasted through same potential difference from rest will have always same value of de-Broglie wavelength.

B. Heisenberg's uncertainty principle is more significant for microscopic particles than for macroscopic particles.

C. The value of wavelength of photons emitted, when an electron in a H like sepcies makes transition from a higher orbit, can be calculated both by using $\lambda = \dfrac{hc}{\Delta E}$ and by Rydberg's formula, where ΔE is difference in energy of two orbits.

D. The radius of the nucles of an atom is directly proportional to the cube root to mass number of that atom.

Answer: A

Watch Video Solution

94. Which of the following graph represents Boyle's law ?

A.

(1)

B.

(2)

C.

(3)
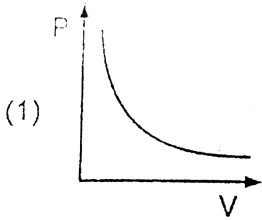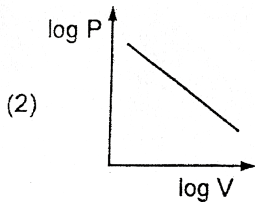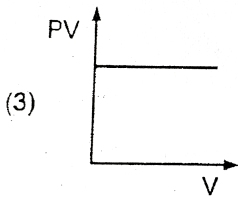
D. All of these

Answer: D

95. Equal moles of each of SO_3, CO_2O_2 and H_2 are kept in a container. A hole is made in the container and gasses are allowed to effuse. After 5 minutes the order of partial pressure of each gas in the container would be :

A. $SO_3 > CO_2 > O_2 > H_2$

B. $SO_3 > O_2 > CO_2 > H_2$

C. $H_2 > O_2 > CO_2 > SO_3$

D. $H_2 > O_2 > SO_3 > CO_2$

Answer: A

▶ Watch Video Solution

96. Kinetic energy per mole of an ideal gas is :

A. directly proportional to its absolute temperature.

B. inversely proportional to its absolute temperature.

C. independent of temperatuer.

D. zero at $0\,^\circ C$.

Answer: A

▶ Watch Video Solution

97. The kinetic energy for electron of Li^{2+} is given by following expression (Where symbols have usual meanning) :

A. $\dfrac{3Ke^2}{r}$

B. $\dfrac{3Ke^2}{2r}$

C. $\dfrac{2Ke^2}{r}$

D. $\dfrac{Ke^2}{r}$

Answer: B

98. When a more intense beam of light is passed during photoelectric effect then :

A. Number of electrons elected is less and their kinetic energy is also less.

B. Number of electrons ejected is more and their kinetic energy is less.

C. Number of electrons ejected is more and their kinetic energy is constant.

D. Number of electrons ejected is less and their kinetic is more.

Answer: C

99. A hypothetical of element X with mass number 40, posses 2 units of positive charge and 23 % more neutrons than electrons. Symbol of the ion is :

A. $_{-}(20)^{40}X^{+2}$

B. $_{-}(19)^{40}X^{+2}$

C. $_{-}(18)^{40}X^{+2}$
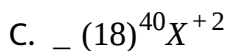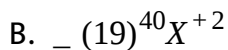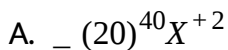
D. None of these

Answer: B

▶ **Watch Video Solution**

100. Among the following orbitals which orbital will have maximum value of orbital angular momentum ?

A. $3s$

B. $4p$

C. $5d$

D. $6f$

Answer: D

▶ **Watch Video Solution**

---

101. Density of a gas is found to be $4gm/dm^3$ at $27°C$ and 2 bar pressure. It density at STP will be :

A. $1.80gm/dm^3$

B. $2.22gm/dm^3$

C. $3.10gm/dm^3$

D. $1.65gm/dm^3$

Answer: B

▶ **Watch Video Solution**

102. The total pressure exerted by a mixture of $8gm$ of dioxygen and $4gm$ of dihydrogen confined in a closed vessel of $1Lat27°C$ is :

    A. $40.01atm$

    B. $45.23atm$

    C. $50.56atm$

    D. $55.35atm$

Answer: D

▶ Watch Video Solution

---

103. A compound contains 4.2% hydrogen, 24.2% carbon and 71.6% chlorine by mass. Its molar mass is $98.96gm/mol$. Empirical formula of compound is :

    A. CH_2CI

B. $C_2H_4Cl_2$

C. $C_2H_2Cl_2$

D. $C_4H_4Cl_4$
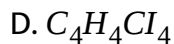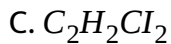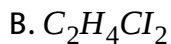
Answer: A

104. Electronic configuration of $._{29}Cu$ in ground state is :

A. $[Ar]3d^9, 4s^2$

B. $[Ar]3d^{10}, 4s^1$

C. $[Ar]3d^{10}, 4s^2$

D. $[Ar]3d^9, 4s^1$
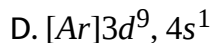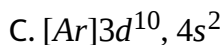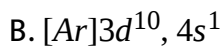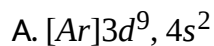
Answer: B

105. Consider the isoelectronic series , $K^{\oplus}, S^{2-}, Cl^{\ominus}, Ca^{2+}$, the radii

of the ions decrease as

A. $Ca^{2+} > K^+ > CI^- > S^{2-}$

B. $CI^- > S^{2-} > K^+ > Ca^{2+}$

C. $S^{2-} > CI^- > K^+ > Ca^{2+}$

D. $K^+ > Ca^{2+} > S^{2-} > CI^-$
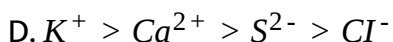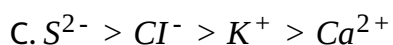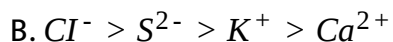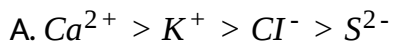
Answer: C

▶ **Watch Video Solution**

106. What is the chemical name of $\left(NH_4\right)_2 PbO_2$?

A. Ammonium plumbite

B. Diammonium plumbite

C. Ammonium plumbate

D. Diammonium plumbate

Answer: A

▶ Watch Video Solution

---

107. Names of which of the following end in-ous acid ?

A. H_2SO_4

B. H_3BO_3

C. HNO_2

D. $HCIO_3$

Answer: C

▶ Watch Video Solution

108. Which of the following is false statement ?

    A. The bond formed between two non metal atoms is covalent bond.

    B. The bond formed between a metal and a non-metal is electrovalent bond.

    C. The bond formed between two metal atoms is covalent bond.

    D. The bond formed between two metal atoms is metallic bond.

Answer: C

▶ Watch Video Solution

109. In which of the following molecules does the central atom not follow the octet rule?

    A. CH_4

B. PH_3

C. BF_3

D. CO_2

Answer: C

▶ Watch Video Solution

---

110. How many monochloro structural products are obtained by

A. 2

B. 4

C. 5

D. 6
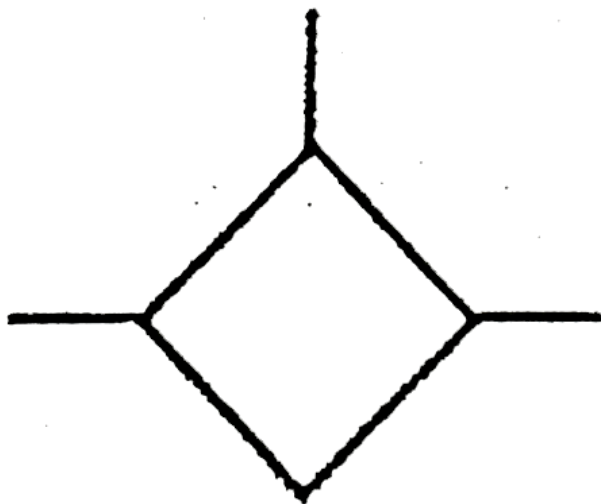
Answer: C

▶ Watch Video Solution

111. What are the radii shown 'a' and 'b' in the figure known as ?
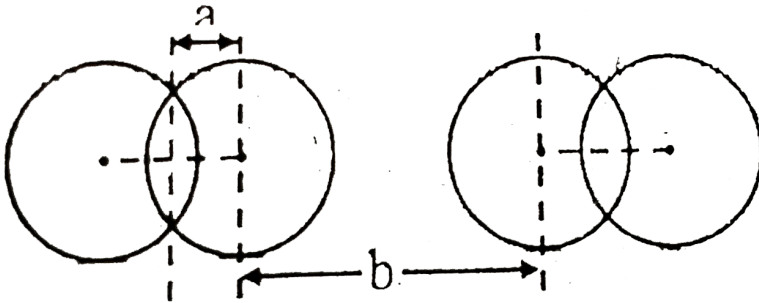
A. a = atomic radius, b = molecular radius

B. a = covalent radius, b = Vander Waal's radius

C. a = covalent radius,b = atomic radius

D. a = Ionic radius, b = convalent radius

Answer: B

▶ Watch Video Solution

(A)   →   (B)

OH
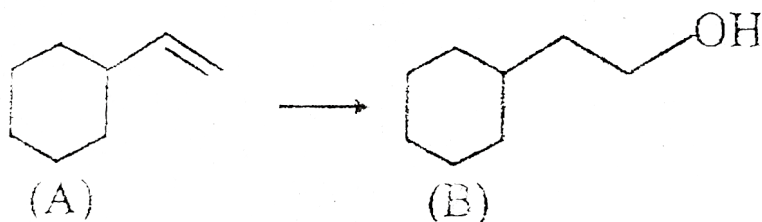
112.

Reagent used is :

A. $Hg(OAC)_2/NaBH_4 \cdot NaOH$

B. $BH_3 \cdot THF/H_2O_2 \cdot NaOH$

C. $LiAIH_4/H_2O$

D. All of these

Answer: B

113. Which of the following si incorrect option for (P) in the given

reaction sequence (P) Unsaturated Hydrocarbon $\xrightarrow[\text{(excess)}]{H_2/Ni}$ (Q)

Saturated structural products.

A. $CH_3 - C \underset{\underset{\displaystyle CH_3}{|}}{\overset{\overset{\displaystyle CH_3}{|}}{}} - C \equiv CH$

(2)

B.

(3)

C.

D. $CH_2 = CH - \underset{\underset{\displaystyle }{|}}{\overset{\overset{\displaystyle CH = CH_2}{|}}{C}} H - CH = CH_2$

Answer: B

---
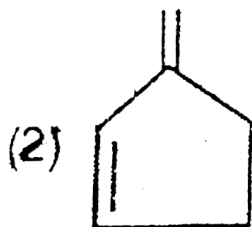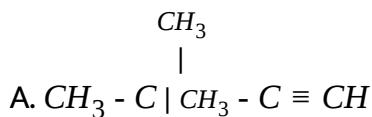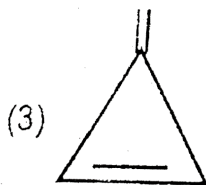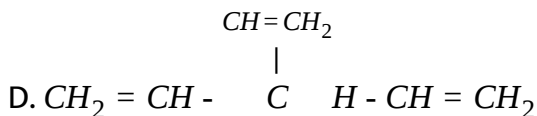
114. Which of the following has Meta Prefix :

A. H_3BO_3

B. H_3PO_4

C. H_2CO_3

D. HPO_3

Answer: D

---
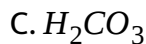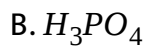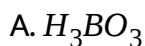
115. An organic compound $(P)C_4H_6$ forms a precipitate with Tolles regent. (P) has an isomer (Q) which on Reductive ozonolysis forms

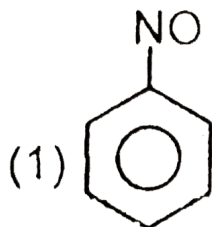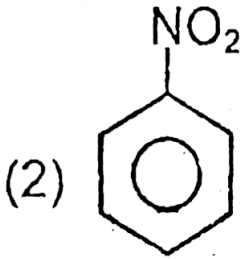only one product. (P) and (Q) are :
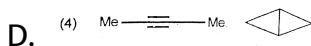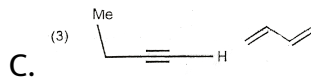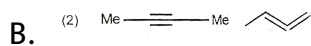
A. (1) Me ‖ ═ —H ▭

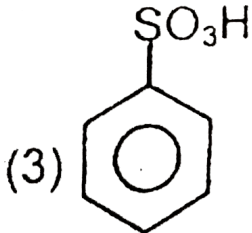B. (2) Me—═—Me ⌇

C. (3) Me ‖ ═ —H ⌇

D. (4) Me—═—Me ◁▷

Answer: A

▶ View Text Solution

---

116. $CaC_2 + H_2O \rightarrow (P) \xrightarrow{\text{Red hot Fe Tube}} (Q) \xrightarrow{Conc.HNO_3 + Conc.H_2SO_4} (R)$

Final product (R) is :

A. (1)

NO

(2)

B.

SO$_3$H

(3)

C.

(4)

D.

Answer: B

▶ Watch Video Solution

117. ,
$$\xrightarrow{\quad Hg(Oac)_2.H_2O \quad} NaBH_4 \quad (P)$$
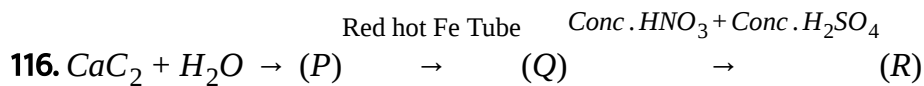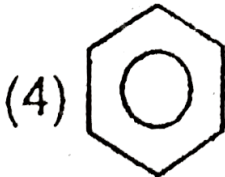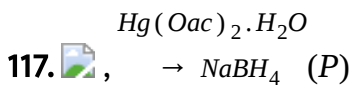
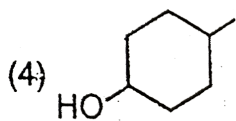P in the following reaction :

A.
(1)

B.
(2)

C.
(3)

D.
(4)
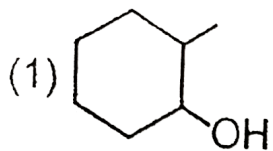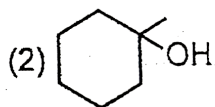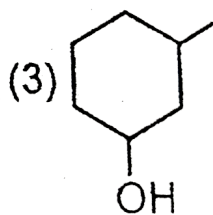
Answer: B

▶ **View Text Solution**

118. Which statement is incorrect ?

A. Pb^{4+} salts are batter oxidising agent.

B. Tl^{3+} salts are better reducing agent.

C. BiF_5 and TlI_3 both compounds exist.

D. PbI_4 is less stable than PbI_2

Answer: B

▶ Watch Video Solution

119. Select the incorrect matching with respect to bonding :

A. $NaBr$ - Electrovalent bond (Ionic bond)

B. Na_2SO_4 - Electrovalent and covalent bond

C. Sodium amalgum - Matallic bond

D. CH_3 - Br - Electrovalent bond (Ionic bond)

Answer: D

120. For chromium element, how many electrons can have

$n + l + |m| = 4$, with clockwise spin in ground state ?

A. 2

B. 3

C. 4

D. 6

Answer: B::C

121. Which of the following molarity values of ions is/are correct for a

aqueous solution which contain $5.85 \% \, w/vNaCI$, $5.55 \% \, w/vCaCI_2$

and $6 \% \, w/vNaOH$.

A. $\left[CI^-\right] = 2M$

B. $\left[Na^+\right] = 1M$

C. $\left[Ca^{2+}\right] = 0.5M$

D. $\left[OH^-\right] = 1.5M$

Answer: A::C::D

122. Which of the following statement(s) is/are correct ?

A. Surfacetension vanishes at critical point.

B. All the physical properties of liquid and gaseous state of a
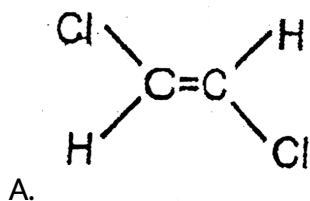substance becomes identical at critical point.

C. For a gas there is no distanction between liquid and vapour
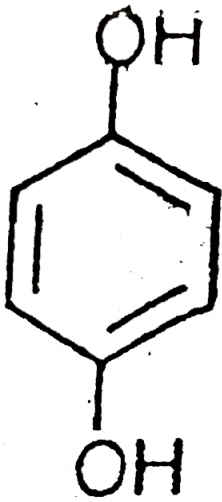state at critical point.

D. Easily liquefiable gases have higher Boyle's temperature while the gases difficult to liquefy have lower Boyle's temperature.
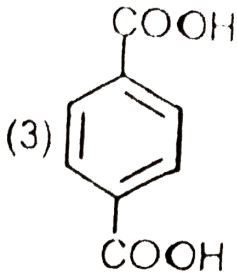
Answer: A::B::C::D

▶ **Watch Video Solution**

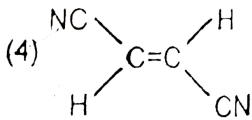**123.** Which of the following is/are nonpolar ($\mu = 0$) ?
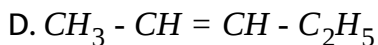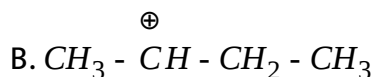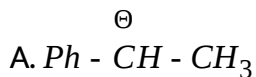

A.

B.

(3)

C.

(4)

D.

Answer: A::D

▶ Watch Video Solution

124. Which of the following species is/are stabilised hyperconjugation ?

A. $Ph - \overset{\ominus}{CH} - CH_3$
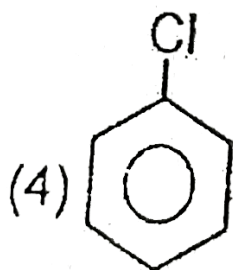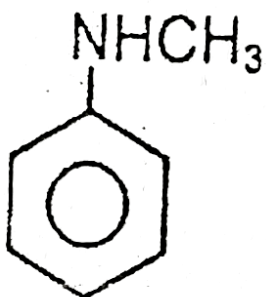
B. $CH_3 - \overset{\oplus}{CH} - CH_2 - CH_3$

C.

D. $CH_3 - CH = CH - C_2H_5$

Answer: B::C::D

▶ **Watch Video Solution**

---

125. Which of the following compound/s have more electron density

$$\xrightarrow[NaBH_4]{Hg(OAc)_2.H_2O} (P)$$

than

OCH₃

A.

NHCH₃

B.

COCH₃

C.

Cl

(4)

D.

Answer: A::B

---
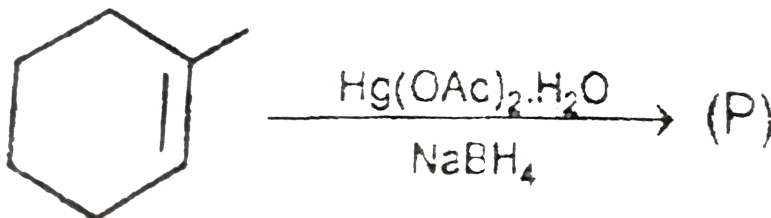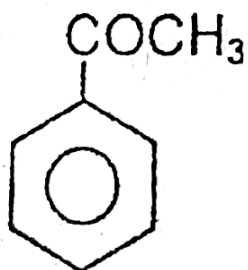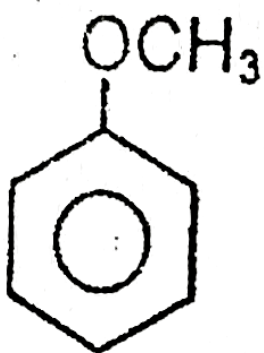
126. The Boyle temperature of a van der Waal gas is $-246\,^{\circ}C$. Its critical temperature on absolute temperature scale is :

A. $5K$

B. $7K$

C. $8K$

D. $10K$

Answer: C

---

127. Which of the following is not an intensive property ?

A. Heat capacity

B. Temperature

C. Specific volume

D. Molar mass

Answer: A

▶ Watch Video Solution

128. A balloon is filled with Hydrogen at room temperature. It will burst if pressure is 0.2 bar. If at 1 bar pressure the gas occupies $2.27L$ volume, at which volume balloon will burst ?
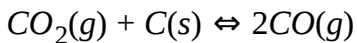
A. $11.35L$

B. $10.5L$

C. $1.46L$

D. $4.54L$

Answer: A

129. The value of K_p for the reaction

$$CO_2(g) + C(s) \Leftrightarrow 2CO(g)$$

is 3.0 bar at 1000K. If initially $P_{CO_2} = 0.48$ bar, $P_{CO} = 0$ bar and pure graphite is present then determine equilibrium partial pressue of CO and CO_2 .

A. $P_{CO} = 0.15, \bar{P}_{CO_2} = 0.66$

B. $P_{CO} = 0.66, \bar{P}_{CO_2} = 0.15$

C. $P_{CO} = 0.33, \bar{P}_{CO_2} = 0.66$

D. $P_{CO} = 0.66, \bar{P}_{CO_2} = 0.33$

Answer: B

130. Determine the degree of association (polymerzation) for the reaction in aqueous solution, if observed (mean) molar mass of HCHO and $C_6H_{12}O_6$ is `150 :

A. 0.50
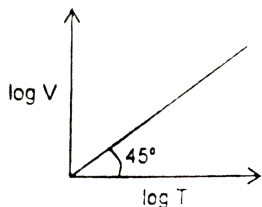
B. 0.33

C. 0.80

D. 0.96
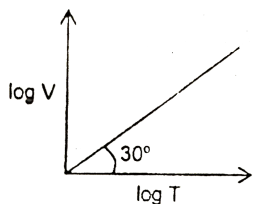
Answer: D

▶ Watch Video Solution

131. For a closed container containing 100 mol of an ideal gas fitted with movable, frictionless, weightless piston operating such that pressure of gas remain constant at 8.21 atm, which graph repsents

correct variation of log V v/s log T where V is in litre and T is in Kelvin

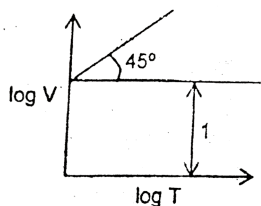$? \left(R = 0.0821 \dfrac{atmL}{molK} \right)$
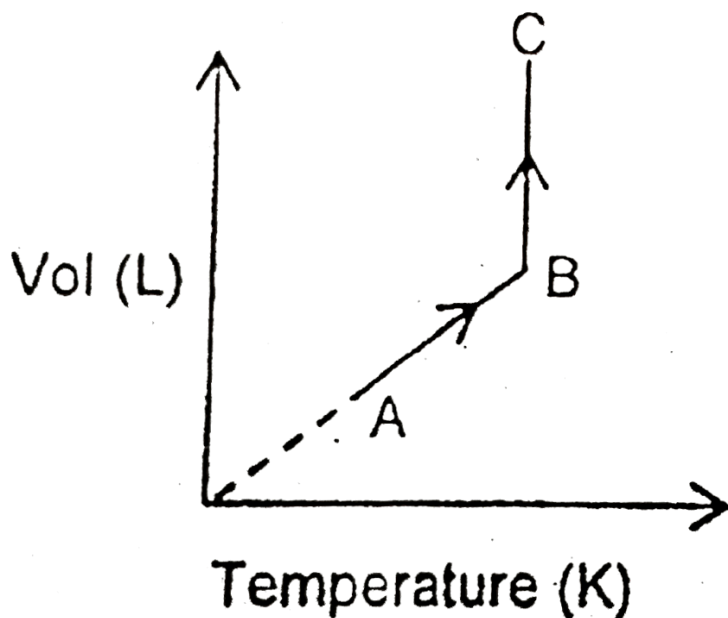

A.

B.

C.

D. None of these

Answer: A

▶ Watch Video Solution

132. Two moles of triatomic linear gas are taken through a reversible process staring from A as shown in figure. The volume ratio $\dfrac{V_B}{V_A} = 4$. If the temperature at 'A' is $-73\,°C$ then determine total enthalpy change in both steps.

133. A mono-atomic gas X and an diatomic gas Y both initially at the same temperature and pressure are compressed adiabatically from a

volume V to $V/2$. Which gas will be at higher temperature?
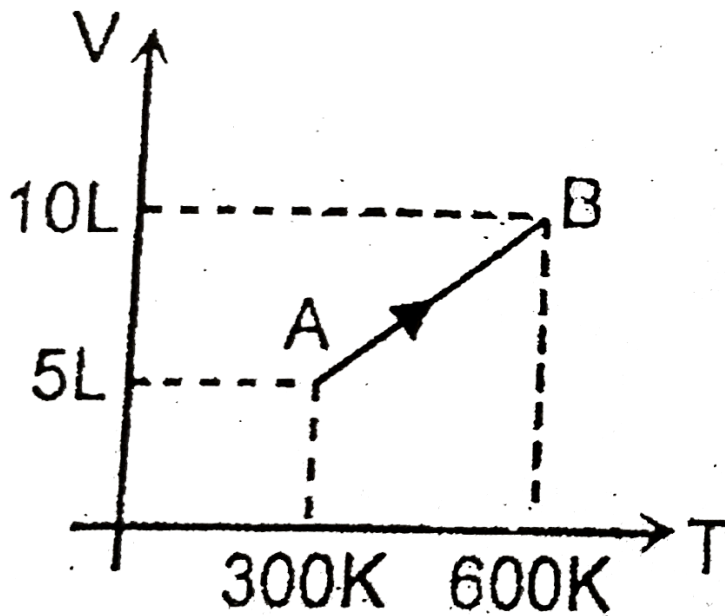
A. X

B. Y

C. same for both

D. can't say

Answer: A

▶ **Watch Video Solution**

134. One mol of an ideal gas was taken from $A \rightarrow B$ as shown in given figure. Mangutitude of work involved in process is $\left(R = \dfrac{25}{3} \dfrac{J}{molK}\right)$:

A. 5*KJ*

B. 7.5*KJ*

C. 2.5*KJ*

D. None of these

Answer: C

▶ Watch Video Solution

135. The van der Waal's constants a & b of CO_2 are $3.64 L^2 mol^{-2}$ bar & $0.04 L mol^{-1}$ respectively. The value of R is $0.083 dm^3 mol^{-1} K^{-1}$. If one mole of CO_2 is confined to a volume of $0.15 L$ at $300K$, then the pressure (in bar) eaxerted by the gas is :
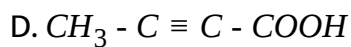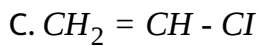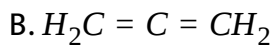
—

A. 11

—

B. 64.58

—

C. 174.50

—

D. 135.78

Answer: B

136. In which of the following molecule conjugation is not present ?

A. $CH_2 = C = NH$

B. $H_2C = C = CH_2$

C. $CH_2 = CH - CI$

D. $CH_3 - C \equiv C - COOH$

Answer: B

137. Number of total resonating structures of cyclopendienly anion is :

A. 2

B. 3

C. 4

D. 5

Answer: D

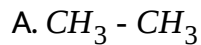**138.** $CH_3 - CH_2 - CI + NaI \xrightarrow[]{\text{Dry acetone}} [X] + NaCI$ Product $[X]$ is -

A. $CH_3 - CH_3$

B. $CH_3 - CH_2 - I$

C. $CH_3 - I$

D. $CH_3 - CH_2 - CH_2 - CH_3$
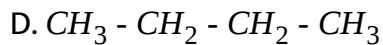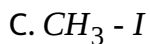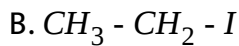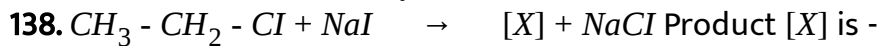
Answer: B

▶ Watch Video Solution

139. Given the major product for the following reaction.

CHCl$_3$/NaOH, Δ

A.

(2) structure with OH, CHO, Me

B.

(3) structure with OH, Me, Me

C.

D.

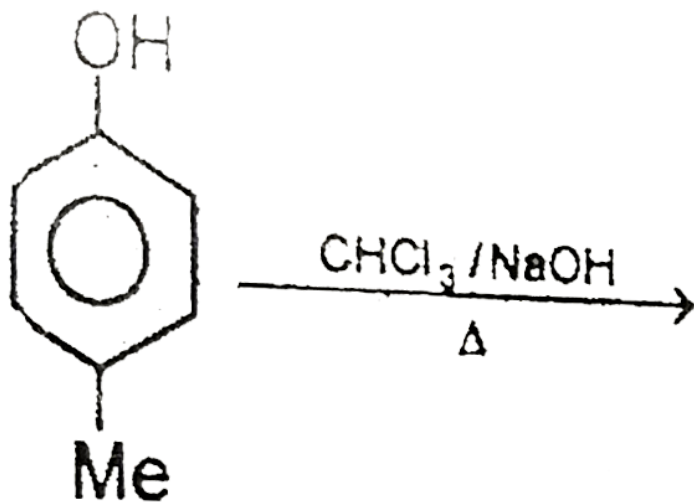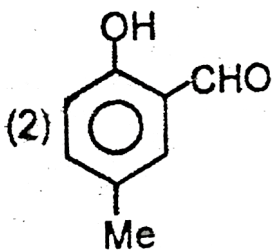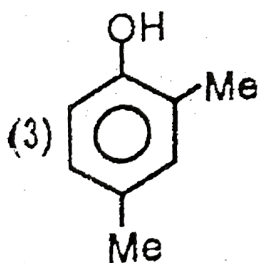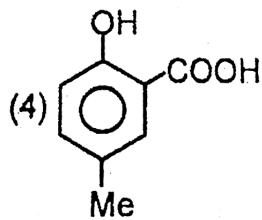Answer: B

▶ Watch Video Solution

---

140. Which of the following is/are aromatic compounds ?
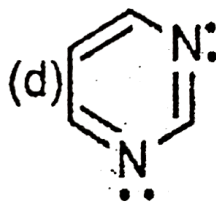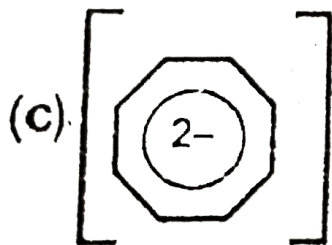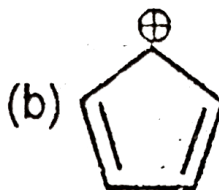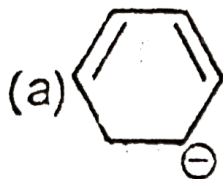
A. a&b

B. $b\&c$

C. $c\&d$

D. $a\&c$

Answer: C

▶ Watch Video Solution

141. The most stable resonating structure is

A. $H_2 \overset{\oplus}{N} - CH - CH = CH - OH_3$

B. $H_2 \overset{\oplus}{N} = CN - CH = CH - OCH_3$

C. $H_2N - CN = CH - CH = \overset{\oplus}{O}CH_3$

D. $\overset{\oplus}{N}H_2 - CH - \overset{\ominus}{C}H - CH = \overset{\oplus}{O}CH_3$
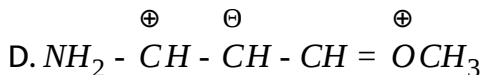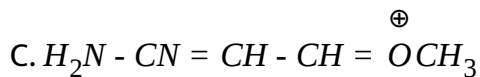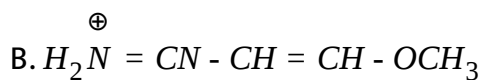
Answer: B

▶ Watch Video Solution

142. In which molecule $C - N$ bond length is maximum ?

A.
$-NO_2$

B.
$-NH_2$

C.
$-NMe_2$

D. (4)
$-\overset{\oplus}{N}H_3$
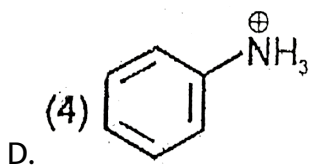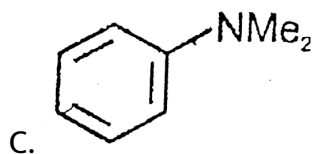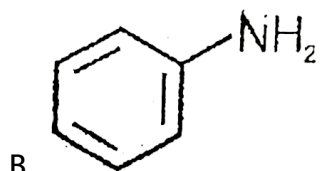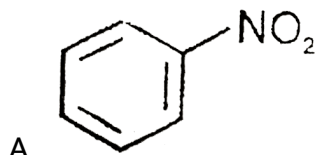
Answer: D

▶ **Watch Video Solution**

143. In which of the following carbocations, delocalisation of positive charge is possible :

A.

B.

C.

D. $CH_2^{\oplus} - O - CH_3$

Answer: D

---
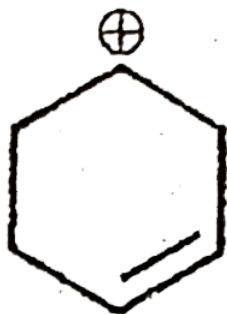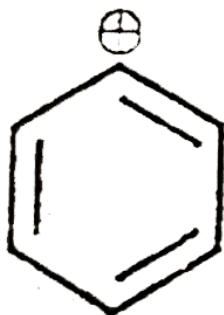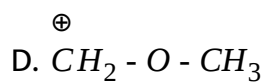
144. In the chemical reaction,

$$CH_3CH_2NH_2 + CHCI_3 + 3KOH \rightarrow (A) + 3KCI + 3H_2O \qquad , \qquad \text{the}$$

compounds (A) is :

A. CH_3NC

B. C_2H_5NC

C. CH_3CN

D. CH_3CH_2CN
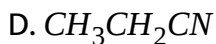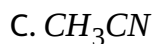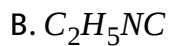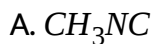
Answer: B

145. A $1.5m$ solution of acetic acid (I) is mixed with $3m$ solution of the acetic acid (II) to prepare $2m$ solution (m is molality of solution). Select the correct statement(s) :

A. Mass ratio of solvents mixed $\left(\dfrac{I}{II}\right)$ is $\dfrac{1}{2}$

B. Mass ratio of solvents mixed $\left(\dfrac{I}{II}\right)$ is $\dfrac{2}{1}$

C. Mass ratio of solutions mixed $\left(\dfrac{I}{II}\right)$ is $\dfrac{109}{59}$

D. Mass ratio of solution mixed $\left(\dfrac{I}{II}\right)$ is $\dfrac{59}{109}$

Answer: B::C

▶ **Watch Video Solution**

146. Consider the reaction :

$$K_C = 10^{12}$$

$$P(g) + \quad 2Q(g) \quad \Leftrightarrow \quad R(g) + \quad S(g)$$
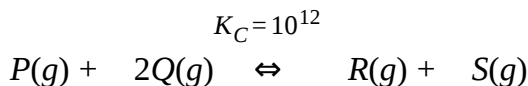
Initial conc. $\quad 2M \qquad 4M \qquad\qquad 0 \qquad\quad 0$

then select correct statement(s)

A. At equilibrium $[R(g)] = [S(g)] \cong 2M$

B. At equilibrium $[P(g)] = [Q(g)] \cong 10^{-4}M$

C. At equilibrium $[P(g)] \cong 10^{-4}M$

D. At equilibrium $[Q(g)] \cong 2 \times 10^{-4}M$

Answer: A::C::D

▶ **Watch Video Solution**

---

147. Which of the following is/are stronger-I group than $-OCH_3$

A. $-NH_2$

B.

$$(2) \; -\overset{\oplus}{N} \overset{CH_3}{\underset{CH_3}{\overset{\diagup}{\diagdown}}} CH_3$$
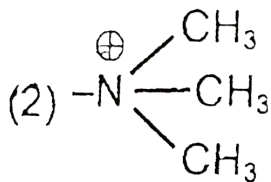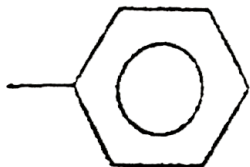
C.

D. $-F$

Answer: B::D

▶ **Watch Video Solution**

---

148. Which of the following is/are diamagnetic in nature ?

A. N_2

B. C_2

C. B_2

D. O_2^{2+}

Answer: A::B::D

▶ Watch Video Solution

149. Which of the following combination of orbitals can not form bond. (If x axis in internuclear axis)

A. $s + p_z$

B. $s + s$

C. $p_z + p_x$

D. $d_{xy} + p_y$

Answer: A::C

150. An unknown gaseous hydrocarbon and oxygen gas are mixed in volume ratio $1:7$ respectively and exploded. The resulting mixture upon cooling occupied a volume of VmL, half of which got absorbed in aq. KOH (absorbed CO_2) and the remaining half was absorbed in

alkaline pyrogallol solution (absorbs O_2) . Assuming all volumes to be measured under identical conditions :

A. The molecular formula of hydrocarbon can be C_2H_6

B. The resulting mixture obtained after cooling contains 50 % O_2 and 50 % CO by mole.

C. The molecular formula of hydrocarbon can be C_3H_4 .

D. Molecular mass of hydrocarbon is definitely less than $28u$.

Answer: C

▶ Watch Video Solution

151. Value of vander Waal's constants a and b for a gas depends upon :

A. moles

B. volume

C. pressure

D. Gas taken

Answer: D

▶ Watch Video Solution

---

152. The volume of acetylene at NTP produced by reaction to $50gm$ of CaC_2 with water is : $CaC_2 + H_2O \rightarrow Ca(OH)_2 + C_2H_2$

A. $10L$

B. $17.5L$

C. $26.25L$

D. $35L$

Answer: B

▶ Watch Video Solution

153. A hypothetical ion of element X with mass number 40, posses 2 units of positive charge and 23% more neutrons than electrons. Symbol of the ion is :

A. $\cdot^{40}_{20}X^{+2}$

B. $\cdot^{40}_{19}X^{+2}$

C. $\cdot^{40}_{18}X^{+2}$
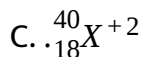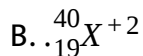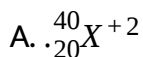
D. None of these

Answer: B

▶ Watch Video Solution

154. For an orbital the graph between $\psi_{(r)}$ and r (distance from nucles) is :
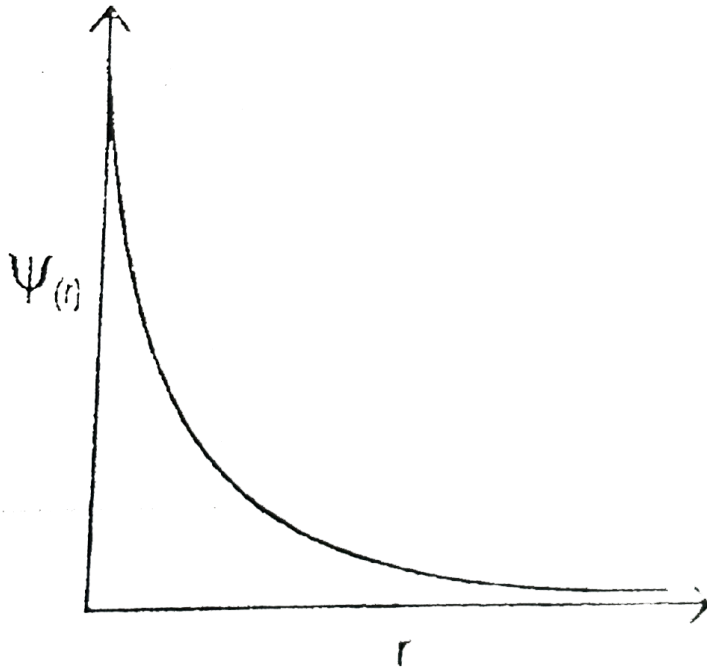
Find the value of $n + l$ of the orbital.

A. 1

B. 2

C. 3

D. None of these

Answer: A

▶ Watch Video Solution

155. For which of the following species sum of spin quantum numbers of all electrons comes out to be zero ?

A. $Cr^+(Z = 24)$

B. $Sc(Z = 21)$

C. $Cu^+(Z = 29)$

D. $Na(Z = 11)$
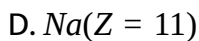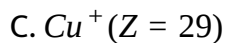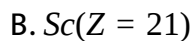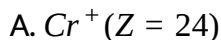
Answer: C

▶ Watch Video Solution

156. Which is an open system ?

A. Preparation of steamed rice in sealed vessel.

B. Gas filled in refrigerator for refrigeration cycle.

C. Cooling by desert cooler.

D. Hot tea.filled in Thermos flask

Answer: C

▶ Watch Video Solution

157. A sample of $HI(g)$ is placed in flask at a pressure of $0.2atm$. At equilibrium. The partial pressure of $HI(g)$ is $0.04atm$. What is K_p for the given equilibrium?

$2HI(g) \Leftrightarrow H_2(g) + I_2(g)$

A. 16

B. 8

C. 4

D. 1/4
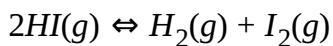
Answer: C

158. Which of the following is not an intensive property ?

A. Heat capacity

B. Temperature

C. Specific volume

D. Molar mass

Answer: A

159. Critical temperature $\left(T_C\right)$ will be maximum for the following gas ?

A. H_2

B. He

C. N_2

D. NH_3

Answer: D

▶ Watch Video Solution

160. Which statement is true for the following reaction ?

$$BF_3 + NH_3 \rightarrow F_3B.\,NH_3$$
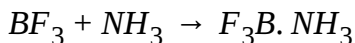
A. Hybridization of boton changes from sp^3 to sp^2

B. Hybridization of nitrogen changes from $sp^2 \rightarrow sp^3$

C. Hybridization of boron changes from $sp^2 \rightarrow sp^3$

D. Hybridization of nitrogen changes from $sp^3 \rightarrow sp^2$

Answer: C

161. Compare the relative stability of the following species and indicate their magnetic properties:

$O_2, O_2^{\oplus}, O_2^{\ominus}$ (superoxide), O_2^{-2} (peroxoide).

A. $O_2^{2-} > O_2^{-} > O_2 > O_2^{+}$

B. $O_2^{+} > O_2 > O_2^{-} > O_2^{-2}$

C. $O_2^{+} > O_2^{-} O_2^{-2} > O_2$

D. $O_2^{2-} > O_2 > O_2^{-} > O_2^{+}$
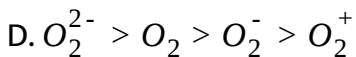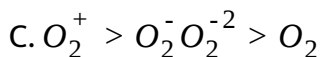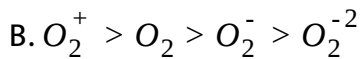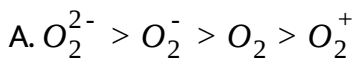
Answer: B

162. Which of the following is non polar species.

A. $CHCI_3$

B.

(2)

C.

(3)

D.

(4)
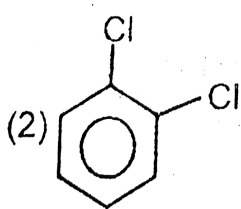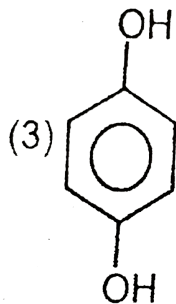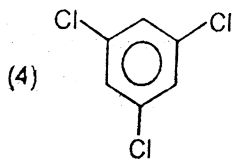
Answer: D

▶ **Watch Video Solution**

---

163. Which of the following is correct order of boiling point ?

A. $T_2 < D_2 < H_2$
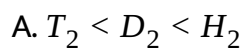
B. n- pentane $<$ neopentane

C. $Xe < Ar < He$

D. p-nitrophenol $>$ o-nitrophenol

Answer: D

▶ **Watch Video Solution**

---

164. Which of the following molecule has intramolecular $-H$ bonding.

A. Hydrogen Fluoride

B. p-nitrophenol

C. 2-methylphenol (o-cresol)

D. o-Flourophenol

Answer: D

▶ **Watch Video Solution**

165. Decreasing $-I$ effect of given is:

(i) CN , (ii) NO_2

(iii) NH_2 , (iv) F

    A. $iii > ii > i > iv$

    B. $ii > iii > iv > i$

    C. $iii > ii > iv > i$

    D. $ii > i > iv > iii$

Answer: D

▶ **Watch Video Solution**

166. Which of the following molecule is planer.

    A. $XeOF_4$

B. XeO_4

C. XeF_4

D. XeO_3
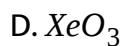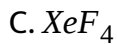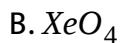
Answer: C

▶ **Watch Video Solution**

---

167. Which of the following species is most ionic.

A. $SnCl_4$

B. CCl_4

C. $SnCl_2$

D. SnI_2
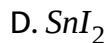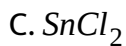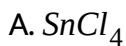
Answer: C

▶ **Watch Video Solution**

168. Which of the following does not exist

A. Be_2

B. B_2

C. C_2

D. N_2

Answer: A

▶ Watch Video Solution

169. The poisson's ratio for O_2 is 1.4. Which of the following are correct for O_2?

A. $C_v = 5cal/molK$

B. c_v or $s_v = 0.45cal/molK$

C. $C_p = \dfrac{R\gamma}{\gamma - 1}$

D. $C_v = \dfrac{R}{(\gamma - 1)}$

Answer: B

> ▶ **Watch Video Solution**

---

170. The electrons identified by quantum numbers n and l :

(a) $n = 5, l = 1$, (b) $n = 5, l = 0$

(c) $n = 4, l = 2$, (d) $n = 4, l = 1$

can be placed in order of increasing energy as :

A. $(c) < (d) < (b) < (a)$

B. $(d) < (b) < (c) < (a)$

C. $(b) < (d) < (a) < (c)$

D. $(a) < (c) < (b) < (d)$

Answer: B

171. Dissolving $180g$ of glucose $(mol.\,w.\,t.\,180)$ in $1000g$ of water gave a solution of density $1.15g/mL$. The molarity of the solution is

    A. $1.78M$

    B. $2.00M$

    C. $0.97M$

    D. $2.22M$

Answer: C

172. How many litres of water must be added to 2 litre aqueous solution of HCI with a pH of 1 to create an aqueous solution with pH of 2 ?

A. $10L$

B. $0.9L$

C. $2L$

D. $18L$

Answer: D

▶ Watch Video Solution

173. Molar volume of an Ideal gas is $0.45dm^3/mol$. The molar volume of

air (assumming as real gas) under the same condition is $0.9dm^3/mol$.

The point which corresponds to air the given graph is :

$$2.0 \cdots\cdots\cdots\cdots \bullet D$$
$$Z \qquad 1.5 \cdots\cdots\cdots\cdots \bullet C$$
$$\text{(Compressibility} \quad 1.0 \cdots\cdots\cdots\cdots \bullet B$$
$$\text{factor)} \qquad 0.5 \cdots\cdots\cdots\cdots \bullet A$$

$$P$$
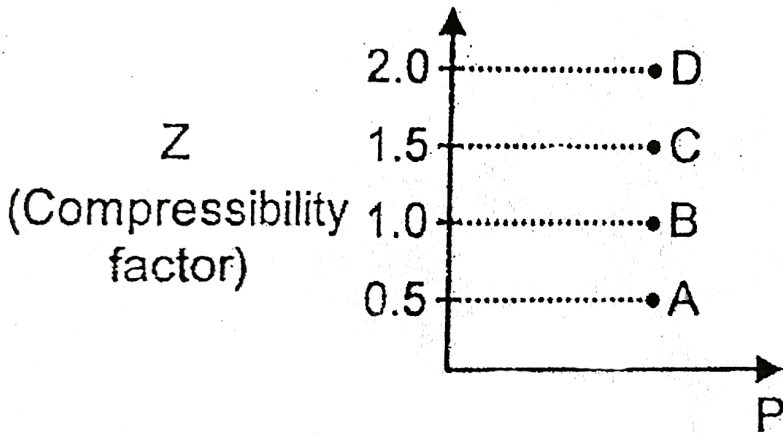
A. B

B. D

C. A

D. None of these

Answer: B

▶ Watch Video Solution
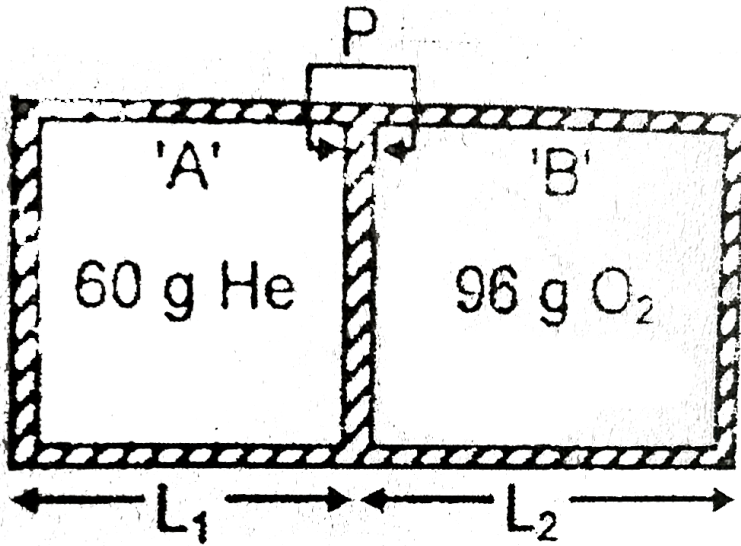
174.

A cylindrical diathemic chamber fitted with movable, massless & frictionless piston. Initially piston was at rest by the stop pin P as shown in figure. Compartment (A) is filled with $60g$ He gas & compartment (B) is filled with $96g of O_2$ gas ast $27°C$. Assume ideal behaviour of gas, then calculate ratio $\dfrac{L_1}{L_2}$, if stop pin is suddenly removed ? \

A. 2

B. 4

C. 5

D. 6

Answer: C

▶ Watch Video Solution

---

175. For a real gas, behaving ideally, the pressure may be:

A. $a. b. V_m$

B. $\dfrac{V_m}{a. b}$

C. $\dfrac{a}{V_m . b}$

D. $\dfrac{b}{a. V_m}$

Answer: C

▶ Watch Video Solution

176. When 1 mole of strong diprotic acid H_2A (completely ionised) is completely neutralized by $NaOH$ then amount of heat is released is $E KJmol^{-1}$. Calculate amount of heat relased when one mole of weak monoprotic acid HB completely neutralized by $NaOH$.

A. E

B. less than $E/2$

C. greater than $E/2$

D. None of these

Answer: B

▶ Watch Video Solution

177. for a reversible reaction $K_c > K_p at 298K$ and $\Delta H = +200KJ$ the forward reaction is not favoured by :

A. Increase in pressure

B. Increase in temperature

C. Decrease in pressure

D. Increase in concentration of reactants

Answer: C

▶ **Watch Video Solution**

178. Enthalpy of atomisation of diamond is $600kJ/mol$. C (diamond)

$\rightarrow$ $C(g)$. Find the bond energy of C - C bond.

A. $30KJmol$.

B. $3000KJ/mol$.

C. $15KJ/mol$.

D. None of these

Answer: B

---

179. $A(s) \Leftrightarrow 2B(g) + C(g)$
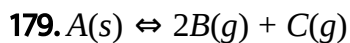
The above equilibrium was established by initially taking $A(s)$ only. At equilibrium, B is removed so that its partial pressure at new equilibrium becomes $1/3^{rd}$ of original total preswsure. Ratio of total pressure at new equilibrium and at initial equilibrium will be :

   A. 2/3

   B. 14/13

   C. 5/3

   D. 17/19

Answer: C

180. Determine the pH of an acidic buffer solution ($HA + NaA$) having acid and salt concentration respectively $0.1M$ and $0.2M$. (Given $pK_a = 4.7$, $\log 2 = 0.30$, $\log 5 = 0.70$)

A. 4

B. 5

C. 3

D. None of these

Answer: B

▶ Watch Video Solution

181. Which of the following species is aromatic :

A.

B.

C.

D.
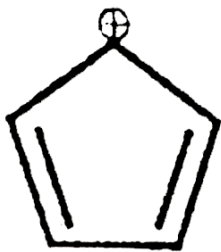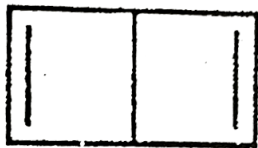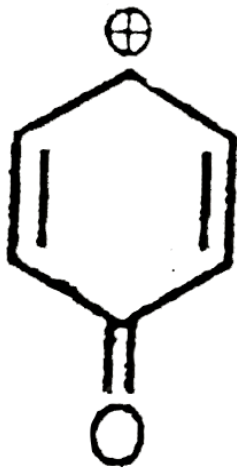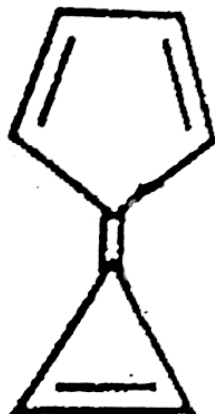
Answer: D

182. When borax is dissolved in water

    A. $B(OH)_3$ is formed only

    B. $\left[B(OH)_4\right]^-$ is formed only

    C. both $B(OH)_3$ and $\left[B(OH)_4\right]^-$ are formed

    D. $\left[B_3O_3(OH)_4\right]^-$ is formed only

Answer: C

183. Correct order of bond strength for the following mmolecule or ions is :

A. $O_2^{++} > O_2^{+} > O_2$

B. $O_2 > O_2^{+} > O_2^{-}$

C. $O_2 > O_2^{-} > O_2^{+}$

D. $O_2^{+} > O_2^{-} > O_2$
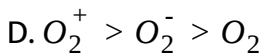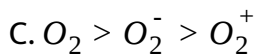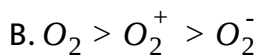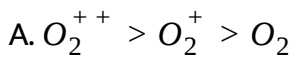
Answer: A

184. Identify the X and Y in the following reaction.

$$\xrightarrow[H_2O,\,5°C]{NaNO_2,HCI} X \xrightarrow[H_2O]{\Delta} H_2OY$$

A.

B. $X = $ $Y = $

C. $X = $ $Y = $

D. $X = $ $Y = $
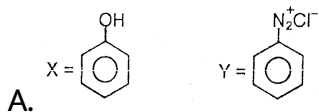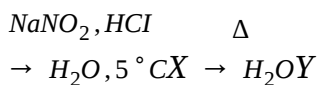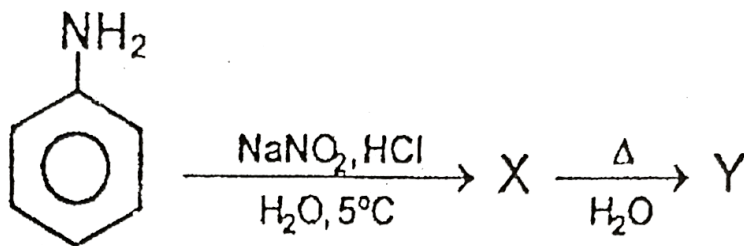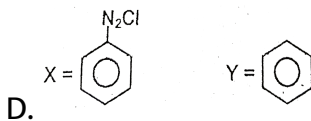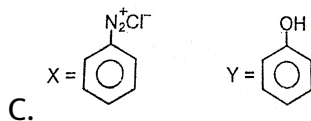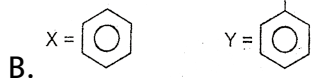
Answer: C

▶ **Watch Video Solution**

---

185. Which of the following order is correct ?

A. $B < C < N < O$ (First ionisation energy)

B. $Li < Na < Rb < K$ (size)

C. $CI > F > Br > I$ (Magnitude of ΔH_{eg}.)

D. $F < O < N < C$ (Electronegativity)

Answer: C

---

186. Which of the following is correct statement ?

A. Double chain silicates are known as amphiboles.

B. In cyclic silicates two oxygen atoms per tetrahedron are shared.

C. Orthosilicates contain discrete $\left(SiO_4\right)^{4-}$ units.

D. All arer correct statements

Answer: D

---

187. What is the product of the following reaction :

$$CH_3 - C \,|\, CH_3 = CH_2 \xrightarrow[\text{Peroxide}]{HBr}$$

A. $CH_3 - C \,|\, CH_3 - H - CH_2 - Br$

B. $CH_3 - C \,|\, CH_3 - CH_3$
   with Br attached:
   $$\begin{array}{c} Br \\ | \\ CH_3 - C \,|\, CH_3 - CH_3 \end{array}$$

C. $CH_3 - C \,|\, CH_3H - C \,|\, BrH - Br$
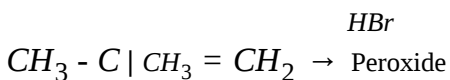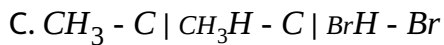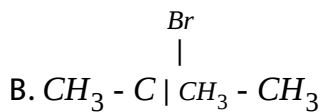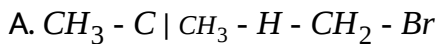
D. None of these

Answer: A

> ▶ **Watch Video Solution**

---

188. The correct stability order of following species is :

(x)   (y)   (z)

A. $x > y > z$

B. $y > x > z$

C. $x > z > y$

D. $z > x > y$
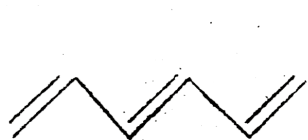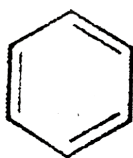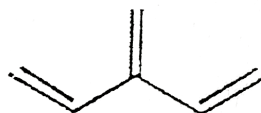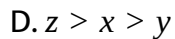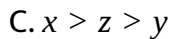
Answer: B

189. Which of the following is the pair of functional isomers ?

A.

B.

C.

D.
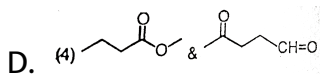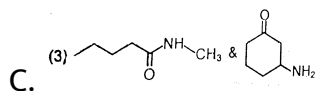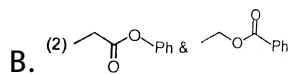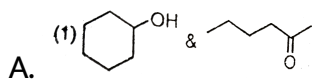
Answer: A

190. A solid compound $'X'$ on heating gives CO_2 gas and a residue. The residue mixed with water forms $'Y'$. On passing an excess of CO_2 through $'Y'$ in water , a clear solution, $'Z'$ is obtained. On boiling $'Z'$, compound $'X'$ is reformed. The compound $'X'$ is

A. Na_2CO_3

B. K_2CO_3

C. $Ca\left(HCO_3\right)_2$

D. $CaCO_3$
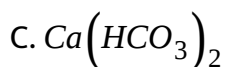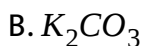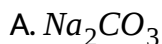
Answer: D

▶ Watch Video Solution

191. The set of d-orbitlas which do not contain any d-orbital which is involved in involved in hybridization of central atom in ICl_4^-

A. $d_{z^2}, d_{x^2-y^2}$

B. $d_{x^2-y^2}, d_{xy}, d_{yz}, d_{zx}$

C. $d_{z^2}, d_{xy}, d_{yz}, d_{xz}$

D. d_{xy}, d_{xz}, d_{yz}

Answer: D

▶ Watch Video Solution

---

192. Which alcohol gives instant turbidity with Lucas regent :

A. CH_3 - CH_2 - OH

B. CH_3 - $C|OHH$ - CH_3

$$CH_3$$
$$|$$
C. CH_3 - $C|OH$ - CH_3

D. CH_3 - CH_2 - CH_2 - OH
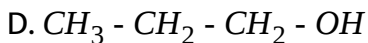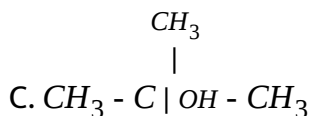
Answer: C

193. The $IUPAC$ name of C_6H_5COCl is

A. Benzyl chloride

B. Benzene chloro ketone

C. Benzene carbonly chloride

D. Chloro phenyl ketone

Answer: C

194. The degencracy of 1st excited state of H atom is _____ (Ignore efffect of spin)

195. How many of the following statement(s) is/are true for free expansion of ideal gas in an insulated container ?

1. It is a Reversible process.

2. $\Delta H = 0$, for this process.

3. $\Delta E = 0$, for this process.

4. $\Delta(PV) = 0$

5. $\Delta T = 0$, for this process.

6. $\Delta S_{\text{surrounding}} = 0$, for this process.

7. $\Delta S_{\text{system}} = 0$, for this process.

8. $\Delta S_{\text{total}} = 0$, for this process.

> ▶ Watch Video Solution

196. what is the ratio of moles of $Mg(OH)_2$ and $Al(OH)_3$ present in 1 litre saturated aqueous solution of $Mg(OH)_2$ and $Al(OH)_3$ (Given K_{sp} of $Mg(OH)_2$) $= 4 \times 10^{-12}$ asnd K_{sp} of $Al(OH)_3$ is 1×10^{-33}). Report your answer after multiplying by 10^{-17} .

197. How many carbonyls of formula $C_5H_{10}O$ are possible :

198. How many monochloro structural isomeric products are formed when isohexane is treated with CI_2/hv :

199. The compressibility factor $Z = \left(\dfrac{PV}{nRT} \right)$ of a gas above $T = \dfrac{a}{Rb}$ will be :

A. less than unity

B. grater than unity

C. equal to unity

D. none of these

Answer: B

---

200. Equal volume of the following Ca^{+2} and F^- solutions are mixed. In which case will percipitation occur? (K_{sp} of $CaF_2 = 7 \times 10^{-10}$).

A. $10^{-2} M Ca^{+2} + 10^{-5} M F^-$

B. $10^{-3} M Ca^{+2} + 10^{-5} M F^-$

C. $10^{-4} M Ca^{+2} + 10^{-2} M F^-$

D. $10^{-2} M Ca^{+2} + 10^{-6} M F^-$
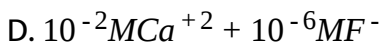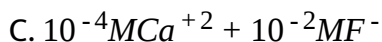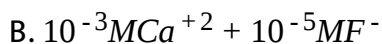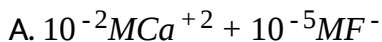
Answer: C

201. A gas $\left(C_{v.m} = \dfrac{5}{2}R\right)$ behaving ideally is allowed to expand reversibly and adiabatically from 1 litre to 32 litre. Its initial temperature is $327\degree C$. The molar enthalpy change (in J/mol) for the process is :

    A. $-1125R$

    B. $-625R$

    C. $-1575R$

    D. None of these

Answer: C

▶ **Watch Video Solution**

202. When $1L$ of $0.1M$ sulphuric acid solution is allowed to react with $1L$ of $0.1M$ sodium hydroxide then the molarity of sodium sulphate

formed is

$$\left(H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O\right):$$
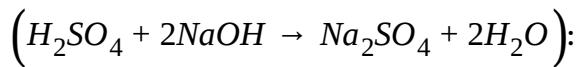
A. $0.1M$

B. $0.05M$

C. $0.025M$

D. $0.2M$

Answer: C

▶ **Watch Video Solution**

203. 0.01 mol of a gaseous compound $C_2H_2O_x$ was treated with $224mL$ of O_2 at STP. After combustion the total volume of the gases is $560mL$ at STP. On treatment with KOH solution the volume decreases to $112mL$. The volue of x is:

A. 4

B. 2

C. 3

D. None of these

Answer: A

204. A mono-atomic ideal gas of two moles is taken through a cyclic process starting from A as shwon in the figure below.

The volume ratios are $V_B/V_A = 2$ and $V_D/V_A = 4$. If the temperature T_A at A is $27\,°C$. Calculate
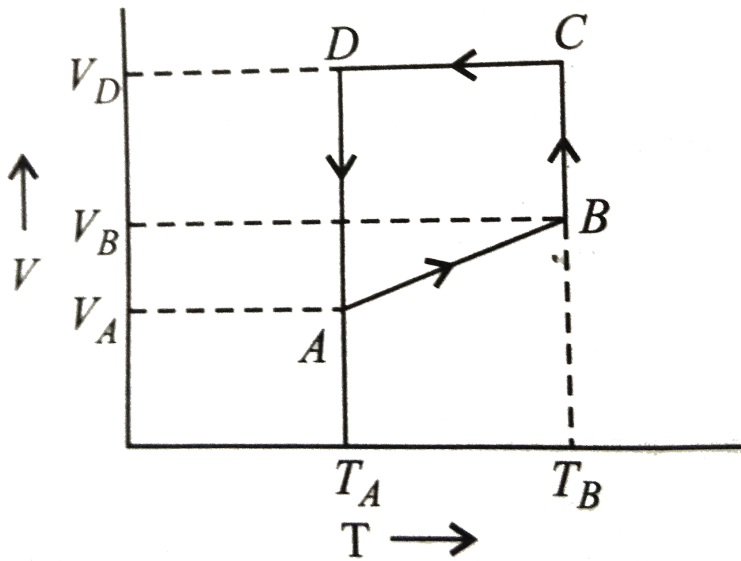
a. The temperature of gas at B.

b. Heat absorbed or evolved in each process.

c. Total work done in cyclic process.

    A. 1200 cal

    B. 3000 cal

    C. 2500 cal

    D. None of these

Answer: A

205. $M(OH)_X$ has $K_{SP}4 \times 10^{-12}$ and solubility $10^{-4}M$. The value of x is:

A. 1

B. 2

C. 3

D. 4

Answer: B

206. The equilibrium constant K_P for the reaction $N_2O_4(g) \Leftrightarrow 2NO_2(g)$ is $4.5 atm$. What would be the average molar mass (in g/mol) of an equilibrium mixture at a total pressure of $2 atm$ of N_2O_4 and NO_2 formed by the dissociation of pure N_2O_4 ?

A. 69

B. 57.5

C. 80.5

D. 85.5

Answer: B

▶ **Watch Video Solution**

207. The electron present in $3d_{z^2}$ orbital can not be found :

A. in xy plane

B. in xz plane

C. in yz plane

D. None of these

Answer: B

208. Titanium oxide $\left(TiO_2\right)$ is heated with excess hydrogen gas to give water and nee oxide Ti_xO_y. If $1.6gmTiO_2$ produces $1.44gTi_xO_y$, then select statement (Molar mass of titanium is $48g/mol$):

A. Volume of x/y is $\dfrac{2}{3}$

B. Moles of H_2 used in reaction is 0.01 mol.

C. Moles of H_2 formed is 0.02 mol.

D. Both (1) and (3)

Answer: D

209. The degree of dissociation of water in a $0.1M$ aqueous solution of HCl at a certain temperature $t\,^\circ C$ is 3.6×10^{-15}. The temperature t

must be : [density of water at $t°C = 1gm/mL$.]

A. $< 25°C$

B. $= 25°C$

C. $> 25°C$

D. insufficient data to predict

Answer: C

▶ View Text Solution

210. A certain transition to H spectrum from an excited state to ground state in one or more steps gives rise to total 10 lines .How many of these belong to UV spectrum ?

A. 2

B. 3

C. 4

D. 5

▶ Watch Video Solution

211. Calculate the temperature above which the given reaction become spontaneous.

$$C_{(s)} + H_2O_{(g)} \rightarrow CO_{(g)} + H_{2(g)}$$
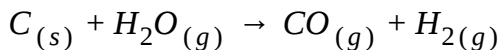
$\Delta H° = +131.3KJ/\text{mole}$,

$\Delta S° = +0.1336KJ/\text{mole}K$

    A. $98.8K$

    B. $709.8°C$

    C. $491.4K$

    D. $354.9°C$

Answer: B

212. Which of the following graphs correctly represents the variation

of $\beta = -\left(\dfrac{dV}{dP}\right)/V$ with P for an ideal gas at constant temperature

A.

B.

(3)

C.
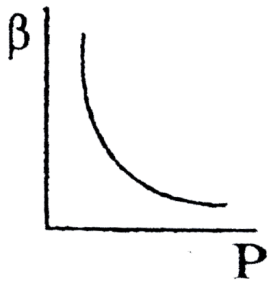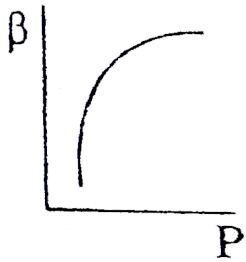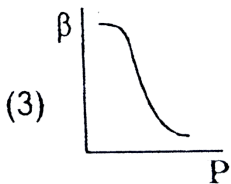
D. None of these

Answer: A

213. According to MOT whch of the following statement about magnetic character and bond order is corrent regarding $O_2^{\oplus}$.

A. Paramagnetic and bond order $< O_2$

B. Paramagnetic and bond order $> O_2$

C. Dimagnetic and bond order $< O_2$

D. Dimagnetic and bond order $> O_2$

Answer: B

214. Total number of ethers possible with the molecular formula $C_5H_{12}O$ exhibiting constitutional isomerism is

A. 3

B. 4

C. 5

D. 6

Answer: D

▶ **Watch Video Solution**

215. What is the geometry of the molecule with sp^3d^2 hybridised contral atom is

A. Square planar

B. Trigonal bipyramidal

C. Octahedral

D. Square pyramidal

Answer: C

▶ **Watch Video Solution**

---

216. On dissolving moderate amount of sodium metal in liquid ammonia at low temperature, which of the following does not occur ?

A. Blue coloured solution is obtained

B. Na^+ ions are formed in the solution

C. Liquid NH_3 becomes good conductor of electricity

D. Liquid ammonia remains diamagnetic

Answer: D

▶ **Watch Video Solution**

217. Which of the following σ - bonds participate in hyperconjugation

?
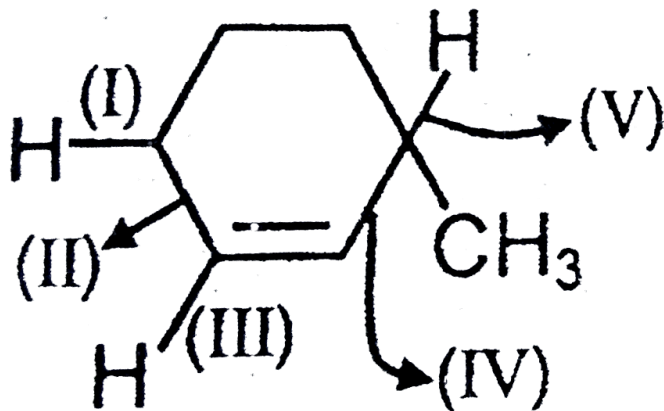
A. *I* and *II*

B. *II* and *IV*

C. *I* and *V*

D. *III* and *IV*

Answer: C

218. Which of the follwing group of chemicals, in additon to water, are used for the manufactire of Na_2CO_3 by Solvay process

A. $NaCl$, CO and NH_3

B. $NaCl$, CO_2 and NH_3

C. $NaCl$, NH_4Cl and CO_2

D. $NaHCO_3$, CO and NH_3

Answer: B

▶ Watch Video Solution

219. The most stable resonating structure is

A. $H_2\overset{\oplus}{N} - CH - CH = CH - OCH_3$

B. $H_2\overset{\oplus}{N} = CH - CH = CH - OCH_3$

C.

D. $NH_2 - \overset{\oplus}{CH} - \overset{\ominus}{CH} - CH = \overset{\oplus}{O}CH_3$
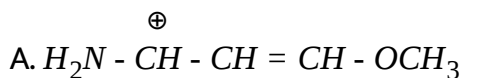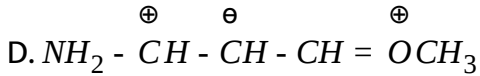
Answer: B

▶ Watch Video Solution

220. Identify the X and Y in the following reaction.

$$\text{NH}_2\text{-benzene} \xrightarrow[\text{H}_2\text{O, 5°C}]{\text{NaNO}_2\text{, HCl}} X \xrightarrow{\text{H}_3\text{PO}_2} Y$$

A. $X =$ (phenol, OH) $Y =$ (diazonium, $N_2^+Cl^-$)

B. $X =$ (benzene) $Y =$ (phenol, OH)

C. $X =$ (diazonium, $N_2^+Cl^-$) $Y =$ (phenol, OH)

N₂Cl

X = (O)   Y = (O)

D.
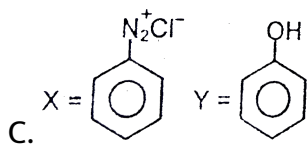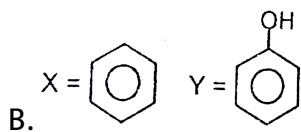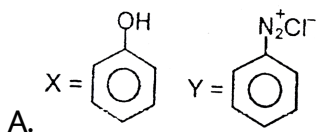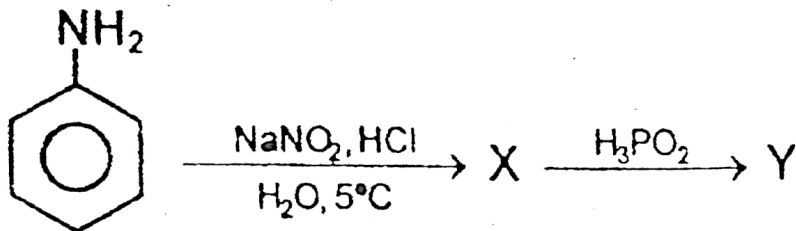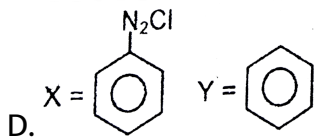
Answer: D

▶ **Watch Video Solution**

---

221. Select the incorrect matching of name of the following compound.

OH
O₂N.   .NO₂
        (O)
        NO₂
Picric acid

A.   , Picric acid

COOH
        .OH
(2)(O)
Salicyclic acid

B.   , Salicyclic acid

OH
(3)
Carbolic acid

C.   , Carbolic acid

.COOH
        Isophthalic acid
COOH

D.   , Isophthalic acid
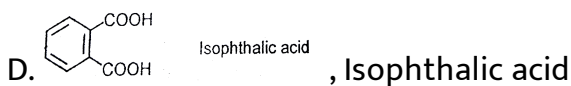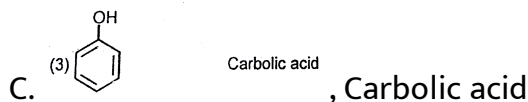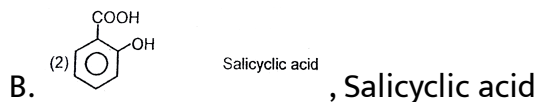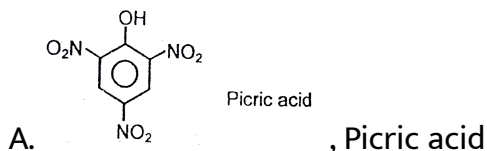
Answer: D

222. Given type of silicones are called $[P]$

$$-O - Si\underset{R}{\overset{R}{|}} - O - Si\underset{R}{\overset{R}{|}} - O - Si\underset{R}{\overset{R}{|}} -$$
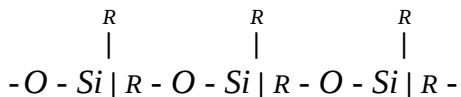
$[P]$ is prepared by hydrolysis of $[Q]$

$[P]$ & $[Q]$ are respectively.

    A. Linear silicone, R_2SiCl_2

    B. branched silicone, R_3SiCl

    C. Cyclic sillicone, R_2SiCl_2

    D. Cyclic silicone, $RSiCl_3$

Answer: A

223. Which of the following statement is correct.

A. For potassium the atomic radius $<$ ionic radius, but for

bromine, the atomic radius $>$ ionic radius.

B. Decreasing order of size is $S^{-2} > Cl^- > K^+ > Ca^{+2}$.

C. The first ionisation potential of Mg is less than the first

ionisation potential of Al.

D. Order of electron gain enthalpy (negative sign) is

$F > Cl > Br > l$.

Answer: B

▶ Watch Video Solution

224. How many position isomers are possible for dichorocyclohexane?

A. 2

B. 4

C. 5

D. 6

Answer: B

▶ **Watch Video Solution**

---

225. Which of the following is not correctly matched:

A. H_2CrO_4 , Chromic acid

B. HPO_3 , Metaphosphoric acid

C. HNO_4 , Peroxynitric acid

D. $HClO_3$ Chlorous acid

Answer: D

▶ **Watch Video Solution**

226. An alkene on ozonolysis gives only one product (Z). Z on reaction with Fehling solution give red precipitate of Cu_2O. Alkene will be?

    A. $Ph - CH = CH - Ph$

B. $\left(CH_3\right)_2 C = C\left(CH_3\right)_2$

C. $CH_3 - CH = C\left(CH_3\right)_2$

D. $CH_3 - CH = CH - CH_3$
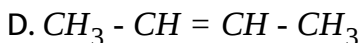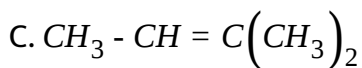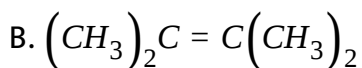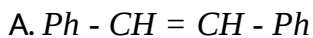
Answer: D

▶ **Watch Video Solution**

---

227. The producet of the reaction of alcoholic silver nitrite with ethyl bromide is :

    A. Nitroethane

B. Nitroethane and ethyl nitrite

C. Ethyl nitrite

D. Ethane

Answer: A

▶ **Watch Video Solution**

---

228. For an ideal solution, if a graph is plotted between $\dfrac{1}{P_T}$ and y_A (mole fraction of A in vapour phase) where $p_A^0 > p_B^0$ then

A. intercept of the graph $= \dfrac{1}{p_B^0}$

B. slope of the graph $= \left(\dfrac{1}{p_A^0} + \dfrac{1}{p_B^0} \right)$

C. slope of the graph $\left(\dfrac{1}{p_B^0} - \dfrac{1}{p_B^0} \right)$

D. the graph is linear

Answer: A::C::D

---

229. For an equimolar ideal mixture of A and B with $p_A^0 < p_B^0$:

$x_A =$ mole fraction of A in solution

$x_B =$ mole fraction of B in solution

$y_A =$ mole fraction of A in vapour phase

$y_B =$ mole fraction of B in vapour phase solution

A. $x_A > y_A$

B. $y_B > y_A$

C. $y_B > x_B$

D. $y_A > y_B$

Answer: A::B::C

230. Which graph is/are incorrect for a pure liquid evaporating in a closed container?

A.

(A) evaporation rate / condensation rate

B.

evaporation rate / condensation rate

C.

evaporation rate / condensation rate

D.

evaporation rate / condensation rate

Answer: B::C::D

---
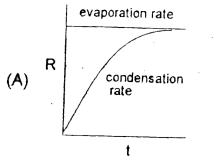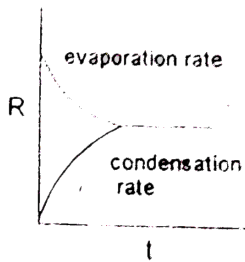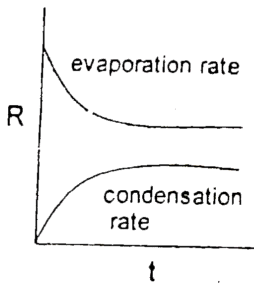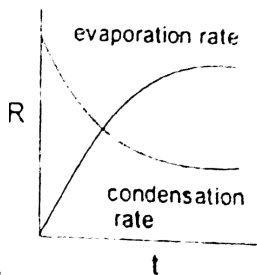
231. Which of the following can act as buffer solution?

A. $Na_2HPO_4 + Na_3PO_4$

B. $H_2S + Na_2S$

C. $HCl + NaCl$

D. $NH_4OH + NH_4Cl$

Answer: A::D

---
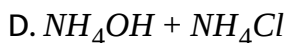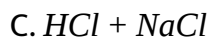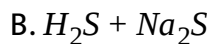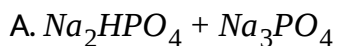
232. Which of the following is/are exothermic process?

A. combustion of C_6H_6

B. Formation of CO from element in their standard state.

C. solubility of gas in liquid.

D. Atomisation of I_2 (s)

Answer: A::B::C

> ▶ **Watch Video Solution**

---

233. The total vapour pressure of equimolar solution of benzene and toluene is given by P_T (in mm Hg) $= 600 - 400X_{\text{toluene}}$ then:

A. $p_{\text{benzene}} = 200mmHg$

B. $p^0_{\text{benzene}} = 600mmHg$

C. $p^0_{\text{toluene}} = 200mmHg$

D. $p^0_{\text{toluene}} = 600mmHg$

Answer: B::C

234. Which of the following phase diagram is/are not correct for water?

A.

B.

C.

D.
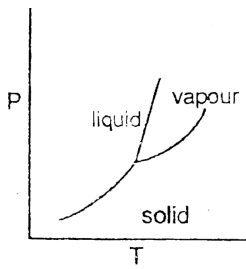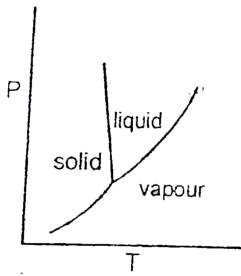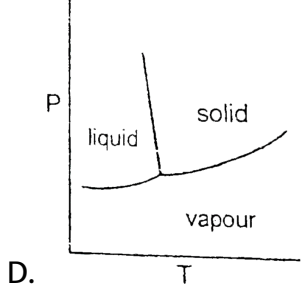
Answer: B::C::D

235. For non ideal solution (positive deviation) which of the following is/are correct?

A. $\Delta S_{\text{surrounding}} = +ve$

B. $\Delta S_{\text{surrounding}} = -ve$

C. $\Delta G_{\text{mixing}} = -ve$

D. $\Delta H_{\text{mixing}} = +ve$

Answer: B::C::D

236. You are given a solution of 50 mL, 0.1 M NaOH, then which of the following statements is/are correct:

A. On addition of 450 mL of water to this solution pH becomes 13

B. on addition of 100 mL, 0.1M CH_3COOH buffer solution will form

C. On addition of 50 mL, $0.1MCH_3COOHpH$ becomes 9.5 (pKa of CH_3COOH = 4.74, log5 = 0.7$\big)$

D. On addition of 25 mL of 0.1 M CH_3COOH pH becomes 12.5 (log3 = 0.5)

Answer: B::D

237. Which of the following is/are correctly matched?

A. $C \mid NH_2H_2C \mid NH_2H_2$ (Ethylenediamine)

B. CH_3NH_2 ..(Methylamine)

C. H_2N - CH_2 - CH_2 - NH - CH_2 - CH_2 - NH_2 (Diethylenetriamine

(dien))

D. CH_3 - $C \mid$ = N - OCH_3-C=N-OHH (Dimethylglyoximate)

Answer: A::B::C

238. Which of the following is/are correct?

A. Bleaching powder is a double salt

B. Dimethylglyyoximate is a chelating ligand

C. sulphate is a flexidentate ligand

D. sulphate can as mono or bidentate ligand

Answer: B::C::D

239. Complete the following reaction

$$Li + H_2 \longrightarrow A \xrightarrow{H_2O} B + C$$
$$\text{(gas)}$$
$$A \xrightarrow{AlH_3} D$$
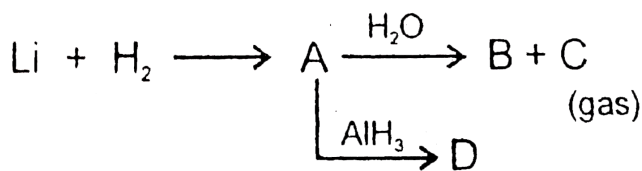
A. A can act as reducing agent

B. C is a paramagnetic gas

C. D is a complex compound

D. B is a base.

Answer: A::C::D

240. Which of the following orientations have non-zero dipole moment

   A. Gauche conformation of 1,2-dibromoethane

   B. Anti conformation of 1,2-dichloroethane

   C. trans 1,4-dibromocyclohexane

   D. Cis-1,4-dibromocyclohexane

Answer: A::D

▶ Watch Video Solution

---

241. An optically active compound A with molecular formula C_6H_{14} undergoes catalytic hydrogenation to give an optically inactive product. Which of the following structures for A is/are consistent with all the data?

(A)
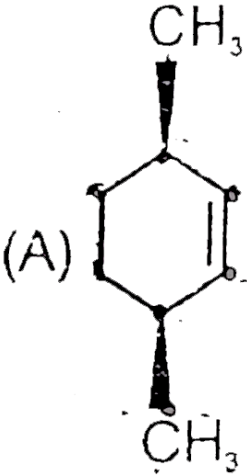
A.
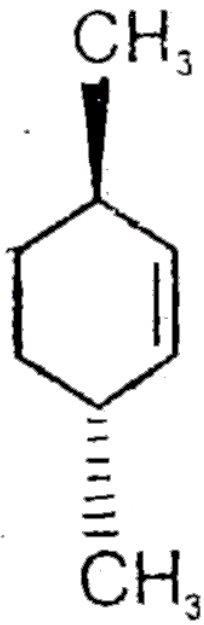
B.
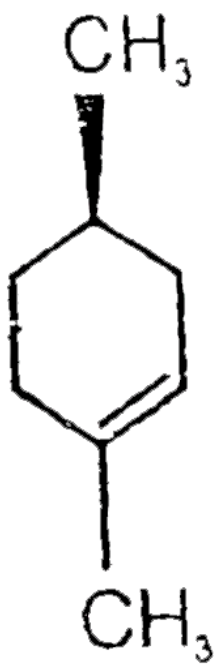
C.

D.
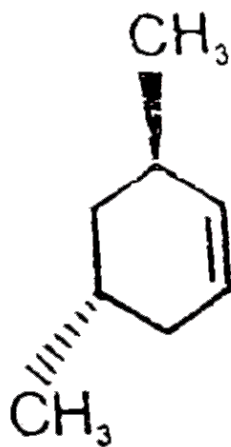
Answer: B::C

 Watch Video Solution

242. Which of the following rection given secondary alcohol?

A. $CH_3 - MgBr + HCHO \xrightarrow{Aq.NH_4Cl}$

B. $CH_3 - MgBr + CH_3 - CHO \xrightarrow{Aq.NH_4Cl}$

C. $Ph - MgBr + Ph - CHO \xrightarrow{Aq.NH_4Cl}$

D. $Ph - MgBr + CH_3 - CO - CH_3 \xrightarrow{Aq.NH_4Cl}$
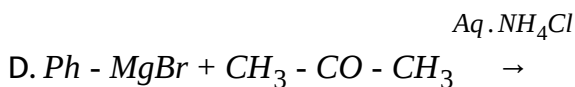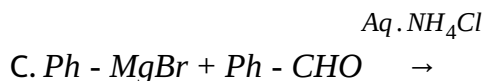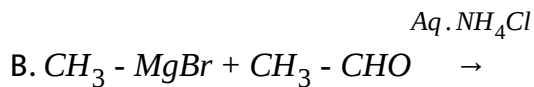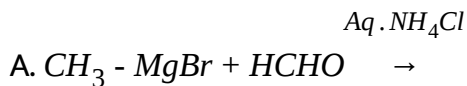
Answer: B::C

▶ Watch Video Solution

243. Which of the following compound(s) show geometrical isomerism?

A.
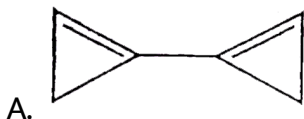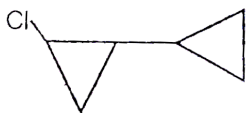
B.
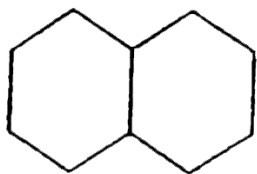
C.

D.
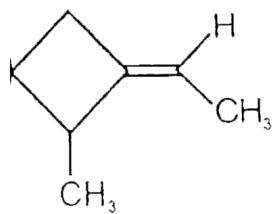
Answer: B::C::D

Watch Video Solution

244. Which is/are correct foor given structres?
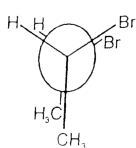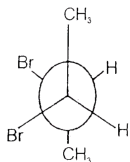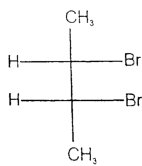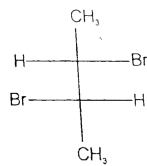
A. I & III are identical

B. II & IV are enantiomers

C. I & IV are diastereomers

D. II & III are diastereomers

Answer: A::B::C::D

▶ **Watch Video Solution**

245. Which set of the following compound(s) give benzene on reaction with PhMgBr?

A. $CH_3 - C \equiv CH$,

B.

C.

D. CH_3NH_2, $CH_3 - CH_2 - SH$
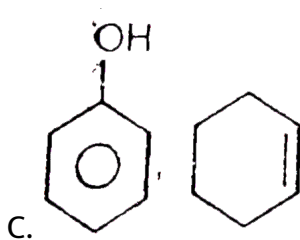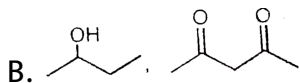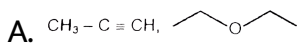
Answer: B::D

246. Which of the following compound have C^3 axis of symmetry.

A.

B.

C.

(D)

D.

Answer: A::B::C::D

---
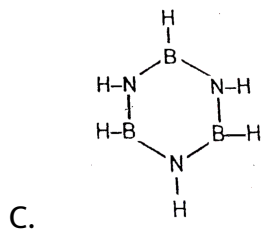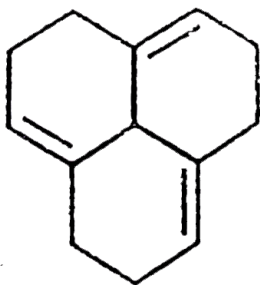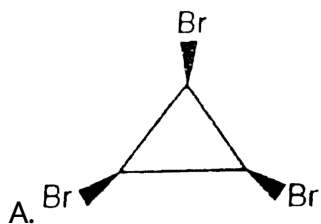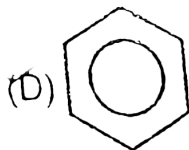
247. which is/are the correct set of electrophile?

A. BF_3, H_2O

B. Br^+, $\overset{+}{N}H_4$

C. $\overset{+}{C}H_3$, SO_3

D. $\overset{+}{N}O_2$: CH_2
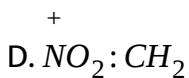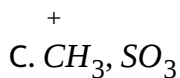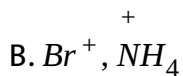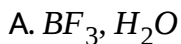
Answer: C::D

248. Which of the following reaction is/are incorrect?

A.

B.

C.

D.
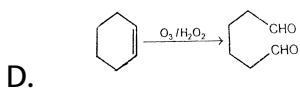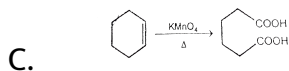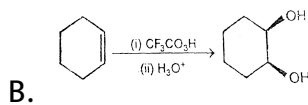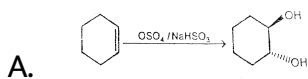
Answer: A::B::D

▶ **View Text Solution**

---

249. Which statement is/are correct:

A. Basicity order $I^- \geq Br^- \geq Cl^- F^-$

B. nucleophilicity   order

$$CH_3 - O^{\ominus} \geq Ph - O^{\ominus} \geq CH_3 - COO^{\ominus} \geq CH_3 - SO_3^{\ominus}$$

C. nucleophilicity order in polar protic solvent is $I^- \geq Cl^-Br^- \geq F^-$

D. leaving group ability order $I^- \geq Br^- \geq Cl^- \geq F^-$

Answer: B::D

> ▶ **Watch Video Solution**

250. How many of the following statement/s is/are correct?

(1). For isothermal process ΔE and ΔH are 0.

(2). On increasing temperature pK_w of water decreases.

(3). For adiabatic process ΔS is always 0.

(4). Indicator methyl orange can be used for titration between strong acid and weak base.

(5). At triple point liquid. vapour and solid state are in simultaneous equilibrium with one another.

(6). ΔH_f° of D_2 (gas) is zero.

(7). Molal elevation constant $\left(K_b\right)$ depends upon nature of solute.

(8). Be does not give flame test.

(9). Solubility of $AgCN$ increases in KCN solution.

251. The freezing point of 0.08 molal aq $NaHSO_4$ solution is -0.372. Calculate α (degree of dessociation) of HSO_4^- given α (degree of dissociation) of $NaHSO_4$ is 100 % & K_f for H_2O = 1.86 $\dfrac{K}{m}$. Give answer after multiplying by 10.

CCl₄   H₂O
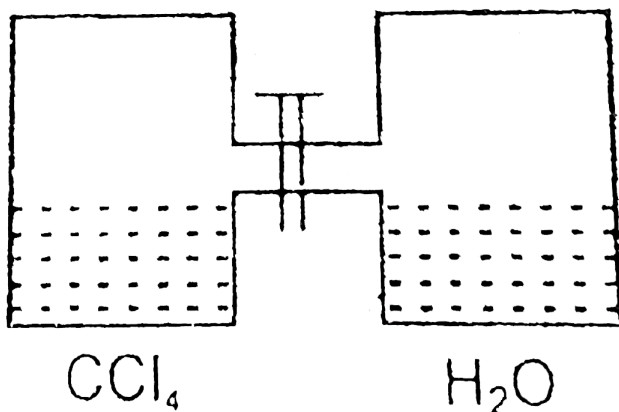
252.

Given $P_{CCl_4}^0 = 100$ torr, $P_{H_2O}^0 = 300$ torr

What will be total pressure after opening the valve? Give your answer after dividing 100.

> ▶ View Text Solution

253. henry's law constant for CO_2 in water is 2.5×10^8 Pa at $298K$ calcualte mmole of CO_2 dissolbed in 144 g water at 2.5 atm pressure at 298K. [take 1 atm $= 10^6 \dfrac{N}{m^2}$ or Pa]

> ▶ Watch Video Solution

254. 0.1 litre so.ution is made by mixing 4 gram $NaOH$, 20 millimoles of H_2SO_4, 40 millimoles of HCl and 20 millimoles of HNO_3 what is the pH of solution.

255. 2 moles of an ideal monoatomic gas undergo a reversible process for which $PV^2 =$ constant. The gas sample is made to expand from initial volume of 1 litre of final volume of 3 litre starting from initial temperature of 300 K. find the value of ΔS_{sys} for the above process. Report your answer as Y where $\Delta S_{sys} = -YRln3$

256. If elevation in boiling point when AB is dissolved in water to make saturated solution at $25\,°C$ is $2 \times 10^{-4}.\,°C$ and K_{sp} of AB is 4×10^{-x}

then determine the value of x. (Assume $\alpha = 1$ molality $=$ molarity)

(given $K_b = 0.5K/m$).

N_2, He
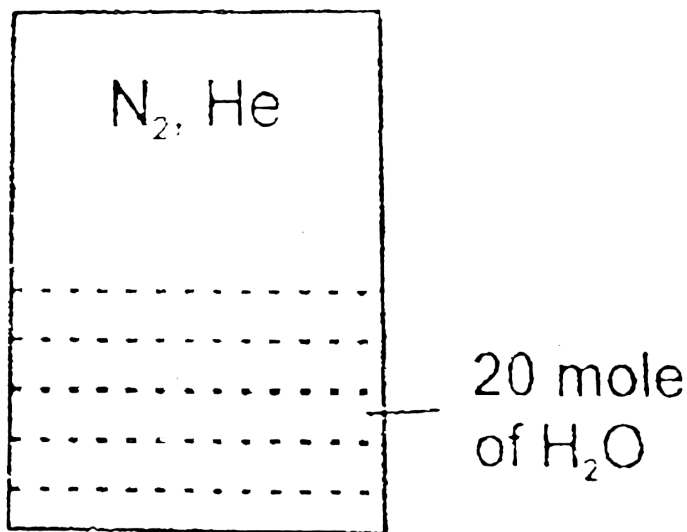
20 mole
of H_2O

257.

In the arrangement given below 20 mole of N_2 and 5 mole of He are present above water. The total pressure above the water is 60 atm. If K_H of N_2 is 10^5 atm. How many moles of N_2 are dissolved in water? give your answer after multiplying by 10^3 The vapour pressure of water is 10 atm.

258. An ideal monoatomic gas initially in state 1 with pressure $P_1 = 20$ atm and volume $V_1 1500 cm^3$ it is then taken to state 2 with pressure $P_2 = 1.5P_1$ and volume $V_2 = 2V_1$ find the change in internal energy in this process in KJ. (take $1 atm$ lit $= 100J$)

259. How many of the following are bidentate ligan?

Oxalate,   Glycinate,   Hydrazine,   Xyanide,   Acetylacetonate, Diethylenetriamine, $dmg^{\ominus}$, ammonia, sulphate, water.

260. Which of the following can act as ambidentate ligand?

$I^-, NO_2^-, CN^-, SCN^-, C_2O_4^{2-}, NH_3, en, H_2O$

261. Total number of stereoisomers of given compound are:
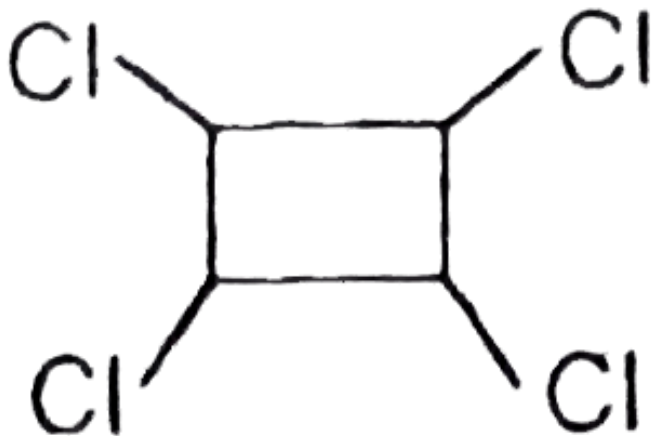
262. In following how many molecules contain plane of symmetry.

(1)

(2)

(3)

(4)

(5)

(6)

(7)

(8)
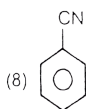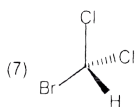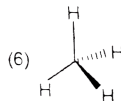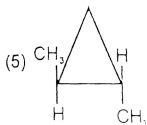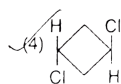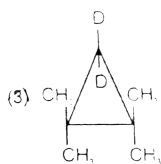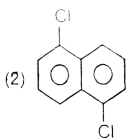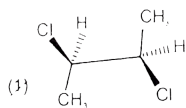
(9) PCl_5

(9). PCl_5

▷ **View Text Solution**

263. In following how many structures are chiral?

(i)

(ii)

(iii)

(iv)

(v)

(vi)

(vii)

(viii)

(ix)
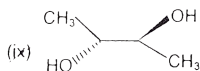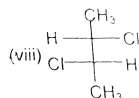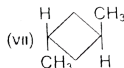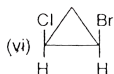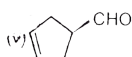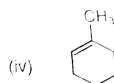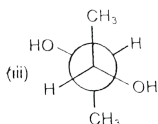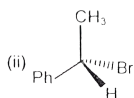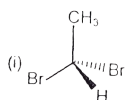
264. In following how many structures show geometrical isomerism?
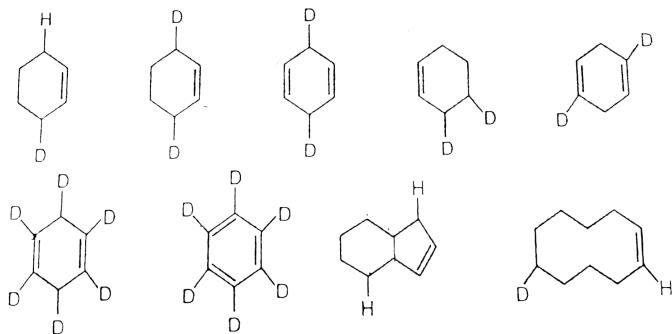
265. How many total possible products are formed in following reaction:
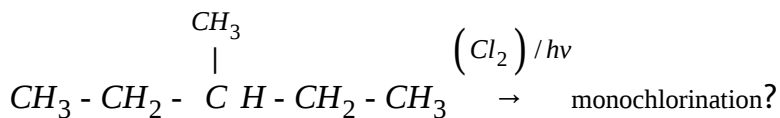
$$CH_3 - CH_2 - \overset{\overset{\displaystyle CH_3}{|}}{C}H - CH_2 - CH_3 \xrightarrow{\left(Cl_2\right)/hv} \text{monochlorination}?$$

266. How many statement(s) is/are correct?

(a). In every case, a pair of enantiomers have a mirror-image relation

(b). Mirror-image molecules are known as enantiomers.

(c). If a compound has an enantiomer it must be criral.

(d). Every chiral compound has a diastereomer.

(e). All diastereomers are chiral. (f). Any molecule containing stereocentre must be chiral.

(g). Some diastereomers have a mirror-image relationship.

(h). All asymmetric carbon are stereocentres

(i). Gauche form of n-butane along $\left(C_2 - C_3\right)$ is chiral is chiral, howerver anti form is achiral.

> ▶ View Text Solution

---

267. A group two element M forms a carbide which is actually a methanide (i.e., it gives off methane of hydrolysis). Then, which of the following statements is/are correct for the element?

A. The aqua complex of M^{2+} acidic.

B. Dolomite is an important mineral of the element M.

C. M is toxic.

D. $M(OH)_2$ is amphoteric and dissolves in excess $NaOH$ to form

hexahydroxido complex.

Answer: A::D

▶ **View Text Solution**

268. Which of the following represent(s) bidentate ligand(s)?

A. ox^{-2}

B. gly^-

C. dien

D. $acac^-$

Answer: A::B::C

---

269. Mark the correct statements(s) regarding Azeotropes

A. At azeotropic composition, vapour phase composition is same as the liquid phase composition.

B. Water and HNO_3 can form minimum boiling azeotrope.

C. Azeotropes are formed by non-ideal solution.

D. Boiling point of azeotropic solutions does not change while boiling thhe solution at constant external pressure. This bahavious is similar to ideal solution.

Answer: B::C

270. A hexa-coordinated complex of formula $CoCl_3.6H_2O$ undergoes 100 % ioisation is aqueous solutin to give van't Hoff factor equal to 3. Which of the following is/are correct regarding the given complex?

A. Effective atomic number of the complex is 36.

B. The complex loses some weight when treated with anhydrous $CaCl_2$

C. Aqueous solution of complex has negligible molar conductivity.

D. 1 mole of the complex gives 2 mole AgCl precipitate when treated with excess of $AgNO_3$ solution.

Answer: A::B::C

▶ View Text Solution

271. the red coloured Wilkinson's catalyst, $\left[RhCl(PPh_3)_3\right]$ is a homogenous catalyst used hydrogenation of alkenes. Which of the following is/are correct about is?

A. it is diamagnetic complex.

B. its IUPAC name is chloridotris (phenylphoshine) rhodium(I).

C. its coordination geometry about Rh is square planar.

D. it has $4sp^3$ hybridized atoms.

Answer: B::C

> ▶ Watch Video Solution

272. Which of the following IUPAC names(s) is/are not correctly matched with its formula?

A. Dichloridobis(ethane-1,2-diamine)cobalt(III) ion: $\left[CoCl_2(en)_2\right]^+$

B. Sodium (ethylenediaminetetraacetato)chromate(II):

$$Na_2\left[Cr(en)\left(CH_3COO\right)_4\right]$$
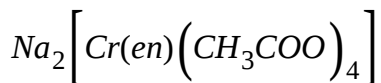
C. Tris(bipyridyl)iron(II) ion: $\left[Fe\left(NH_4C_5 - C_5H_4N\right)_3\right]^{2+}$

D. Ammineaquadibromidocopper(II): $\left[Cu\left(NH_3\right)\left(H_2O\right)Br_2\right]$

Answer: A

▶ **View Text Solution**

Progress of reaction
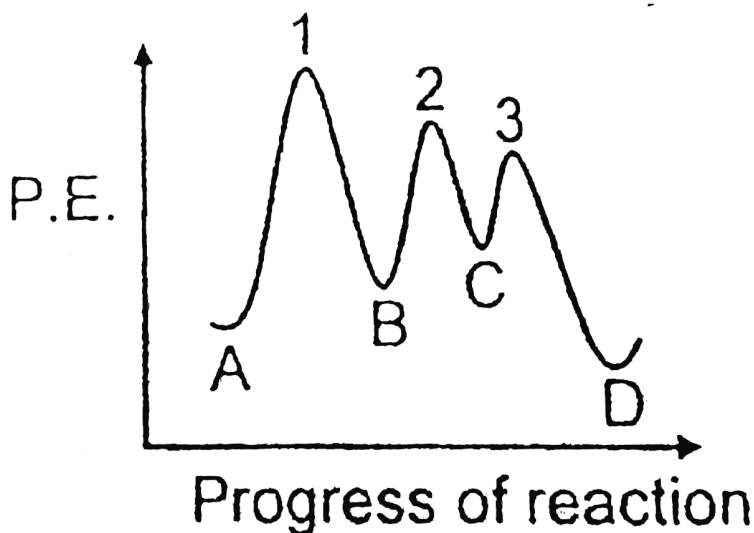
273.

Energy profile diagram for an exothermic reaction. $A \xrightarrow{1} B \xrightarrow{2} C \xrightarrow{3} D$,

is given below the step/s which is/are not rate determining for forward reaction?

A. $A \rightarrow B$

B. $B \rightarrow C$

C. $C \rightarrow D$
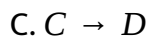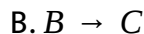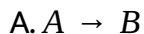
D. can't be predicted

Answer: B::C

274. (I)   (II)   (III)   (IV)
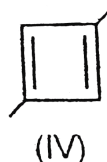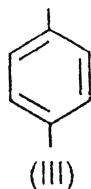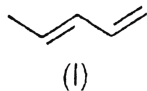
Consider the following compound:

The set of compound/s which give at least one same organic product after reductive ozonolysis:

A. I and II

B. II andIII

C. I and IV

D. II and IV

Answer: A::B

▶ Watch Video Solution

275.
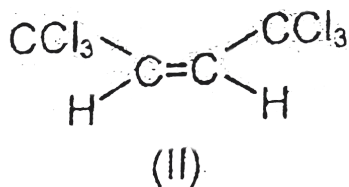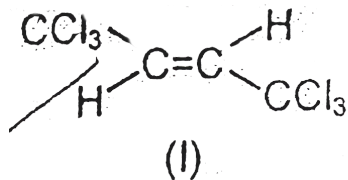
Which is/are true for the above isomeric forms I and II respectively?

A. Polarity (I). More , (II). Less

B. boiling point

(I). Less, (II). More

C. Solubility (in H_2O)

   (I). More, (II). Less

D. ΔH(hydrogenation)

   (I). Less

   (II). More

Answer: B

▶ **Watch Video Solution**
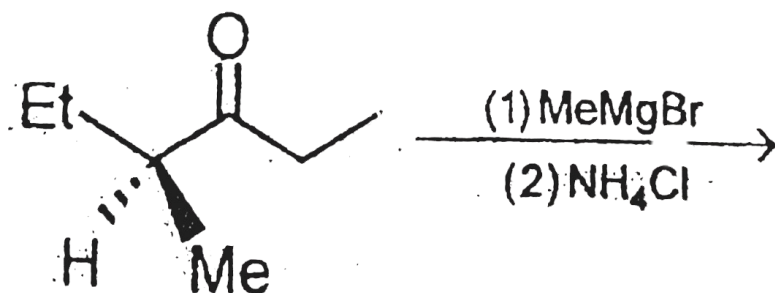
276.

Which of the following is/sre not corrcet regarding the product

formation ?

A. product is recemic mixture

B. products are diastereomers

C. product is a single stereoisomer

D. product is a meso-compound

Answer: B::C::D

▶ View Text Solution

277. Consider the two complexation equilibria in aqueous solution, between the cobalt (II) ion Co^{2+} (aq) and ethylenediamine (en) on the one hand and ammonia NH_3 on the other.

$$\left[CO(H_2O)_6\right]^{2+} + 6NH_3 \Leftrightarrow \left[Co(NH_3)_6\right]^{2+} + 6H_2O \text{ ...(1)}$$

$$\left[Co(H_2O_6)\right]^{2+} + 3en \Leftrightarrow \left[Co(en)_3\right]^{2+} + 6H_2O \text{ ..(2)}$$

Electronicaly, the ammonia and en ligands are very similar, since both bond through N and since the liwis base strengths of their nitrogen atoms are similar. This means that $\Delta H°$ must be very similar for the

two reactions, since six Co-N bonds are formed in each case. Interestingly however, the equilibrium constant is 100,000 times larger for the second reaction than it is for the first. This is the so called chelate effect: "the enhanced affinity of chelating ligands for a metal ion compared to similar non-chelating (monodentate) ligands for the same metal". The chelate effect is entropy-driven.

Q. qWhat may be main reason for reaction (2) having relatively such a large equilibrium constant?

A. Relatively small decrease in entropy in reaction 2

B. Relatively large decrease in entropy in reaction 2

C. Relatively small increase in entropy in reaction 2

D. relatively large increase in entropy in reaction 2

Answer: D

▶ Watch Video Solution

278. Consider the two complexation equilibria in aqueous solution, between the cobalt (II) ion Co^{2+} (aq) and ethylenediamine (en) on the one hand and ammonia NH_3 on the other.

$$\left[Co(H_2O)_6\right]^{2+} + 6NH_3 \Leftrightarrow \left[Co(NH_3)_6\right]^{2+} + 6H_2O \text{ ...(1)}$$

$$\left[Co(H_2O_6)\right]^{2+} + 3en \Leftrightarrow \left[Co(en)_3\right]^{2+} + 6H_2O \text{ ..(2)}$$

Electronicaly, the ammonia and en ligands are very similar, since both bond through N and since the liwis base strengths of their nitrogen atoms are similar. This means that $\Delta H°$ must be very similar for the two reactions, since six Co-N bonds are formed in each case. Interestingly however, the equilibrium constant is 100,000 times larger for the second reaction than it is for the first. This is the so called chelate effect: "the enhanced affinity of chelating ligands for a metal ion compared to similar non-chelating (monodentate) ligands for the same metal". The chelate effect is entropy-driven.

Q. Which of the following can be classified as a chelating ligand?

A. $edta^{-4}$

B. N_3^-

C. PPh_3

D. all of these

Answer: B

> ▶ View Text Solution

279. Crystal field theory with its assumptions of completely electrostatic metal-ligand interactions, does not appear to retionalize the spectrochemical series particularly well. To explain the order of ligands in the series we must admit some covalent contribution to the metal ligand bond, both sigma and pi.

Sigma bonds are formed by ligands using their p orbitals (e.g. Cl^-) or by hybrid orbitals (e.g. sp^3) by (H_2O) since all ligands are capable of such sigma interaction, this is not very useful in rationalizing spectrochemical series. The pi bonding ability of ligands partially

justifies their position in spectrochemical series. pi-acid ligands. which

can accept electron density from filled metal orbital into their empty

orbital via pi interation appear towards stronger/higher and of the

series e.g. CN^-. PR_3 etc. While sigma-donor ligands are typically weak

field ligands e.g. Cl^-, O^{2-} etc.

Q. Which of the following d orbitals of the central atom is useful for

sigma bond formation with ligands in octahedral field?

A. d_{xy}, $d_{x^2-y^2}$

B. d_{z^2}, $d_{x^2-y^2}$

C. d_{yz}, d_{xz}

D. d_{xy}, d_{yz}, d_{xz}

Answer: A

280. Crystal field theory with its assumptions of completely electrostatic metal-ligand interactions, does not appear to retionalize the spectrochemical series particularly well. To explain the order of ligands in the series we must admit some covalent contribution to the metal ligand bond, both sigma and pi.

Sigma bonds are formed by ligands using their p orbitals (e.g. Cl^-) or by hybrid orbitals (e.g. sp^3) by $\left(H_2O\right)$ since all ligands are capable of such sigma interaction, this is not very useful in rationalizing spectrochemical series. The pi bonding ability of ligands partially justifies their position in spectrochemical series. pi-acid ligands. which can accept electron density from filled metal orbital into their empty orbital via pi interation appear towards stronger/higher and of the series e.g. CN^-. PR_3 etc. While sigma-donor ligands are typically weak field ligands e.g. Cl^-, O^{2-} etc.

Q. Which of the following is false for CO ligand?

A. it is a pi-acid ligand.

B. CO accepts electron density from central atom into its pi

bonding molecular orbital.

C. CO forms sigma bond with central atom using its sp hybrid

orbital.

D. CO is a strong field ligand.

Answer: C

▶ **View Text Solution**

281. Dilithium is crucial to the propulsion system of some starships.

Dilithium is fomred by the adhesion of two lithium atoms in the gas

phase:

$Li(g) + Li(g) \rightarrow Li_2(g)$

The enthalpy of formation of dilithium is not easily measurable by

direct means. However, th following thermochemicalparameters are

known.

ΔH_f° of Li_g = 150kJ/mol

IE of Li_g = 5eV/atom[1eV/atom = 100kJ/mol]

BE of $Li_{(g)}^{+}$ = 130kJ/mol

IE of $Li_{2(g)}$ = 5eV/molecule

[IE = ionisation energy] [BE = bond energy]
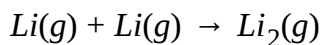
Q. What is ΔH_f° of $Li_{2(g)}$?

A. 130kJ/mol

B. 170kJ/mol

C. 270kJ/mol

D. -270kJ/mol

Answer: A

▶ View Text Solution

---

282. Dilithium is crucial to the propulsion system of some starships.

Dilithium is fomred by the adhesion of two lithium atoms in the gas

phase:

$Li(g) + Li(g) \rightarrow Li_2(g)$
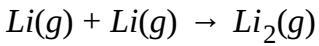
The enthalpy of formation of dilithium is not easily measurable by direct means. However, th following thermochemicalparameters are known.

ΔH_f° of Li_g = 150kJ/mol

IE of Li_g = 5eV/atom[1eV/atom = 100kJ/mol]

BE of $Li^+_{(g)}$ = 130kJ/mol

IE of $Li_{2(g)}$ = 5eV/molecule

[IE = ionisation energy] [BE = bond energy]

Q. What is bond energy of $Li_{2(g)}$?

    A. -230kJ/mol

    B. 230kJ/mol

    C. 170kJ/mol

    D. 130kJ/mol

Answer: B

(X)
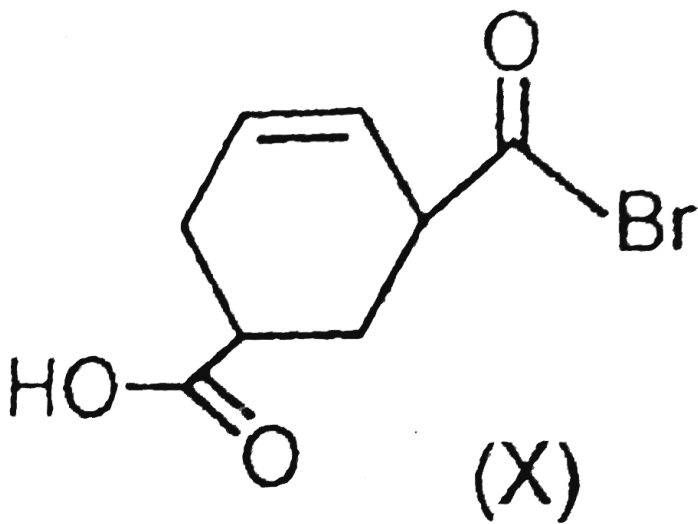
283.

Consider the following compound (X):

Q. Which of the following is correct regarding the given compound (X)?

(i). The IUPAC name of the compound (X) is 3-bromocarbonylcyclohex-4-enoic acid.

(ii). Trans form of compound(X) is optically inactive.

(iii). Compound (X) can show optical isomerism.

(iv). Total stereoisomers of compound (X) is four.

A. I,ii&iii

B. ii,iii&iv

C. ii&iii

D. iii&iv

Answer: D

▶ Watch Video Solution

(X)
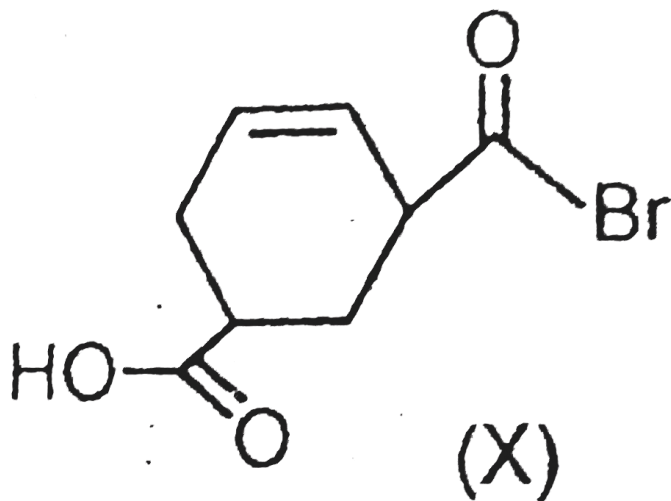
284.

Consider the following compound (X):

Q. When one equivalent of both phenylmagnesium halide and C_2H_6OH are reacted separately with compound (X), then the correct major products are:
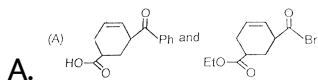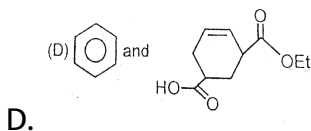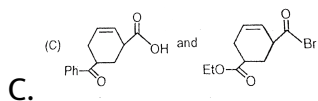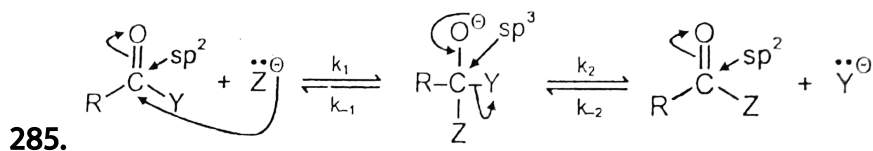
A.
(A) Ph and Br

B.

C.
(C) OH and Br

D.
(D) and OEt

Answer: C

▶ View Text Solution

285.

When a nucleophile attach te carbonyl group of a carboxylic acid

deriative, the carbon-oxygen π- bond breaks. The resulting

intermediate is called a tetrahedral inntermediuate because sp^2

carbon in the reactant has become a tetrahedral $\left(sp^3\right)$ carbon in the

intermediate.

Here $Y \overset{..}{}{}^{\ominus}$ is leaving gourp, the weaker base is expelled preferentially.

Q. Which of the following given compounds dot't form amide, when

react with CH_3COCl.

(1). CH_3 - NH - CH_3

(2). CH_3 - $N | CH_3$ - CH_2H_5
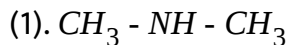
(3)
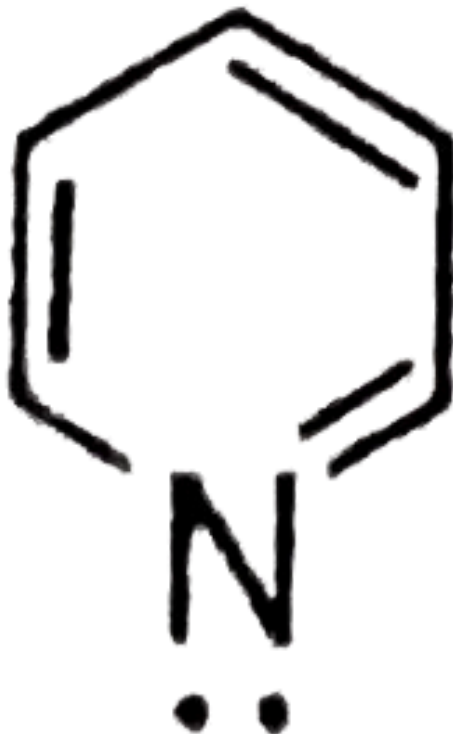
(3).

(4). $CH_3 - CH_2 - CH_2 - NH_2$

    A. (1 and 4)

    B. only (4)

    C. (2 and 3)

    D. only (1)

Answer: B

286.
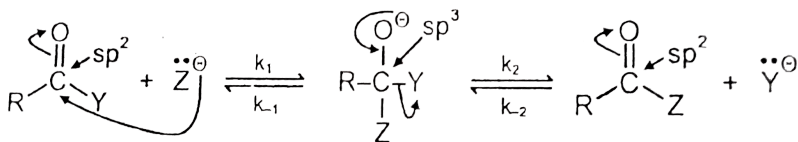
$$R-C(=O)(sp^2)Y \; + \; \ddot{Z}^{\ominus} \; \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} \; R-C(O^{\ominus})(sp^3)(Y)(Z) \; \underset{k_{-2}}{\overset{k_2}{\rightleftharpoons}} \; R-C(=O)(sp^2)Z \; + \; \ddot{Y}^{\ominus}$$

When a nucleophile attach te carbonyl group of a carboxylic acid deriative, the carbon-oxygen π- bond breaks. The resulting intermediate is called a tetrahedral inntermediuate because sp^2 carbon in the reactant has become a tetrahedral $\left(sp^3\right)$ carbon in the intermediate.

Here $\overset{..\ominus}{Y}$ is leaving gourp, the weaker base is expelled preferentially.

Q. Consider the following reaction:

$CH_3 - C| \; |O^{18} \overset{18\,\ominus}{-} C$

(2). $CH_3 - C| \; |O - C^{\ominus}$

(3). CH_3CH_2OH

(4). $CH_3CH_2\overset{18}{O}H$
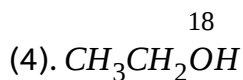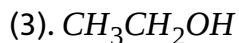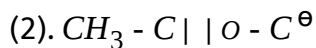
A. (1 and 4)

B. only (2)

C. (1 and 3)

D. only (4)

Answer: D

> ▶ **View Text Solution**

---

287. Consider a setup of two urea solution of concentration C_1 and $C_2 (C_2 > C_1)$, both at temperature T, separated by a semi permeable membrane. External pressure P_1 and P_2 respectively are applied on the two solutions. For what values of P_1 and P_2, osmosis does not occur through the semi permeable membrane? ($R =$ universal gas constant)

A. $P_1 = C_1RT$ and $P_2 = C_2RT$

B. $P_1 =$ zero and $P_2 = \left(C_2 - C_1\right)RT$

C. $P_1 = C_2 RT$ and $P_2 = C_1 RT$

D. $P_1 = 2C_1 RT$ and $P_1 = \left(C_2 + C_1 \right) RT$

Answer: A::B::D

▶ View Text Solution

288. Which of the following statements is/are correct?

A. First law of thermodynamics can be seen as law of conervation

of energy. So according to first law, total energy of a system

always remains constant.

B. pH is an extensive property.

C. Third law of thermodynamics state that entropy of a chemically

pure perfect crystal is zero at $0\,^\circ C$

D. Entropy of an isolated system always increases in an irreversible process.

Answer: D

▶ Watch Video Solution

289. The effect of absorption of CO_2 gas on acidity of water is explained by following three equilibrium reactions.

$CO_2 g Arr CO_{2(aq)}$

$CO_{2(aq)} + H_2O \Leftrightarrow H^+_{aq} + HCO^-_{3(aq)}$

$HCO^-_{3(aq)} + H_2O \Leftrightarrow H_3O^+_{aq} + CO^{2-}_3$
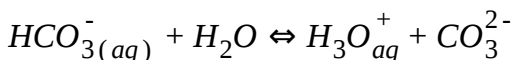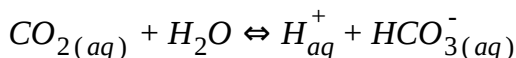
Which of the following will increase the solubility of CO_2 gas in water?

A. increasing the temperature

B. increasing partial pressure of CO_2 above water

C. addig HNO_3 in water

D. Adding sodium acetate in water.

Answer: B::D

▶ **View Text Solution**

---

290. Addition of HI will significantly suppress solubility or dissociation or hydrolysis of which of the following ?

A. HF_{aq}

B. HBr_{aq}

C. Saturated solution of sparingly solution of sparingly soluble salt PbI_2

D. $HClO_{4(aq)}$

Answer: A::C

▶ **Watch Video Solution**

291. Which of the following solutions will resist change in their pH on moderate dilution?

A. A solution which is 0.1 M in $PhNH_2$ and 0.2 M in $PhNH_3^+ Cl^-$

B. 0.1 M $NaHCO_3$

C. A solution obtained by mixing equal volumes of 0.1 M NaOH and 0.2 M PhOH.

D. 0.4 M CH_3COONH_4

Answer: A::B::C::D

▶ Watch Video Solution

---

292. Which of the following is/are true for a solution containing 30g urea in 100 g water?

$\left(K_f \text{ for water } = 1.9.° C. kg/mol \text{ and } K_b \text{ for water } = 0.5.° Ckg/mol \right.$

A. its relative lowering of vapour pressure is $(1/11)$

B. its freezing point is $-9.5.\,^\circ C$

C. its boiling point is $2.5.\,^\circ C$

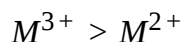D. van't hoff factor for urea in aqueous solution is 1

Answer: B::D

▶ **Watch Video Solution**

---

293. Which of the followig is/are correct regarding the magnitude of crystal field splitting energy Δ?

A. it depends on the coordination geometry. Δ for octahedral $>$

   square planar $>$ tetrahedral

B. it depends on oxidation number of central atom M. Δ for

   $M^{3+} > M^{2+}$

C. it depends on whether the central atom M belongs to 3 series

or $4d/5d$ series.

D. it depedns on the ligand.

Answer: B::C::D

▶ **Watch Video Solution**

294. Which of te following is/are correct for the water insoluble tellow coloured complex $K_2[PtCl_6]$?

A. It is an innter orbital complex.

B. it is high spin complex.

C. its IUPAC name is potassium hexachloridoplatinum (IV).

D. it is homoleptic complex.

Answer: A::D

295. Which of the following coordination complex is/are diamagnetic?

A. $K_3\left[Cu(CN)_4\right]$

B. $\left[CoCl_4\right]^{2-}$

C. $\left[Ni\left(H_2O\right)_6\right]^{2+}$

D. $\left[Zn\left(H_2O\right)_4\right]^{2+}$
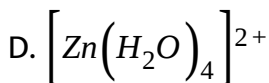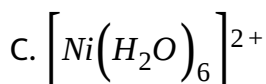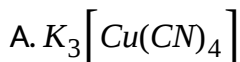
Answer: A::D

296. Consider a ideal solution of component 1 and component 2 component 1 being more volatile x_1 and x_2 represent the respective liquid phase compositions at equilibrium while y_1, y_2 denote the respective vapour phase compositions at equilibrium. p_1, p_2 are

respective partial pressure in vapour phase at equilibrium which of the following is/are necessarly are?
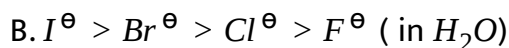
A. $p_1 > p_2$

B. $y_1 < y_2$

C. $y_1 > x_1$

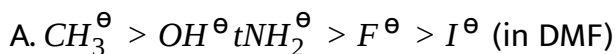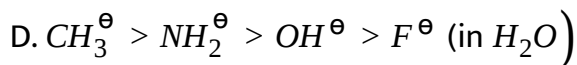D. $x_2 > y_2$

Answer: C::D

▶ Watch Video Solution

---

297. Mark out the incorrect order of nucleophilicity for given nucleophile:

A. $CH_3^{\ominus} > OH^{\ominus} tNH_2^{\ominus} > F^{\ominus} > I^{\ominus}$ (in DMF)

B. $I^{\ominus} > Br^{\ominus} > Cl^{\ominus} > F^{\ominus}$ (in H_2O)

C. $I^{\ominus} > F^{\ominus} > OH^{\ominus} > NH_2^{\ominus} > CH_3^{\ominus}$ (in DMSO)

D. $CH_3^{\ominus} > NH_2^{\ominus} > OH^{\ominus} > F^{\ominus}$ (in H_2O)

Answer: A::C

▶ **Watch Video Solution**

298.

Consider the given compound.: Correct statements is/are regarding these compound:

A. in structure (I), both marked H-atoms are on axial position.

B. In structure (II), both marked H-atoms are on axial position.

C. In structure (I), one H-atom is on axial position and other is on equatorial position.

D. in structure (II), one H-atom is on equatorial and other is one axial position.
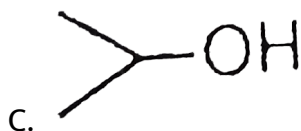
Answer: B::C

---

299. Which of the followig is/are correct?

A.

(I)   and   (II)
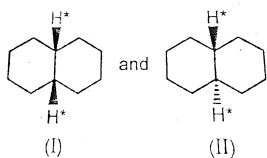
evolved N_2 gas on reaction with $NaNO_2/HCl$

B. Benzaldehyde does not gives fehling solution test.

C.

gives bright yellow ppt. with $I_2/OH^\ominus$

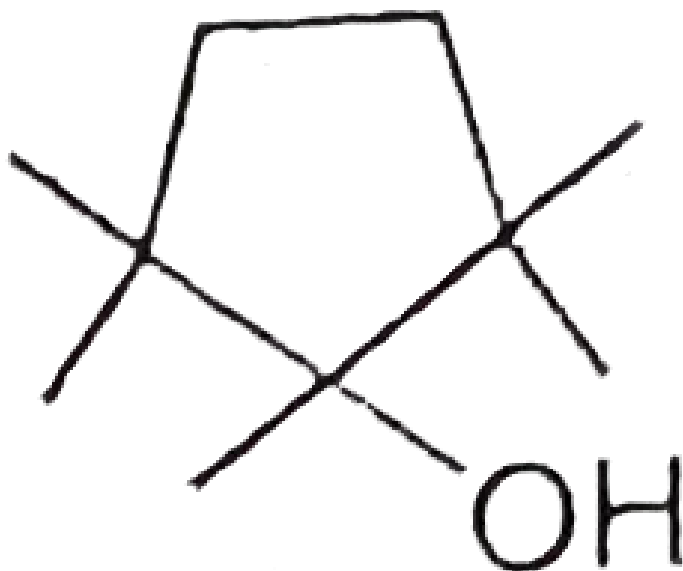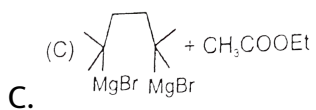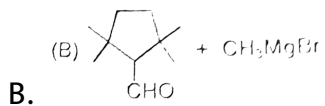D. Hydrazine gives prussian blue colour in lassigne's test.

Answer: A::B::C

300. the compound *Y*

OH

can not be prepared by using which of the reagents:

(A)   MgBr

A.

(B) + CH₃MgBr

CHO

B.

(C) + CH₃COOEt

MgBr MgBr

C.

(D)

 + CH₃COOEt

MgBr

D.
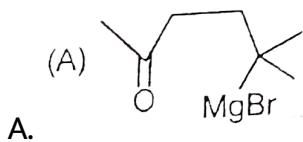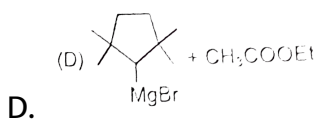
Answer: A::B::D

▶ **View Text Solution**

---

301. Consider the following compounds:

Choose the correct statements(s) from the following:

A. I,II and III are functional following

B. I and IV are position isomers

C. II and III are chain isomers

D. III and IV are metamers.

Answer: A::D

302. Select the incorrect statement among the following:

A. for the phenomenon of absorption $\Delta G < 0$

B. At high concentration of soap in water soap behaves as associated colloid
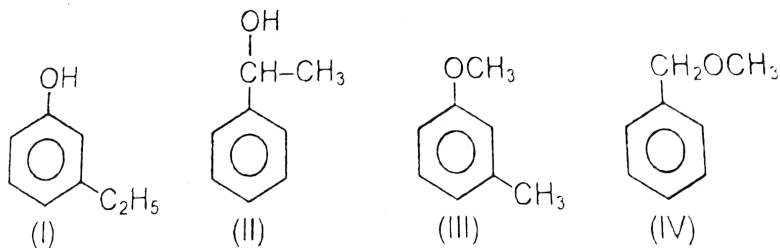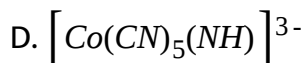
C. The term sorption stands for absorption

D. At te equilibrium position in the process of absorption $\Delta H = T\Delta S$.

Answer: C

303. Select the complex ion which shows geometrical isomerism.

A. $\left[Pt\left(NH_3 \right)_3 Cl \right]^+$

B. $\left[Cr\left(H_2O \right)_4 Cl_2 \right]^+$

C. $\left[Co\left(NH_3 \right)_6 \right]^{3+}$

D. $\left[Co(CN)_5(NH) \right]^{3-}$
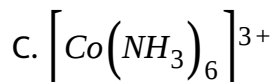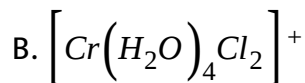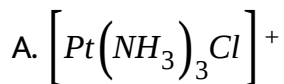
Answer: B

▶ **Watch Video Solution**

---

304. An unripe mango placed in a concentrated salt solution to prepare pickle, shrinks because____

A. it gains water due to osmosis.

B. It loses water due to reverse osmosis

C. it loses water due to osmosis

D. it gains water due to reverse osmosis.

Answer: C

▶ Watch Video Solution

---

305. which of the following complexes formed by X^{2+} ions is most stable?

A. $X^{2+} 4NH_3 \Leftrightarrow \left[X(NH_3)_4\right]^{2+}$, $\log K_{eq} = 11.6$

B. $X^{2+} + 4CN^- \Leftrightarrow \left[X(CN)_4\right]^{2-}$, $\log K_{eq} = 27.3$

C. $X^{2+} + 2en \Leftrightarrow \left[X(en)_2\right]^{2+}$, $\log K_{eq} = 15.4$

D. $X^{2+} + 4H_2O \Leftrightarrow \left[X(H_2O)_4\right]^{2+}$, $\log K_{eq} = 8.9$
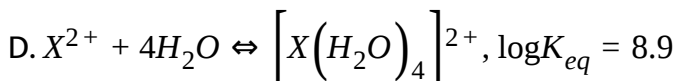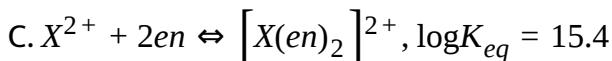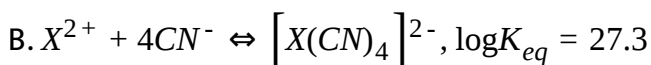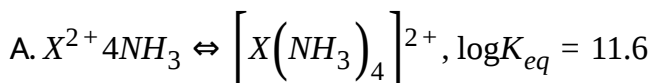
Answer: B

▶ Watch Video Solution

306. The correct statement(s) pertaining to the adsorption of a gas on a solid surface is (are)

A. Adsorption is exothermic

B. Physisorption may transform into chamisorption at high temperature

C. Physisorption increases with increasing temperature but chemisorption decreases with increasing temperature

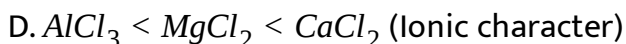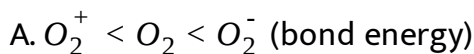D. chemisorption, is moer exothermic than physisorption, however it is usually very slow due to higher energy of activation.

Answer: C

▶ **Watch Video Solution**

307. Which of the following order is incorrect?

A. $O_2^+ < O_2 < O_2^-$ (bond energy)

B. $BF_3 = BCl_3 = BBr_3$ (bond angle)

C. $N - H < P - H < As - H < Sb - H$ (Bond length)

D. $AlCl_3 < MgCl_2 < CaCl_2$ (Ionic character)

Answer: A

▶ Watch Video Solution

---

308. Which liquids pair shows a positive deviation from Raoult's law?

A. Acetone-chloroform

B. Water-nitric acid

C. Benzene-methanol

D. Water-hydrochloric acid

Answer: C

Gases	H_2	He	O_2	NH_3
Critical temperature in Kelvin	33.3	5.3	154.4	405.5

309.

Gases possess characteristic critical temperature which depends upon the magnitude of intermolecular forces between the particles. Following are the critical tempeatures of some gases. From the above data what would be the order of liquefaction of these gases? Start writing the order from the gas liquefying first.

A. He, H_2, O_2, NH_3

B. NH_3, O_2, H_2, He
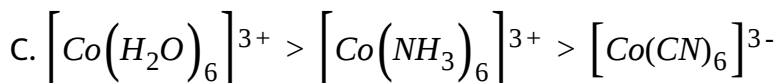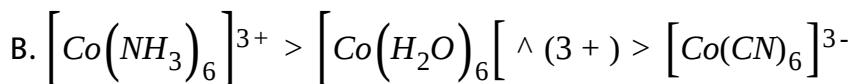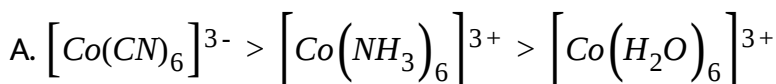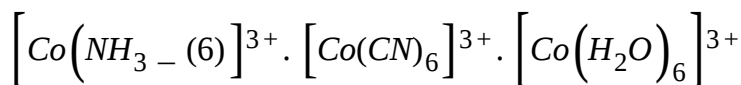
C. NH_3, He, O_2, H_2

D. none of these

Answer: B

▶ Watch Video Solution

---

310. The colour of the coordination compounds depends on the crystal field splitting. What will be the correct order of absorption of wavelength of light of the visible region, for the complexes,
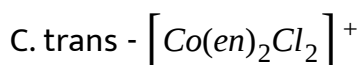
$$\left[Co\left(NH_3 - (6)\right)\right]^{3+}. \left[Co(CN)_6\right]^{3+}. \left[Co\left(H_2O\right)_6\right]^{3+}$$

A. $\left[Co(CN)_6\right]^{3-} > \left[Co\left(NH_3\right)_6\right]^{3+} > \left[Co\left(H_2O\right)_6\right]^{3+}$

B. $\left[Co\left(NH_3\right)_6\right]^{3+} > \left[Co\left(H_2O\right)_6\right[^{(3+)} > \left[Co(CN)_6\right]^{3-}$

C. $\left[Co\left(H_2O\right)_6\right]^{3+} > \left[Co\left(NH_3\right)_6\right]^{3+} > \left[Co(CN)_6\right]^{3-}$

D. none of these

Answer: C

311. Identify the optically inactive compound from the following:

A. $\left[Co(en)_3\right]^{3+}$

B. cis - $\left[Co(en)_2Cl_2\right]^{+}$

C. $trans$ - $\left[Co(en)_2Cl_2\right]^{+}$
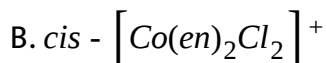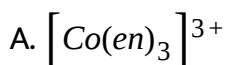
D. none of these

Answer: C

312. What is the hybridisation of cation of liquid BrF_3, which undergoes self-dissociation.

A. sp^2

B. sp^3

C. sp

D. sp^3d

Answer: B

▶ **Watch Video Solution**

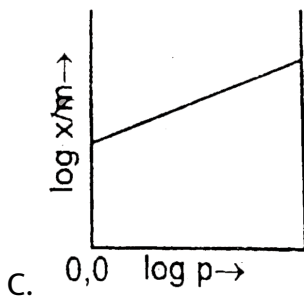**313.** Which of the following electrolytes will have maximum coagulating value for Ag/Ag^+ sol?
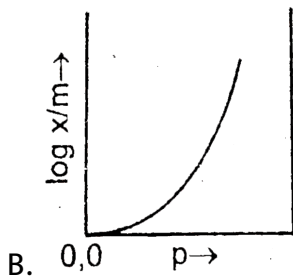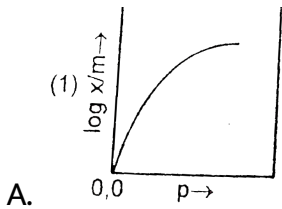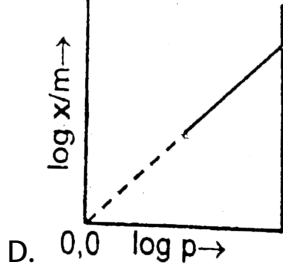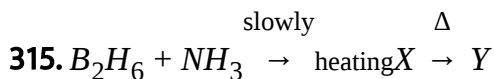
A. Na_2S

B. Na_3PO_4

C. Na_2SO_4

D. $NaCl$

Answer: D

314. Which of the following curves is in accordance with Freundlich adsorption isotherm ?

A.

B.

C.

D. 0,0 log p→

Answer: C

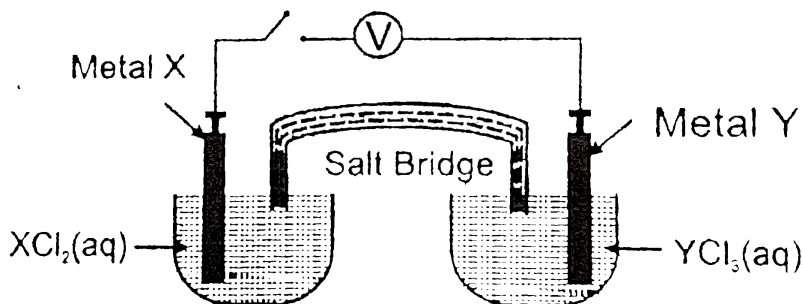315. $B_2H_6 + NH_3 \xrightarrow[\text{heating}]{\text{slowly}} X \xrightarrow{\Delta} Y$

Which of the following statement is incorrect?

A. X is ionic in nature

B. Hybridisation state of B in both cationic and anionic part of X is

same.

C. Y has planar structure.

D. Y is covalent and hybridisation state of all B is different.

Answer: D

316.

The following diagram shows the setup of an electrochemical cell in which the respective half cells contain aqueous 1.0 M solutions of the salts XCl_2 and YCl_3. Given that

$3X(s) + 2Y^{3+}(aq) \rightarrow 3X^{2+}(aq) + 2Y(s) E_{cell}L < 0$ Which of the following statements is correct?

A. The electrode made from metal X has positive

B. Electrode Y is te anode

C. The flow of electrons is from Y to X

D. Ions move randomly in salt bridge here.

Answer: D

▶ **Watch Video Solution**

---

317. How many carbon atoms lie in a plane in $\left[Ni(dmg)_2\right]$?

A. 8

B. 4

C. 6

D. none of these

Answer: A

▶ **Watch Video Solution**

318. What is the IUPAC name of $Hg\left[Co(SCN)_4\right]$?

A. Mercury(II) tetrathiocynato-S-cobaltate(II)

B. Marcury(I) tetrathiocyanato-S-cobaltate(II)

C. mercury(II) tetrathiocyanato-N-cobaltate(II)

D. mercury(II) tetrathiocyanato-S-cobalt(II)

Answer: A

▶ **Watch Video Solution**

---

319. Solute A is a ternary electrolyte and solute B is non-elctrolyte ,if 0.1M solution of solute$B$ produces an osmotic pressure of $2P$,then 0.05Msolution of Aat the same temperature will produce on osmotic pressure equal to
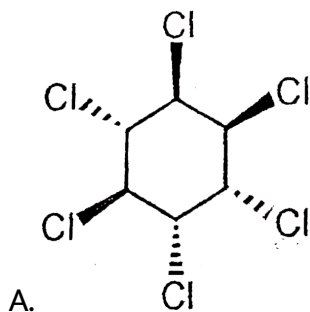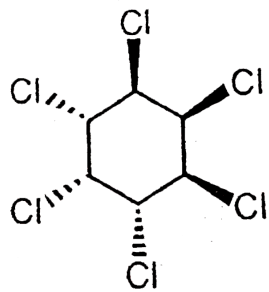
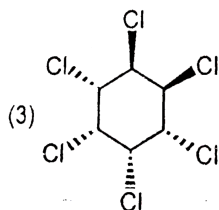A. $2P$

B. 1.5P

C. 3P

D. none of these

Answer: B

▶ Watch Video Solution

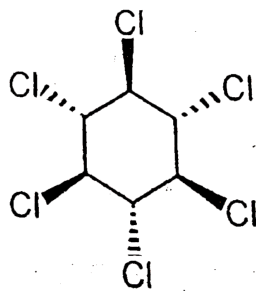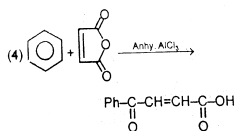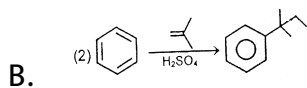**320.** Identify the optically active stereoisomer of benzene hexachloride (BHC).

A.

B.

(3)

C.

D.

Answer: A

▶ **Watch Video Solution**

321. Which of te following reaction gives correct major product-

A.

(1) → Cl₂/Δ (1) → Ph–H/Anhy AlCl₃ (2) →

CH_2 with Br and Br₂/Δ (3)

B.

(2) → H₂SO₄ →

C.

(3) + CH_2-Cl → Anhy AlCl₃ →

D.

(4) + → Anhy AlCl₃ →

$Ph-C-CH=CH-C-OH$ (with =O groups)

Answer: D

▶ View Text Solution

---

322. $Ph - C \equiv C - CH_2 - CH_3 - \left(\dfrac{Hg^{2+}}{D^{\oplus}} \right) \rightarrow \dfrac{D_2SO_4}{D_2O} A$, A is

A. $Ph - C | \, | O - CH_2 - C | DH - CH_3$

B. $Ph - C | \, | O - C | DH - CH_2 - CH_3$

C. $Ph - C | OHD - CH_2 - CH_2 - CH_3$
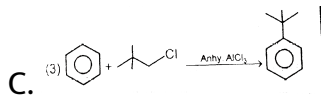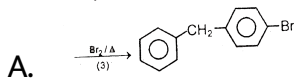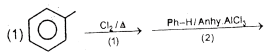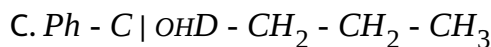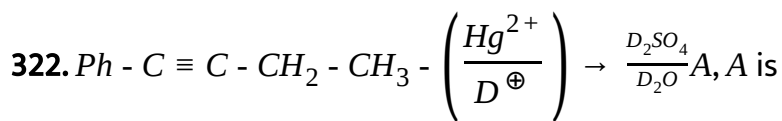
D. $Ph - C| |o - CD_2 - CH_2 - CH_3$

Answer: D

▶ Watch Video Solution

Y [Position isomer of X]

X [C_7H_8O] ──────→ Z [Chain isomer of X]

Benzenoid
compound ──────→ W [Functional group
isomer of X and
does not give
Victor mayer test]
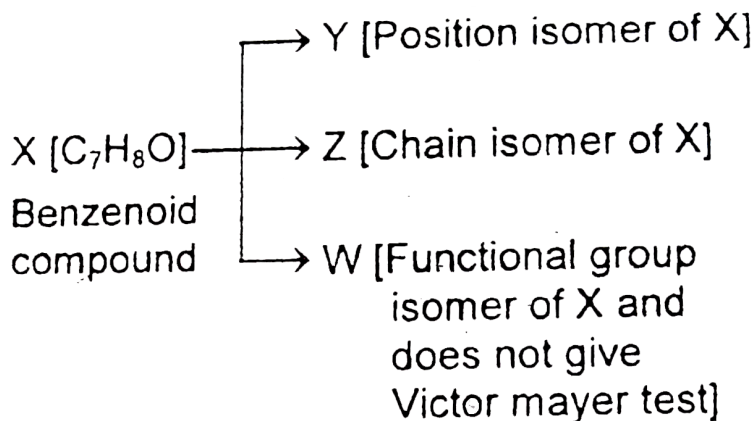
323.
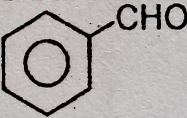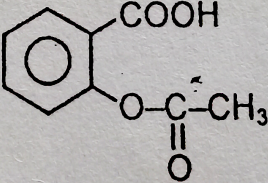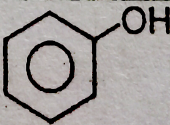
Choose the correct option if compound X gives positive test with

neutral $FeCl_3$

OCH$_3$

(1) W is

A.

B. Y is

C. Z is

D. X is
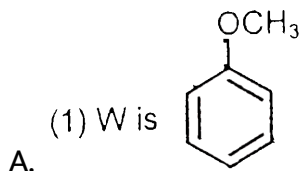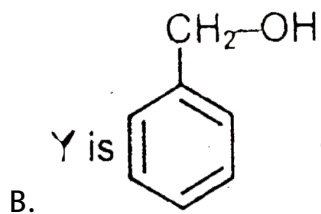
Answer: A

▶ **Watch Video Solution**

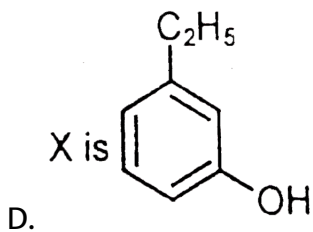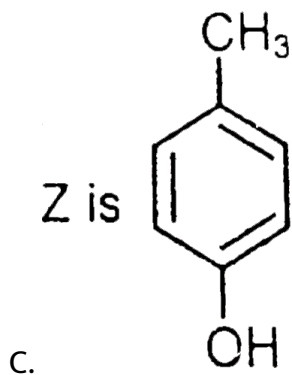| Column A			Column B
P.	Aspirin	A.	(benzaldehyde CHO on benzene ring)
Q.	Oil of bitter almond	B.	(benzene ring with COOH and O–C–CH₃ with C=O) $COOH$, $O-C-CH_3$, $\overset{\|}{O}$
R.	Carbolic acid	C.	(benzene ring with OH)

324.

The correct match of the compoun in column a with the description

in column B is:

A. $P \rightarrow A, Q \rightarrow B, R \rightarrow C$

B. $P \rightarrow B, Q \rightarrow A, R \rightarrow C$

C. $P \rightarrow B, Q \rightarrow C, R \rightarrow A$

D. $P \rightarrow C, Q \rightarrow B, R \rightarrow A$

Answer: B

325. In which fo the following reaction the product formed by anti markonikoff rule is observed:

A. $ClCH = CH_2 \xrightarrow{HCl}$

B. $CH_3CH = CH_2 \xrightarrow{HCl}$

C. $CH_3OCH = CH_2 \xrightarrow{HCl}$
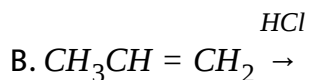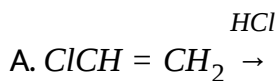
D. none of these

Answer: B

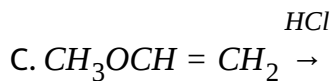**326.** In which of the following reaction ethyl benzene obtained in good yield:

A. (1) $\bigcirc$ + ~~CI $\xrightarrow{AlCl_3}$

B. (2) $\bigcirc$ $\xrightarrow[\text{2. Zn-Hg/H}^+]{\text{1. } \overset{O}{\overset{\|}{C}}-Cl \text{ / AlCl}_3}$

C. (3) $\bigcirc$ + ~~OH $\longrightarrow$

D. $\bigcirc$ $\xrightarrow[\text{2. KMnO}_4/\text{H}^+]{\text{1. } \diagdown\text{Cl / AlCl}_3}$

Answer: B

▶ Watch Video Solution

$$\text{Benzene} \xrightarrow{C_2H_5Cl\,/\,AlCl_3} \xrightarrow{(X)}$$

$$\xrightarrow{(Y)} \quad \text{(4-ethylbenzoic acid: COOH / } C_2H_5 \text{)}$$
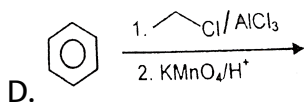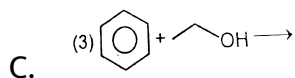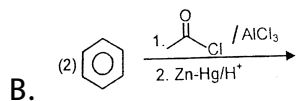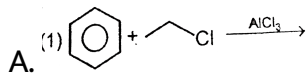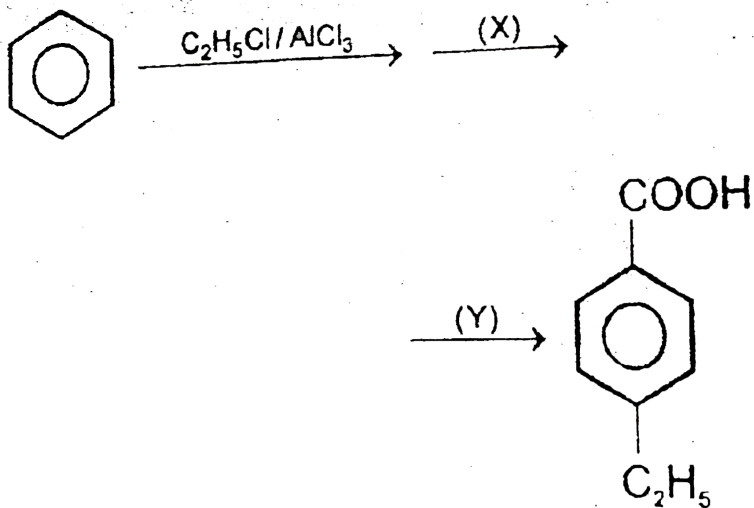
327.

The reagents X and Y are respectively:

A. $X = CH_3COCl/AlCl_3$

   $Y = KMnO_4/OH^{\ominus}/\Delta$, acidification

B. $X = CH_3CH_2Cl/AlCl_3$

   $Y = CrO_3/H^{\oplus}/\Delta$

C. $X = CH_3COCl/AlCl_3$

   $Y = I_2/NaOH$, acidification

D. $X = KMnO_4/OH^{\ominus}/\Delta$ acidification,

   $Y = CH_3CH_2Cl/AlCl_3$
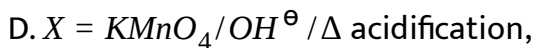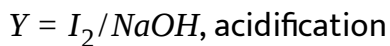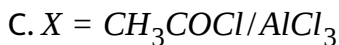
Answer: C

328. Which of the following is a step in the mechanism of the reaction shown?

$$CH_2 = CH - CH_3 + HBr \xrightarrow{\text{Peroxide}} C|BrH_2 - CH_2 - CH_3$$

A. (1) •‿‿✓ + HBr

B. Br (structure with radical •) + HBr

C. Br (structure with ⊕ charge) + HBr

D. ⊕‿‿✓ + HBr

Answer: B

329.

$(1) PhMgBr$

$\rightarrow$ $(2) H^{\oplus} / H_2O$ product
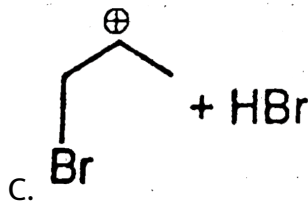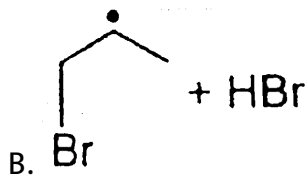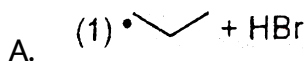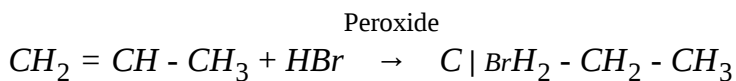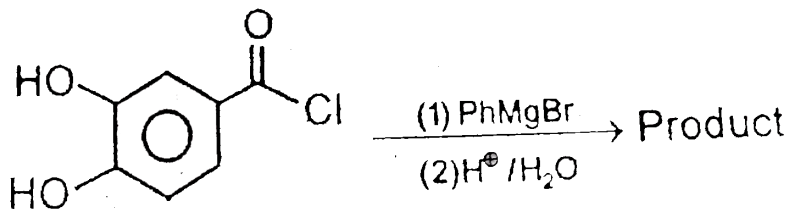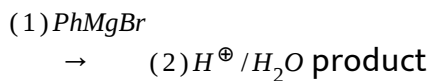
$\left(3^{\circ}\ \text{alcohol}\right)$

Number of equivalent of $PhMgBr$ consumed in above reaction is/are:

A. 1

B. 2

C. 4

D. 3

Answer: C

330. Choose the correct option for major product

A.

B.

C. $CH_3 - CH_2 - C \equiv CH \quad \xrightarrow{\substack{(1)BH_3 \\ (2)H_2O_2/\overset{\ominus}{OH}}} 1\text{- butanol}$

D. $CH_3 - C \equiv Ch \quad \xrightarrow{HOBr} \quad CH_3 - \overset{\overset{O}{||}}{C} - CBr_2$
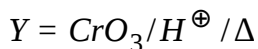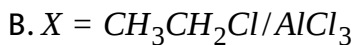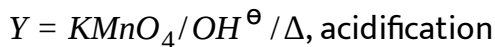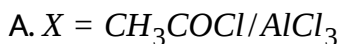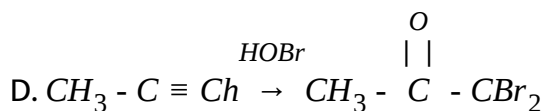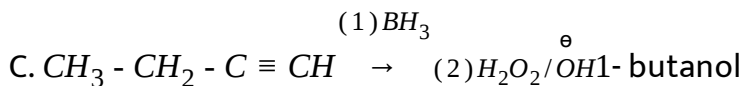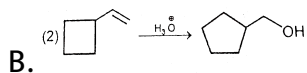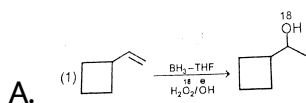
Answer: D

▶ Watch Video Solution

---

331. A mixture of boron trichloride and hydrogen is subjected to silent electric discharge to form (A) and HCl. (A) is mixed with ammonia and heated to $200 \degree C$ to from (B). Identify (A) and (B).

A. B_2H_6

B. $B_3N_3H_6$

C. $H_3N \rightarrow BH_3$
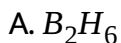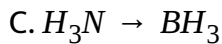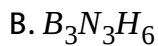
D. none of these

332. HOMO (highest occupied molecular orbital) of N_2 molecule is (consider x-axis as an inter nuclear axis):

A. $\sigma 2p_z$

B. $\sigma 2p_x$

C. $\pi 2p_x$

D. $\sigma 2p_y$
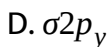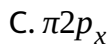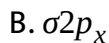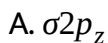
333. Which one of following compound undergoes bromination of its aromatic ring (electrophilic aromatic substitution) at the faster rate ?

A.
(A)

B.
(B)

C.
(C)

D.
(D)
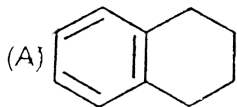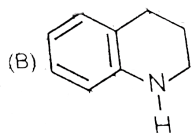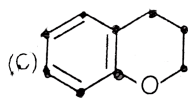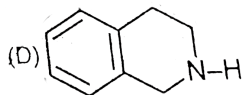
334. To obeserve the effect of concentration on the conductivity, electrolytes of different natures are taken in two vessels A and B, A contains weak electrolyte, $e.g.$, NH_4OH and B contains strong electrolyte, $e.g.$, $NaCl$. In both containers, the concentration of respective electrolyte is increased and the conductivity observed:

A. In 'A' molar conductivity increases.

B. In 'A' molar conductivity decreases

C. In 'B' molar conductivity increases.

D. In 'B' molar conductivity decreases.

▶ Watch Video Solution

335. In the electrolysis of an aqueous potassium sulphate solution, the PH of the solution in the space near an electrode increased. Which pole of the current source is the electrode connected to ?

A. The positive pole

B. could be either pole

C. The negative pole

D. cannot be determined

336. Arrange the following compounds in order of increasing molar conductivity

(a) $K\left[Co\left(NH_3\right)_2\left(NO_2\right)_4\right]$

(b) $\left[Cr\left(NH_3\right)_3\left(NO_2\right)_3\right]$

(c) $\left[Cr\left(NH_3\right)_5\left(NO_2\right)\right]_3\left[Co\left(NO_2\right)_6\right]_2$

(d) $Mg\left[Cr\left(NH_3\right)\left(NO_2\right)_5\right]$

A. $II < I < IV < III$

B. $II < IV < I < III$

C. $II < IV = III$

D. $IV < III < II < I$

337. Standard reduction potentials (SRP) for different systems can be used to decide the spontaneity of a reaction e.g., $E^{\circ}_{Zn^{2+}/Zn} = -0.76V$, hence for the reaction $Zn + 2H^{+} \rightarrow Zn^{2+} + H_2$, ΔG° is negative. It has been found experimentally that if (SRP of an oxidant-SRP of a reductant) is more than 1.7V, then their combination may lead to explosion (though it may be prevented by kinetic factors).

Now go through the following data and answer the questions.

Data:

$E^\circ_{Ag^+|Ag} = 0.80$ V ;

$E^\circ_{N_2|N_3} = -3.09$ V

$E^\circ_{ClO_4^-|ClO_3^-} = 1.23$ V ;

$E^\circ_{Na^+|Na} = -2.71$ V

$E^\circ_{Fe^{3+}|Fe^{2+}} = 0.77$ V ;

$E^\circ_{O_2|H_2O_2} = -1.03$ V

$E^\circ_{H_2O_2|H_2O} = 1.76$ V ;

$E^\circ_{O_3|O_2} = 2.07$ V

$E^\circ_{MnO_4^-|Mn^{2+}} = 1.54$ V ;

$E^\circ_{Cr_2O_7^{2-}|Cr^{3+}} = 1.33$ V

Which of the following ionic combinations may lead to the formation of explosive substance?

A. sodium ion and azide ion

B. silver ion and perchlorate ion

C. silver ion and azide ion

D. Fe^{3+} ion and azide ion

▶ Watch Video Solution

---

338. Standard reduction potentials (SRP) for different systems can be used to decide the spontaneity of a reaction e.g., $E^\circ_{Zn^{2+}/Zn} = -0.76V$,

hence for the reaction $Zn + 2H^+ \rightarrow Zn^{2+} + H_2$, $\Delta G°$ is negative. It

has been found experimentally that if (SRP of an oxidant-SRP of a

reductant) is more than 1.7V, then their combination may lead to

explosion (though it may be prevented by kinetic factors).

Now go through the following data and answer the questions.

Data:

$E_{Ag^+|Ag} = 0.80$ V ; $E_{N_2|N_3^-} = -3.09$ V

$E_{ClO_4^-|ClO_3^-} = 1.23$ V ; $E_{Na^+|Na} = -2.71$ V

$E_{Fe^{3+}|Fe^{2+}} = 0.77$ V ; $E_{O_2|H_2O_2} = -1.03$ V

$E^\circ_{H_2O_2|H_2O} = 1.76$ V ; $E_{O_2|O_2} = 2.07$ V

$E^\circ_{MnO_4^-|Mn^{2+}} = 1.54$ V ; $E_{Cr_2O_7^{2-}|Cr^{3+}} = 1.33$ V

Which of the following ion will be capable of causing catalytic

decomposition of H_2O_2?

A. Fe^{3+}

B. Fe^{2+}

C. Na^+

D. Ag^+
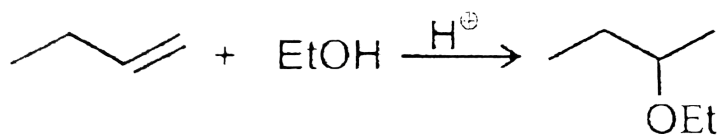
339.

The electrophile in first step is

A. $CH_3 \overset{\oplus}{C}H_2$

B. $H^{\oplus}$

C. $CH_3 - CH_2 - \overset{\oplus}{C}H - CH_3$

D. $CH_3CH_2CH_2\overset{\oplus}{C}H_2$

$$\text{CH}_2=\text{CHCH}_3 \quad + \quad \text{EtOH} \xrightarrow{\ H^{\oplus}\ } \text{CH}_3\text{CH}(\text{OEt})\text{CH}_3$$

340.

The electrophile in second step is

A. $\overset{\oplus}{CH_3CH_2}$

B. $H^{\oplus}$

C. $CH_3\overset{\oplus}{C}HCH_2CH_3$

D. $CH_3CH_2\overset{\oplus}{C}HK_2CH_2$
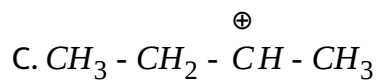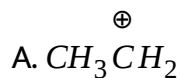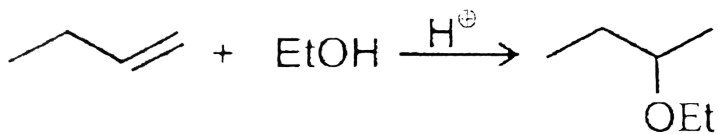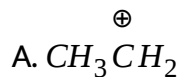
▶ **Watch Video Solution**

341. How many alkene/s react faster than propene with dil H_2SO_4?

(a)

(b)
Ph

(c)
Ph
Ph

(d)
CH_3O

(e)

(f)

(g)

(h)
Cl
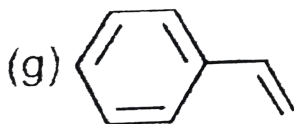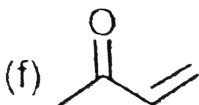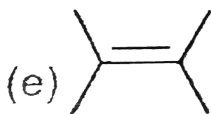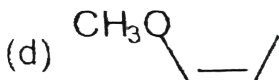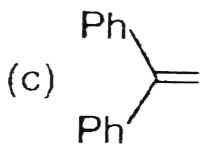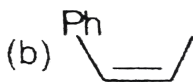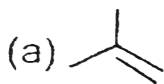
▶ Watch Video Solution

---

342. Which of the following displacement occur:

A. $Zn + 2H^+ \rightarrow Zn^{2+} + H_2 \uparrow$

B. $Fe + 2Ag^+ \rightarrow Fe^{2+} + Ag \downarrow$

C. $Cu + Fe^{2+} \rightarrow Cu^{2+} + Fe \downarrow$

D. $Zn + Pb^{2+} \rightarrow Zn^{2+} + Pb \downarrow$
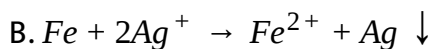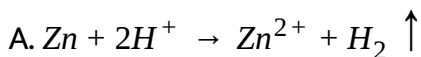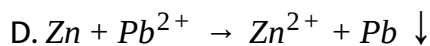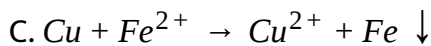
Answer: A::B::D

▶ View Text Solution

343. Conjugate base of $\left[Al(H_2O)_6\right]^{3+}$ is

A. $\left[Al(H_2O)_5(OH)\right]^{+2}$

B. $\left[Al(H_2O)_5(OH)\right]^{+3}$

C. $\left[Al(H_2O)_5(H_3O^+)\right]^{+4}$

D. $\left[Al(OH)_4\right]^-$
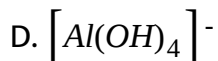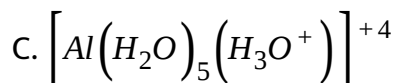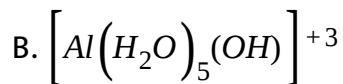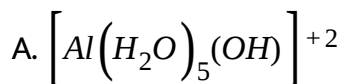
Answer: A

▶ Watch Video Solution

344. Which are true for a standard hydrogen electrode ?

A. The hydrogen ion concentration is 1M

B. Temperature is $25\,^{\circ}C$

C. Pressure of hydrogen is 1 atmosphere

D. It contains a metallic conductor which does not absorb

hydrogen.

Answer: A::B::C

▶ Watch Video Solution

345. A correct electrochemical series (increasing SRP) can be obtained

from K. Li, Zn, Fe, H, Ag, Cu, Au by interchanging:

A. K and Li

B. Zn and Fe

C. Ag and Cu

D. Fe and H

Answer: A::C

---

346. For a reaction, $Ox + \neq^- \rightarrow red$, the neerst equation has a form of:

A. $E = E° + \dfrac{RT}{nF}\dfrac{\ln([red])}{[Ox]}$

B. $E = E° - \dfrac{RT}{nF}\dfrac{\ln([red])}{[Ox]}$

C. $E = E° - 2.303\dfrac{RT}{nF}\dfrac{\log([red])}{[Ox]}$

D. $E = E° + \dfrac{RT}{nF}\dfrac{\log([red])}{[Ox]}$

Answer: B::C

347. The e.m.f. of the cell

$Ti \left| Ti^+(0.001M) \right| \left| Cu^{2+}(0.01M) \right| Cu$ is 0.83V the emf of this cell could b

e increased by

    A. increase the concentration of Cu^{++} ions

    B. Decreasing the concentration of Ti^+

    C. Increasing the concentration of both

    D. None of these.

Answer: A::B

> ▶ **Watch Video Solution**

---

348. The CORRECT statement (s) is/are:

    A. In metallurgy of iron, flux is a substance used to convert

        infusible impurities to fusible mass.

B. Cryolite is Na_3AIF_6 and is used in the electrolysis of alumina for lowering the melting point of alumina.

C. Combination of FeO with SiO_2 must be avoided in metallurgy of copper.

D. Lead can be extracted by self reduction of gelena.

Answer: A::B::D

▶ **View Text Solution**

---

349. Which does not represent a concentration cell?

A. $Pt \mid H_2 \mid HCl \mid \mid CHI \mid Pt \mid H_2$

B. $Pt \mid H_2 \mid HCl \mid \mid Cl_2 \mid Pt$

C. $Zn \mid Zn^{2+} \mid \mid Cu^{2+} \mid Cu$

D. $Fe \mid Fe^{+2} \mid \mid Cu^{2+} \mid Cu$
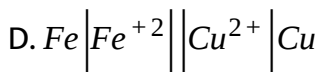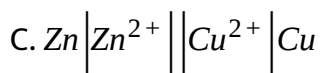
Answer: B::C::D

350. $Pb|PbSO_4|H_2SO_4(aq) |$ $|$ $PbCl_2$ saturated solution $|Cl_2|Pt$ As the cell discharged:

    A. Conductivity of anode solution decreases

    B. Concentration of Pb^{2+} increases at anode solution and

       decreases at cathode

    C. E°_{cell} depends on K_{sp} of $PbSO_4$ and K_{sp} of $PbCl_2$

    D. E°_{cell} is zero

Answer: A::C

351. Which of the following correctly represent the equivalent conductivity $\left(\wedge_N\right)$ and molar conductivity $\left(\wedge_M\right)$ of aluminium sulphate where equivalent conductivities of Al^{+3} and SO_4^{-2} are λ_1 and λ_2 respectively?

A. .^^_(N)=lamda_(1)+lamda_(2)`

B. .^^_(M)=3lamda_(1)+2lamda_(2)`

C. .^^_(N)=(lamda_(1))/(3)+(lamda_(2))/(2)`

D. .^^_(M)=6lamda_(1)+6lamda_(2)`

Answer: A::D

▶ View Text Solution

---

352. Four moles of electrons were transferred from anode to cathode in an experiment of electrolysis of water. The volumes of gases (at STP) produced will be approximately (in litres).

A. $.^{\wedge\wedge}\_(H\_(2))=22.4$`

B. $V_{H_2} = 44.8$

C. $V_{O_2} = 22.4$

D. $V_{O_2} = 44.8$

Answer: B::C

▶ **Watch Video Solution**

353. The amount of an ion discharged during electrolysis is directly proportional to :

A. resistance time

B. current strength

C. electrochemical equivalent of the element.

D.

Answer: B::C::D

---

354. Observe the following two reactions:

(I). $CH_3 - C||O - CH + C_2H_5H \xrightarrow{18H_2SO_4}$ products + water

(II). $(X) +$ water $\xrightarrow[\Delta]{\text{sodium hydroxide}}$ $CH_3 - C||O - ONa + C_2H_5OH$ (18 above)
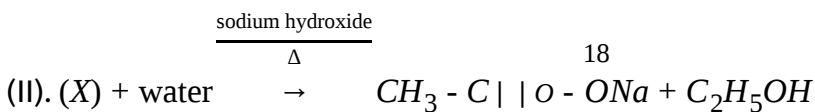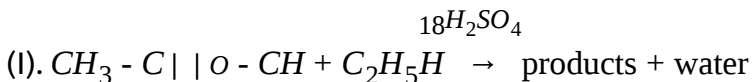
the correct statements are:

A. In reaction(I) the products is $CH_3 - \overset{18}{C}||O - O - C_2H_5$

B. In reaction (II) the reactant is $CH_3 - \overset{18}{C}||O - C - C_2H_5$

C. In reaction (II) the reagent is $\dfrac{H_2 \text{ overset } (18)}{\underset{NaOH}{18}}$

D. Reaction (I) is irreversible while reaction (II) is reversible.

Answer: A::C

355. identify the option which represents the correct products of the following reaction.

$$Ph - CH = O + CH_3CH = O \quad \xrightarrow{\text{Dil NaOH}} \quad \text{(Aldols)}$$

A. $Ph - C \,|\, OHH - CH_2 - CH = O$

B. $CH_3 - C \,|\, CHH - CH_2 - CHO$

C. $CH_3C \,|\, OHH - C \,|\, Ph = O$

D. $CH_3 - - \,|\, OH - CHOHPh$
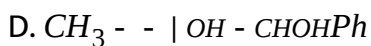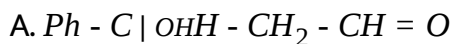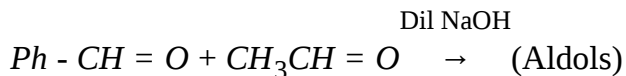
Answer: A::B

▶ **View Text Solution**

$$\text{CHO}$$

356.

can be reduced to

$$CH_2OH$$

by   the

reagents.

A. $LiAlH_4$

B. $NaBH_4$

C. $Sn + HCl$

D. $\dfrac{H_2}{Pd}$
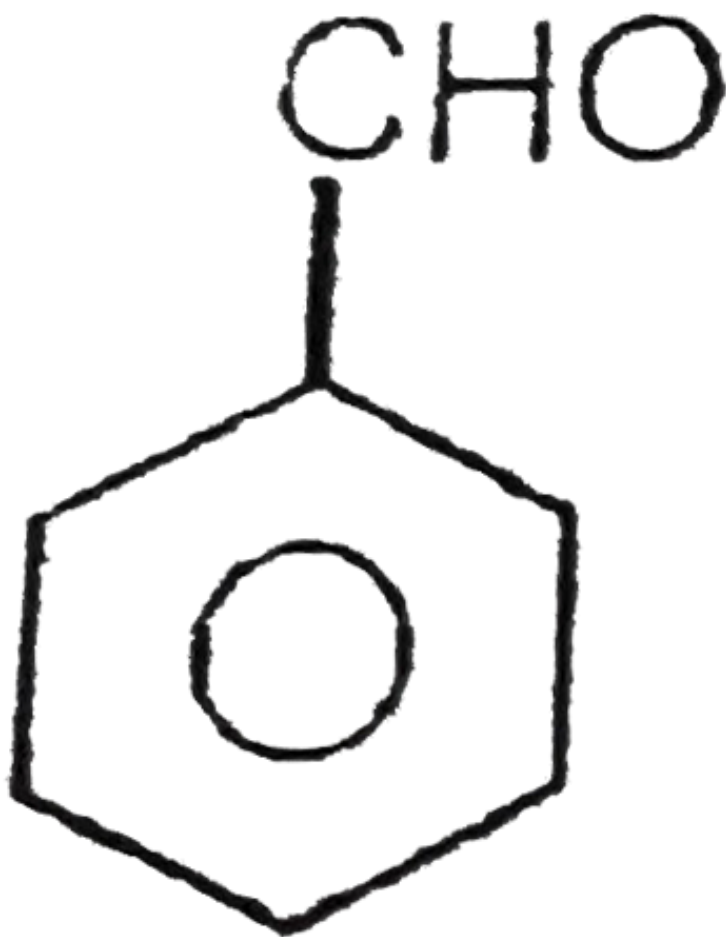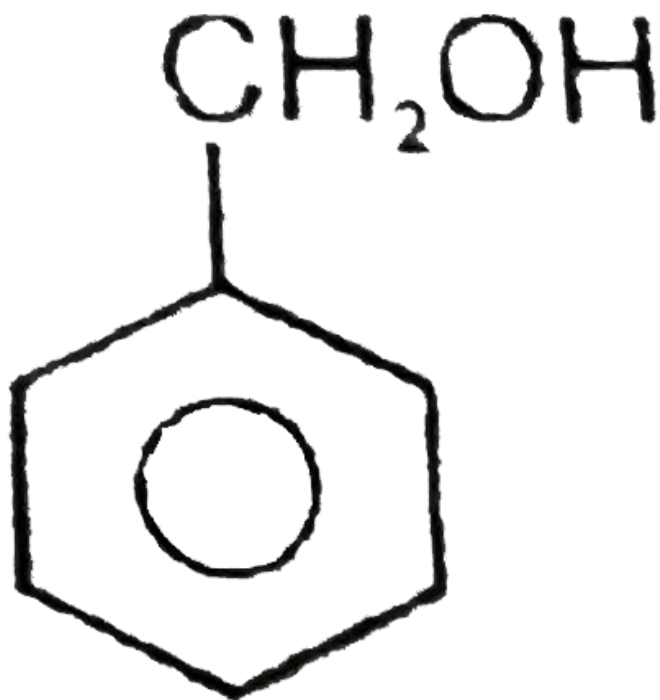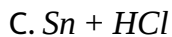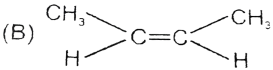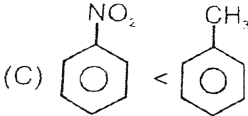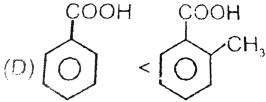
Answer: A::B::D

357. Which is (are) correct out of the following:

A. $CH_2 = CH_2 < H - C \equiv C - h$ (rate of electrophilic addition)

B.

 $< H_3C - C \equiv C - CH_3$ (rate of catalytic

hydrogenation)

C.

 (rate of electrphilic substitution reaction)

D.

 (order of acidic strength)

Answer: B::C::D

358. Identify the correct options related with the physical properties of the unknown compounds (X), formed as major product and (Y) as minor product in the given reaction.

$$\underset{\text{OH}}{\text{C}_6\text{H}_5} \xrightarrow{\text{CHCl}_3 + \text{NaOH}}$$
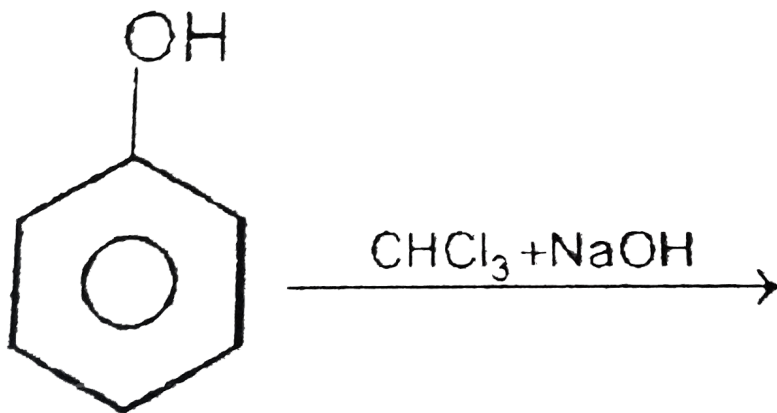
$[X]_{\text{major}} + [Y]_{\text{minor}}$

    A. water solubility of [Y] is greater than [X].

    B. Boiling point of [Y] is greater than [X].

    C. Melting point of [Y] is greater than [X].

    D. $[X]$ is more volatile than [Y].

Answer: A

359. Choose the incorrect option (s):

A. Picric acid & Benzoic acid can be distrinstinguished by $NaHCO_3$

B. $<$ rate of S_N2 reaction

C. $+CH_3MgI$ → (1eq.)

does't show tautomerism.

Answer: A::C::D

360. In which of the following reactions correct major product has be mentioned?

A.

B.

(B) $\xrightarrow[\text{H}_2\text{SO}_4]{\text{HNO}_3}$ O–N=O

C.

(C) $\xrightarrow{\text{conc } \text{H}_2\text{SO}_4}$

D.

(D) $\xrightarrow[\Delta]{\text{CH}_3\text{–CH}_2\text{–C–Cl/AlCl}_3}$
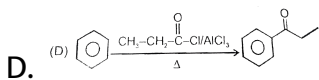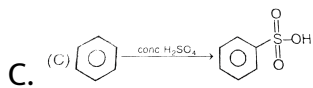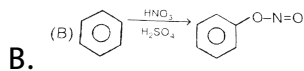
Answer: A::C::D

▷ **Watch Video Solution**

---

361. Which of the following are correct regarding the given reaction?

 $\text{CH}_2\text{CH}_2\text{CH}_2\text{Cl}$ $\xrightarrow{\text{CH}_3\text{MgI}}$
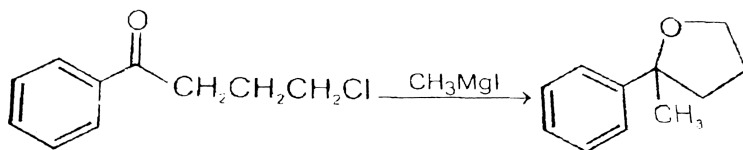
A. Nucleophilic substitution

B. Intramolecular nucleophilic attack

C. Dehydration

D. Nucleophilic addition

Answer: A::B::D

362. The K_a of monobasic acid P, Q and R are $10^{-6}, 10^{-8}$ and 10^{-10} respectively. The concentrations of P, Q and R are respectively 0.1M, 0.01 M and 0.001 M .

Q. Which of the following is true?

    A. P is weakest acid

    B. Q is strongest acid

    C. R is weakest acid

    D. R is strongest acid

Answer: C

363. The K_a of monobasic acid P, Q and R are $10^{-6}, 10^{-8}$ and 10^{-10} respectively. The concentrations of P, Q and R are respectively 0.1M, 0.01 M and 0.001 M .

Q. Which acid has the minimum pH?

   A. P

   B. Q

   C. R

   D. All have equal pH

Answer: A

> ▶ View Text Solution

364. At infinite the equivalent conductances of CH_3COONa, HCl and CH_3COOH are 91, 426 and 391 mho $cm^2 eqv^{-1}$ respectively at $25\,°C$

Q. The difference of equivalent conductances of H^+ and Na^+ is:

A. 300

B. 35

C. 335

D. 340

Answer: A

▶ View Text Solution

365. At infinite the equivalent conductances of CH_3COONa, HCl and CH_3COOH are 91, 426 and 391 mho $cm^2 eqv^{-1}$ respectively at $25 \degree C$

Q. The equivalent conductance of NaCl at infinite dilution will be:

A. 126

B. 209

C. 391

D. 908

Answer: A

▶ **View Text Solution**

366. OHC⌒CHO + CH₂O (1 eq.) $\xrightarrow[\text{2) heat}]{\text{1) base}}$ (x) $\xrightarrow{\text{NaBH}_4}$ (y) $\xrightarrow[\text{SOCl}_2]{\text{excess}}$ (z) $\xrightarrow[\text{3) KOBr/Δ}]{\substack{\text{1) KCN} \\ \text{2) OH}^- \text{ (partial hydrolysis)}}}$ (w)
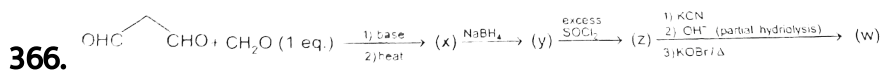
Synthesis of propellane takes placed by the following route.

Q. Product (x) in the above reaction sequence is:
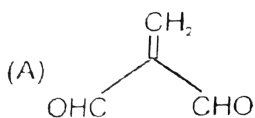
A.
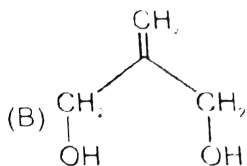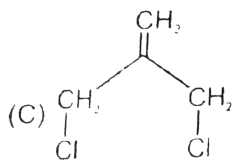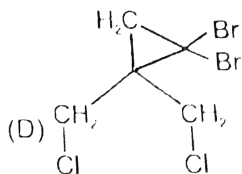
(A)

OHC⌒(CH₂)⌒CHO

B.

(B) CH₃—CH(OH)⌒(CH₂)⌒CH₂—OH

C.

(C) CH₃—CCl⌒(CH₂)⌒CH₂—Cl

(D)

D.

Answer: A

367.

$$\text{OHC}\underset{}{\overset{}{\frown}}\text{CHO} + \text{CH}_2\text{O (1 eq.)} \xrightarrow[\text{2) heat}]{\text{1) base}} (x) \xrightarrow{\text{NaBH}_4} (y) \xrightarrow[\text{}]{\overset{\text{excess}}{\text{SOCl}_2}} (z) \xrightarrow[\text{3) KOBr/Δ}]{\overset{\text{1) KCN}}{\underset{\text{2) CH}^- \text{ (partial hydrolysis)}}{}}} (w)$$
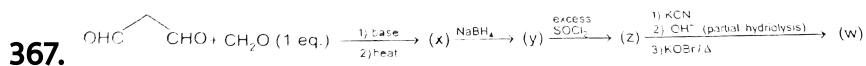
Synthesis of propellane takes placed by the following route.

Q. The product (w) is:

(A)

A.

(B)

B.

(C)

C.

(D)

D.
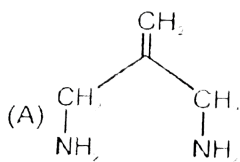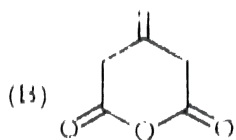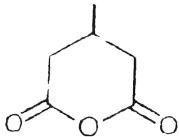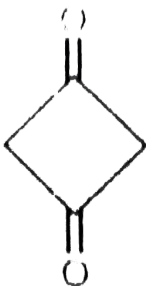
Answer: A

▶ View Text Solution

---

368. 22.4 mL of CO_2 at STP was absorbed in 100 mL water at $25°C$ (assume no volume change). The solution was found to have $pH = 4$. What is the value of pK_{a1} of carbonic acid (assume only first dissociation)?

▶ View Text Solution

369. What is pH of pure water whose is degree of dissociation 18×10^{-9}?

370. For a call reaction $\Delta G\,^{\circ} = -1930\dfrac{kJ}{mol}$ and the cell e.m.f $\left(E\,^{\circ}\right)$ at standard condition is 2.5 V. What is value of $\dfrac{\Delta G\,^{\circ}}{2FE\,^{\circ}}$?

371. How many of the following pairs are conjugate acid/base pairs?

HCl, Cl^{-}

KH, KCl

H_2SO_4, Na_2SO_4

$NaHS, Na_2S$

$CH_3COOH, CH_3COOH_2^{+}$

$Na_2CO_3, NaHCO_3$

NH_3, NH_4Br

HCl, $ClOH$

Aniline, anilinium

▶ **View Text Solution**

---

372. What is sum of oxidation number and coordination number of Al in Cryolite?

▶ **Watch Video Solution**

---

373. What is atomicity of gaseous compound formed in the Mond's process when Ni reacts with CO?

▶ **Watch Video Solution**

374. How many monocarboxylic acids (indluding stereo) would give Methylcyclopropane on sodalime decarboxylation.
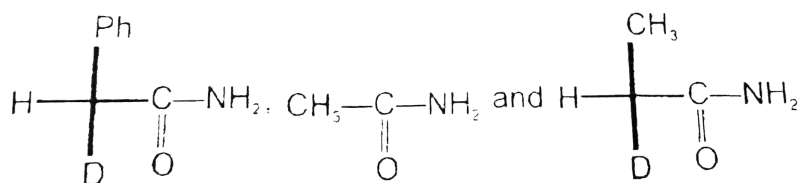
375. When
$$H—\underset{\underset{D}{|}}{\overset{\overset{Ph}{|}}{C}}—\underset{\underset{O}{||}}{C}—NH_2, \quad CH_3—\underset{\underset{O}{||}}{C}—NH_2 \quad and \quad H—\underset{\underset{D}{|}}{\overset{\overset{CH_3}{|}}{C}}—\underset{\underset{O}{||}}{C}—NH_2$$
is
mixed and reacted with $\dfrac{Br_2}{KOH}$ then how many products are obtained.
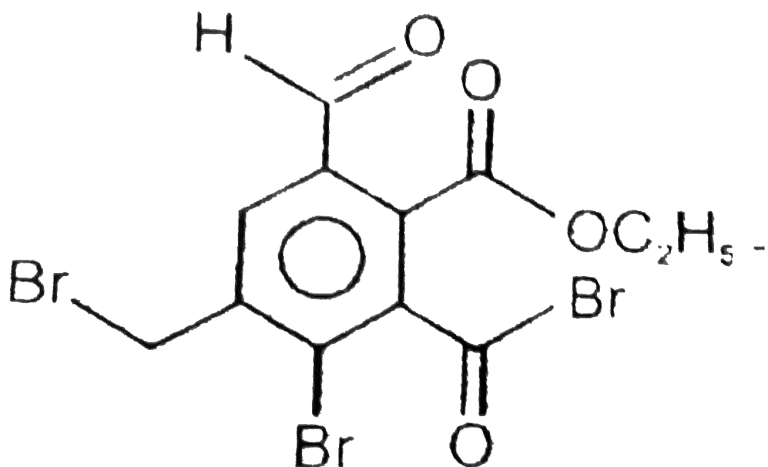
376.

underset((ii).   (H^(+))/(H_(2)O))overset((i).   CH_(3)MgBr   (3.0

"equivalents"))to"product"

How many bromine atoms are present in final major product?

> ▶ Watch Video Solution
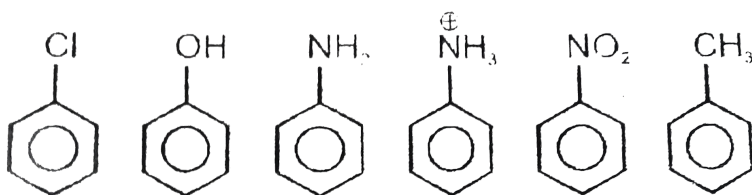
377.

How many of the following compounds are more reactive than

benzene towards electrophilic substitution.

378. Diatomic molecule has a dipole moment of $1.2D$ If its bond 1.0Å what fraction of an electronic charge exists on each atom ? .

A. 11 %

B. 20 %

C. 25 %

D. None of these.

Answer: C

379. Two types FXF angles are presnet in which of the following molecule ($X = S, Xe, C$) ? .

A. SF_4

B. XeF_4

C. SF_6

D. CF_4
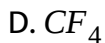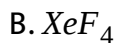
Answer: A

▶ Watch Video Solution

380. Which one of the following compounds in a peroxide?

A. KO_2

B. BaO_2

C. MnO_2
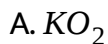
D. NO_2

Answer: B

▶ Watch Video Solution

---

381. Which of the following is thermally stable carbonate?

A. Li_2CO_3

B. Na_2CO_3

C. $BeCO_3$

D. $CaCO_3$

Answer: B

▶ Watch Video Solution

382. Which of the following statements is correct with respect to the metal carbonyls of I^{st} transition series?

A. As $M - C\pi$ bonding increase, the $C - O$ bond length increases.

B. As positive charge on the central metal atom increases, the $C - O$ bond length increases.

C. As electron density on the central metal atom increases, the $C - O$ bond length increases.

D. (1) and (3) both

Answer: D

▶ View Text Solution

383. The electrode potentials for

$Cu^{2+} + e^- \rightarrow Cu^+$ and

$$Cu^+ e^- \rightarrow Cu_s$$
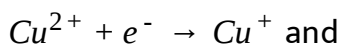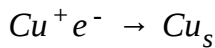
are $+0.15V$ and $+0.50V$ respectively the value of $E\,^{\circ}_{\frac{Cu^{2+}}{Cu}}$ will be?

A. 0.500 V

B. 0.325 V

C. 0.650 V

D. 0.150 V

Answer: B

▶ Watch Video Solution

384. Durinh electrlysis of an aqueous solution of $CuSO_4$ using copper electrodes, if $2.5g$ of Cu is deposited at cathode, tehn at anode

A. 890 mL of O_2 at STP is liberated

B. 445 mL of O_2 at STP is liberated

C. 445 mL of O_2 at STP is liberated

D. 2.5 g of copper is deposited

Answer: D

385. Densities of diamond and graphite are $\dfrac{3.5g}{mL}$ and $\dfrac{2.3g}{mL}$.

$\Delta_r H = -1.9 \dfrac{kJ}{mole}$

Favourable conditions for formation of diamond are:

A. high pressure and low temperature

B. low pressure ad high temperature

C. high pressure and high temperature

D. low pressure and low temperature

Answer: C

(i) $-\dfrac{dC}{dt}$

(ii) $-\dfrac{dC}{dt}$

iii) $t_{1/2}$ ... C_0

(iv) $t_{1/2}$ ... C_0
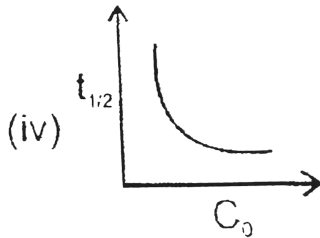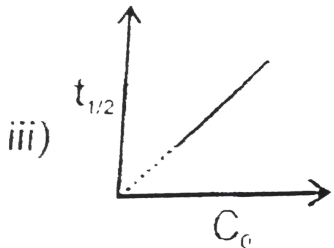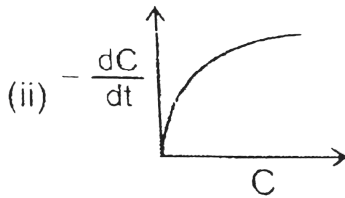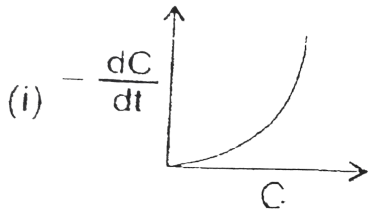
386.

Which of the following graphs are correct for a second order reaction: (where symbols have their usual meanings)

A. (i) and (iii)

B. (i) and (iv)

C. (ii) and (iii)

D. (ii) and (iv)

Answer: B

▶ Watch Video Solution

387. At least how many half-lives should elapse for a 1st order reaction $A \rightarrow$ products so that the reaction is at least $95\,\%$ completed? $(\log2 = 0.3)$

A. 4

B. 5

C. 6

D. 7

Answer: B

▶ Watch Video Solution

388. Which of the following does not represent a first order reation?

A. Population growth

B. radioactive decay

C. decomposition of H_2O_2

D. Alkaline hydrolysis of ester

Answer: D

389. For a reaction $A \rightarrow B$ the concentration of A is decreased by equal amounts in equal time intervals. The rate of reaction can be expressed as:

A. $k[A]^0$

B. $k[A]^{-1}$

C. $k[A]$

D. $k[A]^2$

Answer: A

390. Which one of the following statements is correct?

    A. the elements having large negative values of electron gain

       enthalpy generally act as strong oxidising agents.

    B. the elements having low values of ionisation enthalpies act as

       strong reducing agents.

    C. The formation of $S^{2-}(g)$ from $S(g)$ is an endothermic process.

    D. All of the above

Answer: D

▶ Watch Video Solution

391. dz^2 orbital has:

A. a lobe along z-axis and a ring along xy-plane

B. a lobe along z-axis and a lobe along xy-plane

C. a lobe along z-axis and a ring along yz-plane

D. a lobe and ring along z-axis

Answer: A

▶ Watch Video Solution

392. Among the following find the incorrect statement:

A. stability of lyophilic colloids is mainly due to the strong interaction between dispersed particle and dispersion medium.

B. Entropy change for absorption of gases over solid is positive

C. Gelati has considerably low value of gold number and is an effective protective colloid.

D. Lyophobic colloids shows Tyndall effect

Answer: B

▶ View Text Solution

393. Real gases behave ideally at:

A. low pressure and low temperature

B. high pressure and low temperature

C. low pressure and high temperature

D. high pressure and high temperature

Answer: C

▶ Watch Video Solution

394. The metal extracted by leaching with cyanide is

A. Mg

B. Ag

C. Cu

D. Na

Answer: B

▶ Watch Video Solution

395. pH of a saturated solution fo magnesium hydroxide in water at $298K$ is 10. The solubility of the hydroxide in water at 298 K is
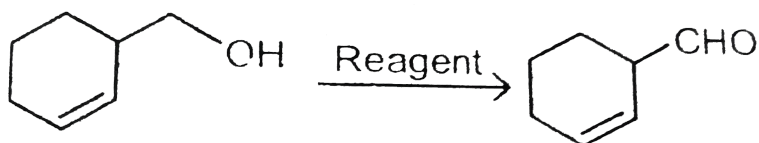
A. $5 \times 10^{-5} molL^{-1}$

B. $5 \times 10^{-12} molL^{-1}$

C. $1 \times 10^{-4} molL^{-1}$
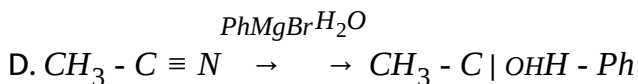
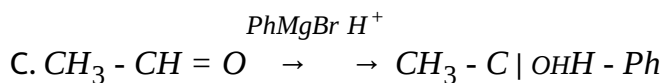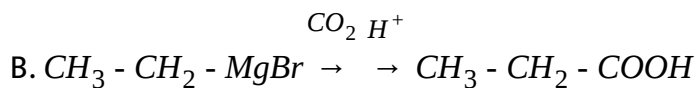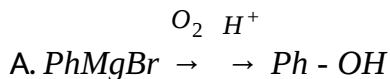D. $1 \times 10^{-10} molL^{-1}$

Answer: A

396.

Reagent for the above reaction will be:

A. hot acidic $KMnO_4$

B. CrO_3, H^+

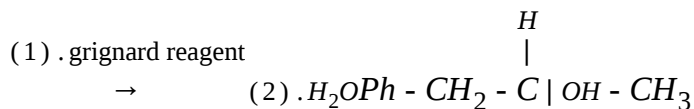C. CrO_3, Pyridine, CH_2Cl_2

D. dil alkaline $KMnO_4$

Answer: C

397. In which of the following reaction incorrect product is given?

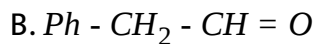A. $PhMgBr \xrightarrow[]{O_2} \xrightarrow[]{H^+} Ph\text{-}OH$

B. $CH_3\text{-}CH_2\text{-}MgBr \xrightarrow[]{CO_2} \xrightarrow[]{H^+} CH_3\text{-}CH_2\text{-}COOH$

C. $CH_3\text{-}CH = O \xrightarrow[]{PhMgBr} \xrightarrow[]{H^+} CH_3\text{-}C\,|\,OHH\text{-}Ph$

D. $CH_3\text{-}C \equiv N \xrightarrow[]{PhMgBr} \xrightarrow[]{H_2O} CH_3\text{-}C\,|\,OHH\text{-}Ph$

Answer: D

> ▶ Watch Video Solution

398. Corbonyl compound (p)

$\xrightarrow[(2).H_2O]{(1).\,grignard\ reagent} Ph\text{-}CH_2\text{-}\overset{\overset{H}{|}}{C}\,|\,OH\text{-}CH_3$

Carbonyl compound can be:

A. $Ph - CH_2 - C||O - CH_3$

B. $Ph - CH_2 - CH = O$

C. $CH_3 - CH_2 - CH = O$

D. $CH_3 - C||O - CH_3$

Answer: B

399. Cis-2-butene $\xrightarrow[NaHSO_3]{\overset{OsO_4}{}}$ $\xrightarrow{HIO_4}$ products is/are:

A. $CH_3 - CH = O$

B. $CH_3 - COOH$

C. $CH_3 - \overset{O}{\overset{||}{C}} - \overset{O}{\overset{||}{C}} - CH_3$
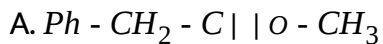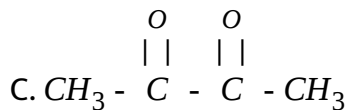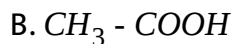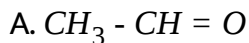
D. All of these

Answer: A

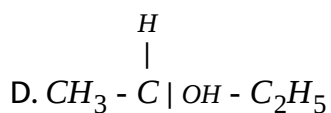400. Ethylester $\quad \xrightarrow{CH_3CH_2MgBr} \quad$ excess$P$. The product P will be
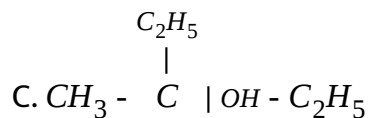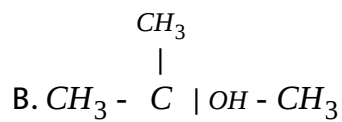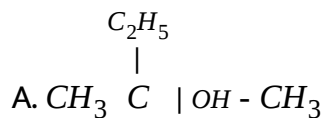
A. $CH_3 \overset{\overset{\displaystyle C_2H_5}{\displaystyle |}}{C} |_{OH} - CH_3$

B. $CH_3 - \overset{\overset{\displaystyle CH_3}{\displaystyle |}}{C} |_{OH} - CH_3$

C. $CH_3 - \overset{\overset{\displaystyle C_2H_5}{\displaystyle |}}{C} |_{OH} - C_2H_5$

D. $CH_3 - \overset{\overset{\displaystyle H}{\displaystyle |}}{C} |_{OH} - C_2H_5$

Answer: C

401.

$$\xrightarrow{NaBH_4} EtOHA \xrightarrow{Conc.H_2SO_4} \Delta B \text{ products B is:}$$

A.

(1)

B.

(2)

(3)

C.

(4)

D.

Answer: C

402.

$\xrightarrow{Cu} \Delta A \xrightarrow{PhMgBr} \xrightarrow{H_2O} B$ is:

A. (1)

B. (2)

C. (3)

D. (4)
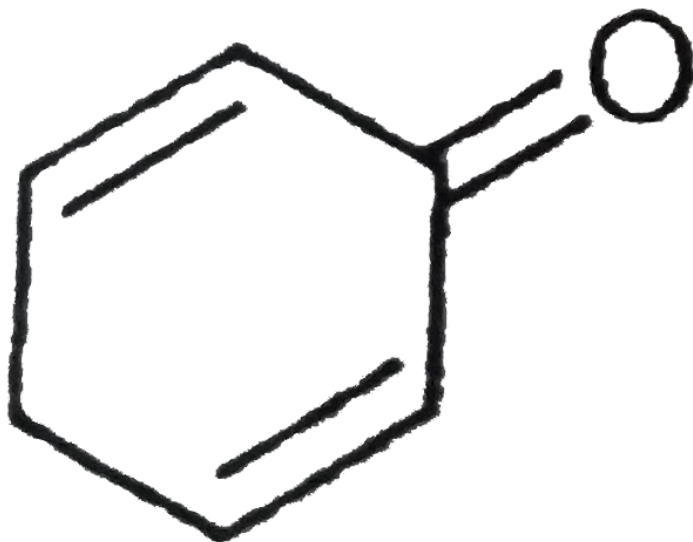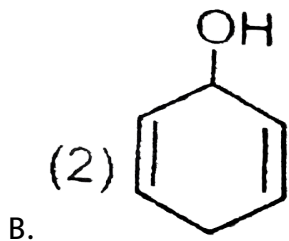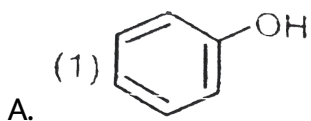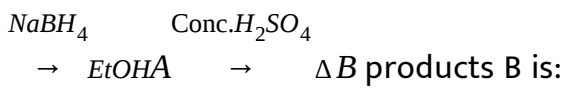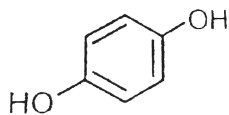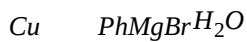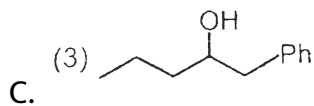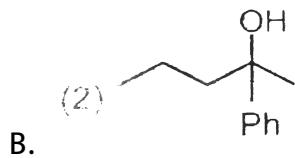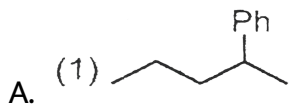
Answer: B

▶ **Watch Video Solution**

403.

product is:

A. (1) CH_3-C with CH_3 and OH substituents on cyclohexanone ring, =O

B. (2) HO-C(=O)— cyclohexane with OH and CH_2-CH_2-CH_2OH substituents

C. (3) H-C(=O)— cyclohexanone =O

D. (4) O= cyclohexane —$COOH$
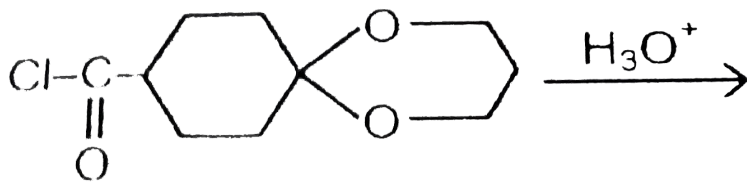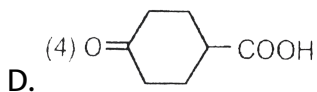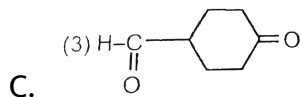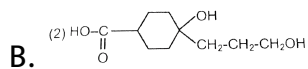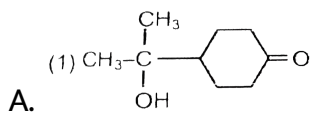
Answer: D

▶ View Text Solution

---

404. Which of the following statements is true in aqueous medium?

A. $CH_2CH_2S^-$ is a stronger base and more nucleophilic than $CH_3CH_2O^-$
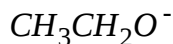
B. CH_3CH_2S is a stronger base but is less nucleophilic than $CH_3CH_2O^-$

C. $CH_3CH_2S^-$ is a weaker base but is more nucleophilic than

$CH_3CH_2O^-$

D. $CH_3CH_2S^-$ is a weaker base and less nucleophilic than

$CH_3CH_2O^-$
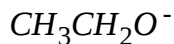
Answer: C

▶ View Text Solution
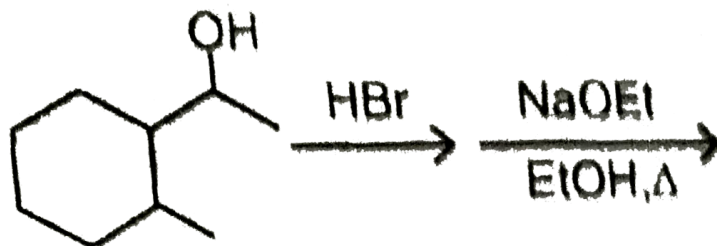
405.   Major

product is:
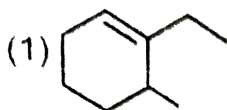
A.
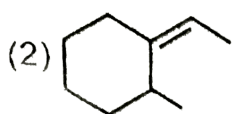
B. (2)
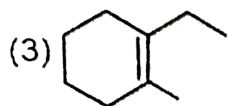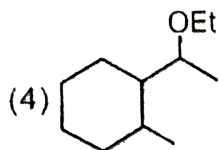
C. (3)

D. (4)

OEt

Answer: C

▶ **Watch Video Solution**

Zn–Hg,HCl
———————→
Δ

406.

Zn - Hg . HCl

→ Δ   product of the reaction will be:
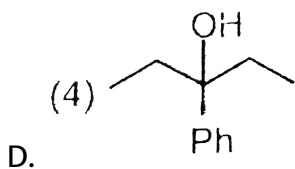
A.

(1)

B.

(2)

C.

(3)

D.

(4)
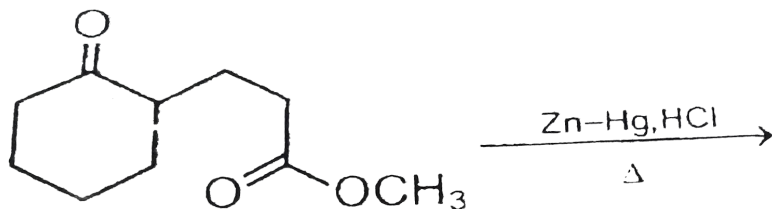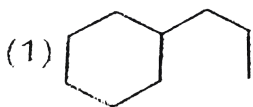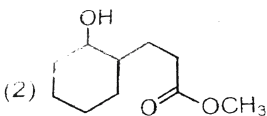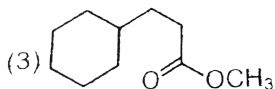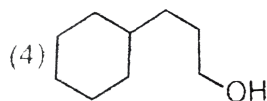
Answer: C

▶ Watch Video Solution

407. Which one fo the following would on ozonolysis yields CH_3COCH_3 and $CH_2(CHO)_2$ in 1:1 proportion?

A. $\left(CH_3\right)_2 C = CH \text{ - } CH_2 \text{ - } C \,|\, CH_3 = CH$

$CH_2 \text{ - } CH = CH \text{ - } CH_3$

(2) H_3C >C = CH – CH =
    H_3C

B.

CH – CH$_2$ – CH$_2$ – CH = C $<$ CH$_3$
                                   CH$_3$

C. $\left(CH_3\right)_2 CH - CH = CH - CH = CH - CH = C\left(CH_3\right)_2$

(4) H_3C >C = CH – CH$_2$ – CH
    H_3C

CH – CH$_2$ – CH = C $<$ CH$_3$
                        CH$_3$

D.
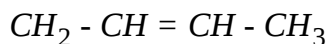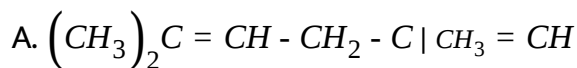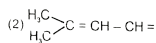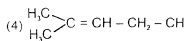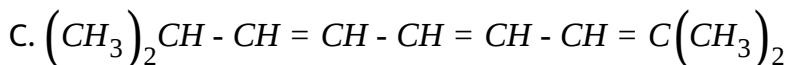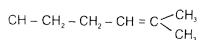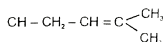
Answer: D

▶ Watch Video Solution

---

408. Copper is the most noble of the first transition metals and occurs in small deposits in several countries. Ores of copper include chalcanthite $\left(CuSO_4.5H_2O\right)$, atacamite $\left(Cu_2Cl(OH)_3\right)$, cuprite $\left(Cu_2O\right)$, copper glance $\left(Cu_2S\right)$ and malachite $\left(Cu_2(OH)_2CO_3\right)$. Howerver 80 % of the world copper production comes from the ore chalcopyrites $\left(CuFeS_2\right)$ the extraction of copper from chalcopyrites involves partial roasting of iron and self reduction.

Q. Partial roasting of chalcopyrites with silica added to it, produces,

A. $FeSiO_3$

B. Fe_2O_3

C. Cu_2S

D. CuO
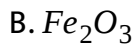
Answer: A::C

▶ Watch Video Solution

409. Copper is the most noble of the first transition metals and occurs in small deposits in several countries. Ores of copper include chalcanthite $\left(CuSO_4.5H_2O\right)$, atacamite $\left(Cu_2Cl(OH)_3\right)$, cuprite $\left(Cu_2O\right)$, copper glance $\left(Cu_2S\right)$ and malachite $\left(Cu_2(OH)_2CO_3\right)$. Howerver 80 % of the world copper production comes from the ore chalcopyrites $\left(CuFeS_2\right)$ the extraction of copper from chalcopyrites involves partial roasting of iron and self reduction.

Q. In self reduction the reducing species is ....

Select the correct options for blank.

A. Cu^+

B. O^{-2}

C. S^{-2}

D. SiO_2

Answer: C::D

▶ View Text Solution

410. Consider reaction in which reactant R is converted into product P: $R \rightarrow P$. When the initial concentration of $R^{'}$ is $0.5M$ The half life of the reaction is 20 minute. When the initial concentration is increased to 1.3 M, the half life decreases to 7.69 minute.

Q. What is the order of the reaction?

A. 0

B. 1

C. 2

D. 3

Answer: C::D

 Watch Video Solution

411. Consider reaction in which reactant R is converted into product P : $R \rightarrow P$. When the initial concentration of R' is $0.5M$ The half life of the reaction is 20 minute. When the initial concentration is increased to 1.3 M, the half life decreases to 7.69 minute.

Q. What is the rate canstant of the reaction?

A. $0.1M^{-1}$ min^{-1}

B. $0.6M^{-1}$ min^{-1}

C. $0.3M^{-1} \, \text{min}^{-1}$

D. $1.0M^{-1} \, \text{min}^{-1}$

Answer: A
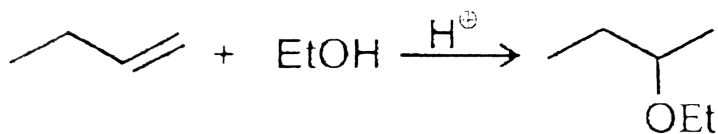
412.

The electrophile in first step is

A. $CH_3 \overset{\oplus}{C}H_2$

B. $H^{\oplus}$

C. $CH_3 - CH_2 - \overset{\oplus}{C}H - CH_3$

D. $CH_3CH_2CH_2\overset{\oplus}{C}H_2$

Answer: B
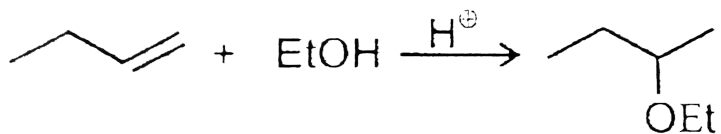
413.

The electrophile in second step is

A. $\overset{\oplus}{CH_3CH_2}$

B. $H^{\oplus}$

C. $CH_3\overset{\oplus}{C}HCH_2CH_3$

D. $CH_3CH_2CH_2\overset{\oplus}{C}H_2$
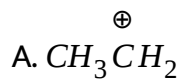
Answer: C::D

414. Benzene is an unsaturated hydrocarbon but does not give additio reactions under normal conditions. It undergoes electrophilic substitution reactions mainly. In substituted derivatives of benzene, orientation of further substitution is decided by resonance effect, steric factor etc. On the basis of this , answer of following:

Q. In which of the following the given product is the major product
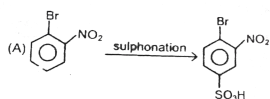
A.
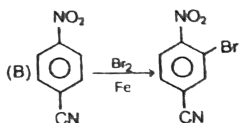
B.
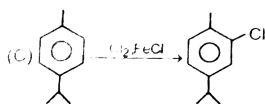
C.
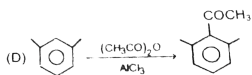
D.

Answer: A::C

▶ Watch Video Solution

415. Benzene is an unsaturated hydrocarbon but does not give additio reactions under normal conditions. It undergoes electrophilic substitution reactions mainly. In substituted derivatives of benzene, orientation of further substitution is decided by resonance effect, steric factor etc. On the basis of this , answer of following:

Q. Which of the followig reagents used for alkylation of benzene by electrophilic substitution mechanism will give same product?

A. $CH_3 - \overset{\overset{\textstyle CH_3}{|}}{C}H - CH_2 - Cl$ in presence of anhy. $AlCl_3$

B. $(CH_3)_3 COH$ in presaence of H_2SO_4

C. $(CH_3)_2 CH - CH_2 - OH$ in presenc of H_2SO_4

D. $CH_3 - \overset{\overset{\textstyle CH_3}{|}}{C} |CH_3 - CH_2 - OH$ in presence of H_2SO_4
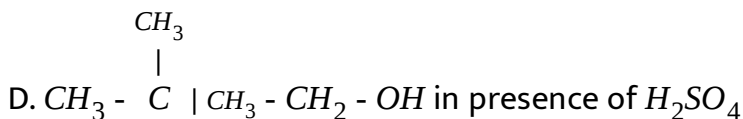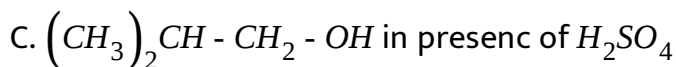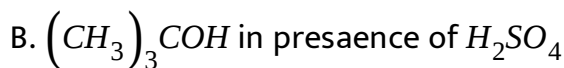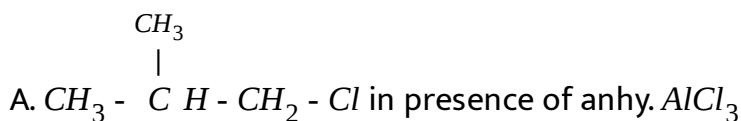
Answer: A::B::C

▶ Watch Video Solution

416. Find total number of process which has positive value of standard electrode potential.

$$E^0_{Fe \,|\, Fe^{2+}}, E^0_{Cu \,|\, Cu^{2+}}, E^0_{Zn^{2+} \,|\, Zn}, E^0_{Mg^{2+} \,|\, Mg}, E^0_{Sn \,|\, Sn^{2+}}, E^0_{Cr \,|\, Cr^{3+}}, E^0_{Ag \,|\, Ag^+}$$
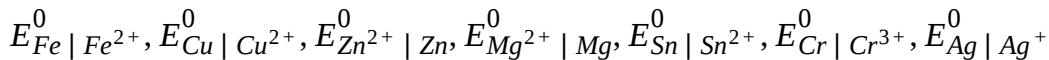
> ▶ Watch Video Solution

417. The half reactions that occur in a lead acid battery are:

$$PbSO_3(s) + 2e^- \;\rightarrow\; Pb(s) + SO_4^{2-}(aq) \qquad E^\circ = -0.36V$$

$$PbO_2(s) + 4H^+(aq) + SO_4^{2-}(aq) + 2e^- \;\rightarrow\; PbSO_4(s) + 2H_2O(l) \qquad E^\circ = +1.69V$$
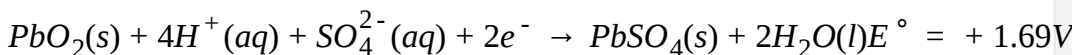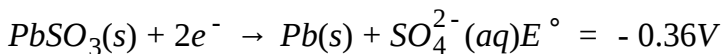
Calculate the overall potential for the cell in discharging reaction, E°_{cell} Give answer in nearest single digit integer.

> ▶ Watch Video Solution

418. $A \;\rightarrow\; B$ (zero order reaction)

$C \;\rightarrow\; D$ (first order reaction)

In first order reaction gets 75 % completed in 40 min and zero order reaction gets 75 % completed in 30 min then calculate the value of Z where

$$Z = \frac{\text{Half life period of first order reaction}}{\text{Half life period of zero order reaction}}$$

419. How many of the following can dissolve in aqueous HCl as well as in NaOH solution to liberate H_2?

$B, Al, B_2H_6, B_2O_3, NaAlH_4, Al_2O_3, AlCl_3, BF_3$

420. A vessel of 250 L was filled with 0.01 mole of Sb_2S_3 and 0.01 mole of H_2 to attain the equilibrium at 440 $°C$ as

$$Sb_2S_{3(s)} + 3H_{2(g)} \Leftrightarrow 2Sb_s + 3H_2S_g$$
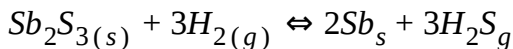
After equilibrium the H_2S formed was analysed by dissolving it in

water and treating with excess of Pb^{2+} to give 1.19 g of PbS as

precipitate. The value of K_C at $440\,°C$ is $(Pb = 20S)$

421. Consider the following set of reaction:

$Z = LiAlH_4 \rightarrow X + LiF + AlF_3$

$X + H_2O \rightarrow Y + H_2$

$$X + O_2 \xrightarrow{\Delta} B_2O_3 + H_2O$$
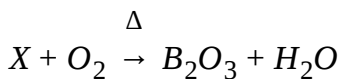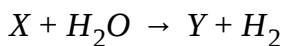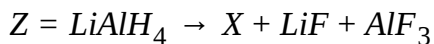
Then calculate the total number of boron atoms in one molecule each

of compounds X, Y and Z.
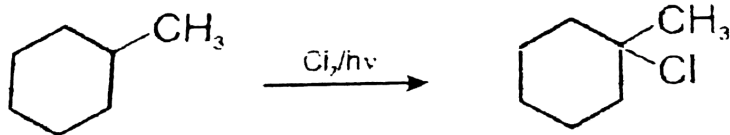
422.

Observe the following reaction and mention the number which show

slowest and rate determine step.

423. How many alkene/s react faster than propene with dil H_2SO_4?

(a)

(b) Ph

(c) Ph / Ph

(d) CH_3O

(e)

(f)

(g)

(h) Cl
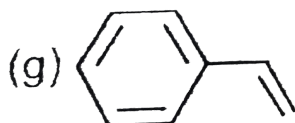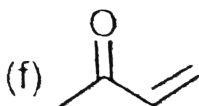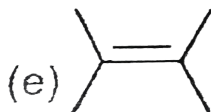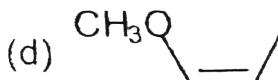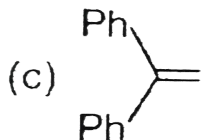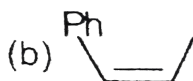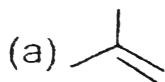
424. The number of optically inactive stereoisomers possible for tartaric acid.

$$\begin{array}{c} \text{CHO} \\ \text{H} \underline{\hspace{0.5cm}}\text{---}\underline{\hspace{0.5cm}}\text{CH}_3 \\ \text{H} \underline{\hspace{0.5cm}}\text{---}\underline{\hspace{0.5cm}}\text{D} \\ \text{Ph} \end{array} \xrightarrow{\begin{array}{c}(1)\ \text{KCN} \\ (2)\ \text{H}^{\oplus}\end{array}}$$
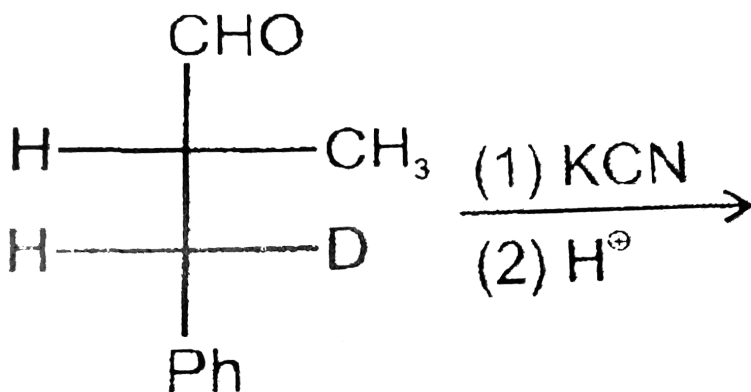
425.

Total number of products formed in the following reaction is:

426. 0.2 mol $A_x B_y \rightarrow$ 0.5 mol A_2 + 0.4$molB_3$. From this data the molecular formula of AB

A. AB_2

B. A_2B_2

C. A_4B_5

D. A_5B_6
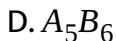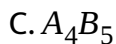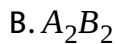
Answer: D

▶ Watch Video Solution

---

427. Which of the followig reaction is not a ion-exchange reaction?

A. $Pb\left(NO_3\right)_2 + 2KI \rightarrow PbI_2 \downarrow + 2KNO_3$

B. $KNO_2 + AgF \rightarrow AgNO_2 \downarrow + KF$

C. $2AgF + MgCl_2 \rightarrow MgF_2 \downarrow + 2AgCl \downarrow$

D. $CaSO_3(ppt) + SO_2 + H_2O \rightarrow Ca\left(HSO_3\right)_2$
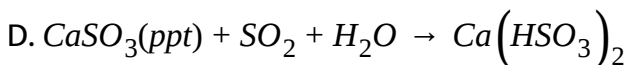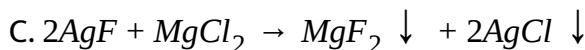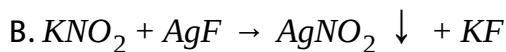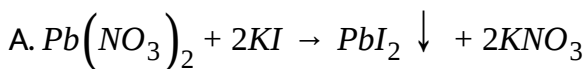
Answer: D

428. For metal complexes (i) $\left[PtCl_3\left(C_2H_4\right)\right]^-$ and (ii) $\left[PtCl_3\left(C_2F_4\right)\right]^-$ the correct statement is/ are that:

A. Carbon-carbon bond length is sae both in (i) and (ii)

B. carbon-carbon bond length in (i) is smaller than in (ii)

C. carbon-carbon bond length in (i) is larger than in (ii).

D. chelation takes place in both the complexes.

Answer: C

429. For reaction $NH_3(liq.) + Na \xrightarrow{warm} P + Q \uparrow$ Incorrect statement is:

A. Hydrolysis of P produces NH_3 gas.

B. Gas Q reacts with heated alkali metals.

C. Anionic part of P is weaker base than NH_3

D. Gas Q is also produced, when Li metal is heated with NH_3 gas

Answer: C

▶ **Watch Video Solution**

(2eq)

430.

Major product is:

(A)

Ph

A.

(B)

B.

(C)

C.

(D)

D.

Answer: A

▶ Watch Video Solution

---

431. $Ph - C \equiv C - CH_2 - CH_3 - \left(\dfrac{Hg^{2+}}{D^{\oplus}} \right) \xrightarrow{\ D_2SO_4 \ }_{D_2O} A$, A is

A. $Ph - C \, | \, | \, O - CH_2 - C \, | \, DH - CH_3$

B. $Ph - C \, | \, | \, O - C \, | \, DH - CH_2 - CH_3$

C. $Ph - C||O - CD_2 - CH_2 - CH_3$

D. $Ph - C|OHD - CH_2 - CH_2 - CH_3$
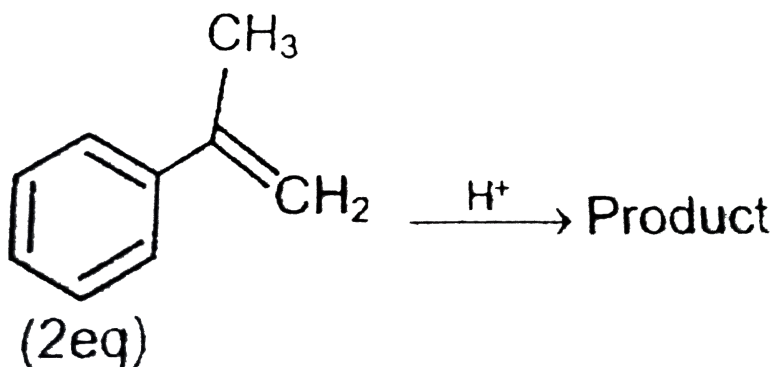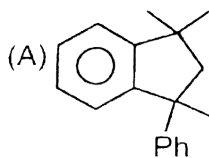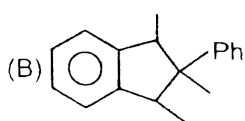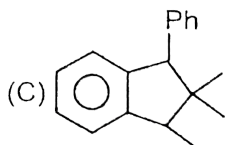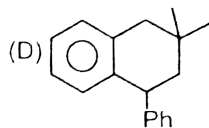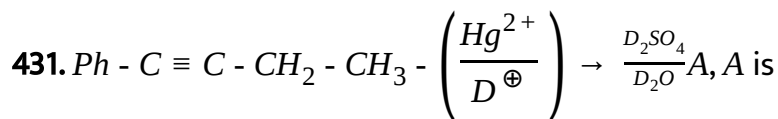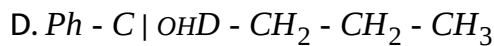
Answer: C

▶ **Watch Video Solution**
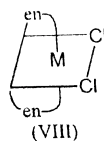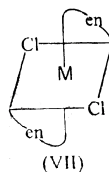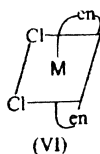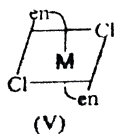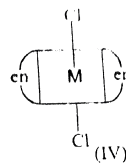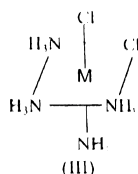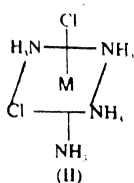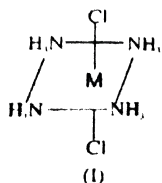
432.

Consider the following structures (M: central metal).

Choose the correct statement (s):

A. I and II are geometrical isomers

B. VI and VIII are identical structure

C. IV and VIII are geometerical isomers

D. V and VII are optical isomers.

Answer: A::B::C

▶ View Text Solution

433. Which of the following gas/gases show $Z > 1$ at all temperature?

A. H_2

B. He

C. CH_4

D. None of these.

Answer: D

▶ Watch Video Solution

434. The CORRECT statement (s) is/are:

A. For coagulation of As_2S_3 sol, $+ve$ ions are effective.

B. For coagulation of aluminium hydroxide sol Ba^{2+} ions are more

effective than Na^+

C. Cellulose solution is an example of multimolecular colloid

system

D. colloidal sol of metals such as gold, silver etc are prepared by

Bredig's arc method.

Answer: B::C

▶ **Watch Video Solution**

435. The wave function of 3s and $3p_z$ orbitals are given by :

$$\Psi_{3s} = \frac{1}{9\sqrt{3}}\left(\frac{1}{4\pi}\right)^{1/2}\left(\frac{Z}{\sigma_0}\right)^{3/2}(6 = 6\sigma + \sigma)e^{-\sigma/2}$$

$$\Psi_{3s_z} = \frac{1}{9\sqrt{6}}\left(\frac{3}{4\pi}\right)^{1/2}\left(\frac{Z}{\sigma_0}\right)^{3/2}(4 - \sigma)\sigma e^{-\sigma/2}\cos 0,$$

$$\sigma = \frac{2Zr}{n\alpha_0}$$

whereα_0 = 1st Bohr radius , Z= charge number of nucleus, r= distance from nucleus.

From this we can conclude:

A. Number of nodal surface for $3p_z$ & 3s orbitals is equal.

B. The angualr nodal surface of $3p_z$ orbital has the equation $\theta = \frac{\pi}{2}$

C. The radial nodal surfaces of 3 orbital and $3p_z$ orbital are at

equal distance from the nucleus.

D. 3s electron have greater penetrating power intot he nucleus in

comparison to 3p electrons.

Answer: A::B::D

436. Which of the followig is/are correct?

A. $\approx_A + \approx_B$ gives bonding molecular orbital.

B. ![image] is bonding molecular orbital

C. The probability density of finding the electrons in bonding molecular orbital equal to $\approx_A^2 + \approx_B^2 + 2 \approx_A \approx_B$.

D. Electron density increases between te nuclei of bonding M.O.

Answer: A::B::C::D

437. Aniline, $C_6H_5NH_2$ react with water according to the equation

$C_6H_5NH_2(aq) + H_2O(I) \Leftrightarrow C_6H_5NH_3^+ (aq) + OH^-(aq)$
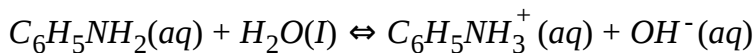
In a 0.180 M aqueous aniline solution the $\left[OH^-\right] = 8.80 \times 10^{-6}M$

The value of the base ionization constant K_b for $C_6H_5NH_2(aq)$ and

the percent ionization of $C_6H_5NH_2$ in this solution are,

A. 4.3×10^{-10}

B. 3.1×10^{-10}

C. $4.9 \times 10^{-3}\%$

D. $2.4 \times 10^{-3}\%$

Answer: A::C

▶ Watch Video Solution

---

438. Observe the following reaction I and II k_1, k_1', k_2, k_2' are rate

constant. Select the correct option(s).

(I).

$$\left(CH_3CH_2 \right)_3 N$$

$$\left[K_1' \right] CH_3 - I$$

$$\xrightarrow[(k_1)]{}$$

N:

$$\left(CH_3CH_2 \right)_3 N$$

$$\xleftarrow{} \left[k_2' \right] CH_3 - C|IH - CH_3$$

$$(k_2)$$
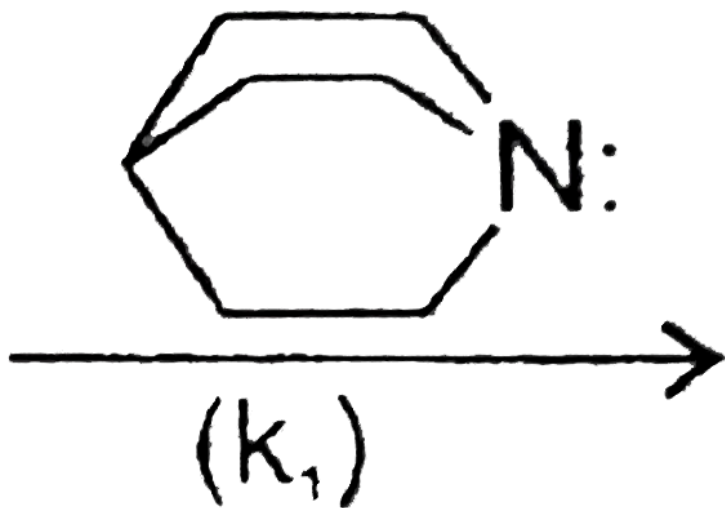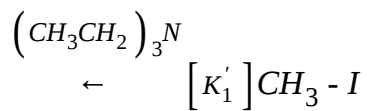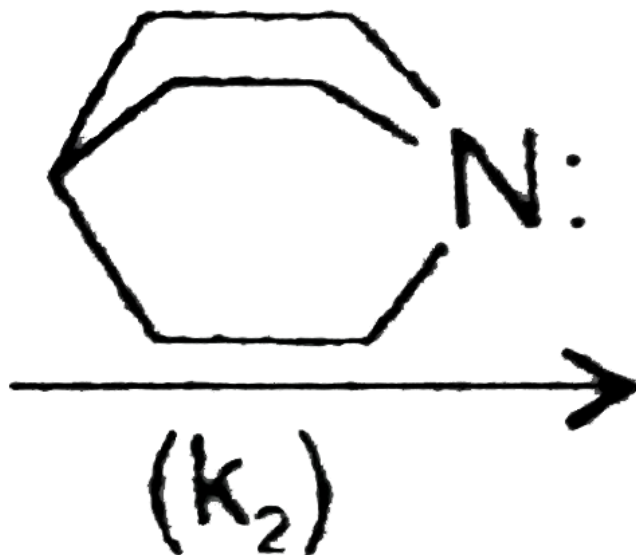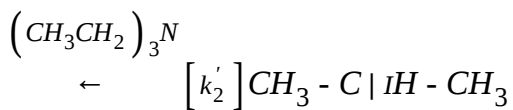
A. $k_1 > k_1'$

B. $k_1 > k_2$

C. $k_2' > k_2$

D. $k_2' > k_1'$

Answer: A::B

439. Which can not be the major product formed upon addition of 1 mole of HBr in the following reactions is:

$$\overset{HBr}{\underset{1mol}{\Big)}} \rightarrow$$

major select?

(A)

A.

(B)

B.

(C)

C.

(D)

D.
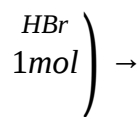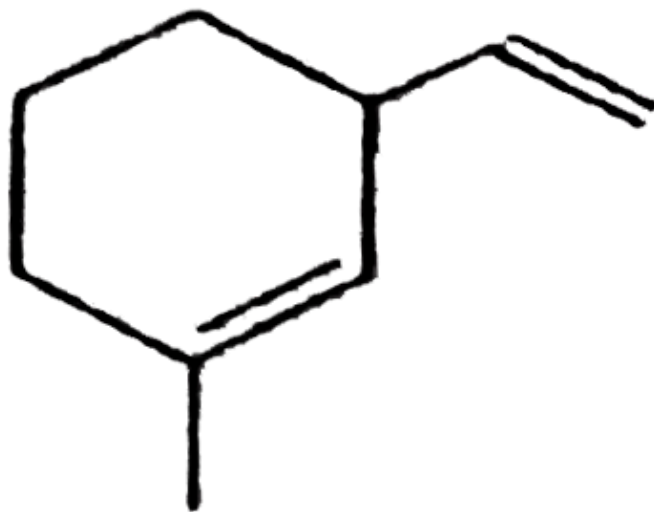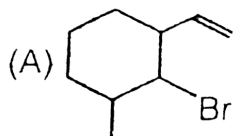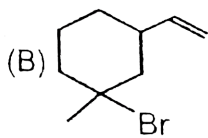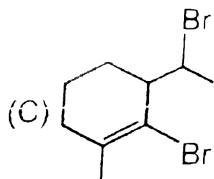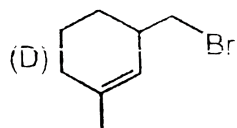
Answer: A::C::D

▶ **Watch Video Solution**

440. Choose the correct option for major product:

(A)

A.

(B)

B.

C. (C) NBS/hv → Br

D. $CH_3 - CH \equiv CHOBr \rightarrow$ $\overset{H}{CH_3} - \overset{\overset{O}{||}}{C} - CHBr_2$
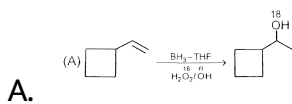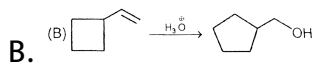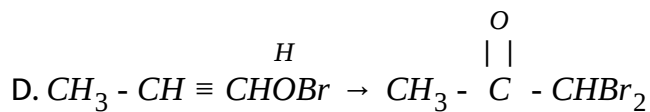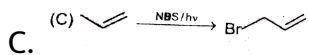
Answer: C::D

▶ **Watch Video Solution**

441. Which of the following is/are meso compound:

A.

B.

C.

(D)

D.
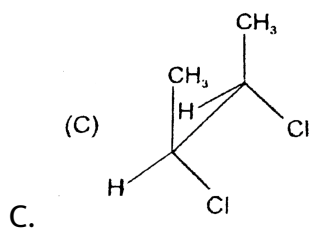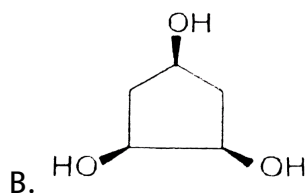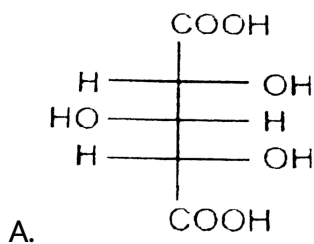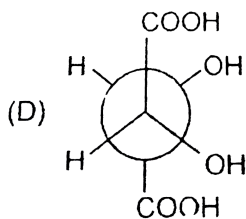
Answer: A::B::C

▶ Watch Video Solution

---

442. The reaction $A(g) \rightarrow B(g) + 2C(g)$ is a first order reaction with rate constant $2.772 \times 10^{-3} sec^{-1}$ reaction is started with only 0.1 mol of A in a container with volume 2 litre and is allowed to take place at constant volume and at constant temperature $300K [R = 0.082$ litre atm $mol^{-1} K^{-1}]$

$(\log 2 = 0.30)$

Q. Concentration of A after 250 sec will be:

A. 0.125 M

B. 0.0125 M

C. 0.05 M

D. 0.025M

Answer: D

▶ Watch Video Solution

---

443. The reaction $A(g) \rightarrow B(g) + 2C(g)$ is a first order reaction with rate constant $2.772 \times 10^{-3} \text{sec}^{-1}$ reaction is started with only 0.1 mol of A in a container with volume 2 litre and is allowed to take place at constant volume and at constant temperature $300K[R = 0.082$ litre atm $mol^{-1}K^{-1}]$

$(\log 2 = 0.30)$

Q. Select the correct statement (s)

A. Concentration of C after 250 sec will be 0.05 M

B. concentration of C after 250 sec will be 0.1 M

C. Partial pressure of C after 250 will be 2.46 atm

D. Partial pressure of C after 250 will be 1.23 atm

Answer: A::D

▶ Watch Video Solution

---

444. Grignard reagents are *singma*- bonded organometallic compound. There exists covalent bond between carbon and magnesium atoms. Grignard reagent finds applications in the sysnthesis of variety of compounds. Gringnard reagent reacts as carbanion and the reaction of carbanion with the proton of an acid is acid- base reaction. Cabonyl compound (including ester) on interation with grignard reagent generates alkoxide ion and thus can be converted into alcohols. Grignard reagent react with almost all functional groups. Notable exceptions are tertiary amines aliphatic and aromatic $C = C$ bonds.

Q. Which of the following combination of reactant can be used to

prepare the following given compound?

A. $Ph - C | | O - O - CH_3$ $\quad\xrightarrow[\quad(2)H_2O,H^+\quad]{(1)CH_3 - MgBr\,(excess)}$

B. $Ph - C | | O - CH_3$ $\quad\xrightarrow[\quad(2)H_2O,H^+\quad]{(1)Ph - MgBr\,(excess)}$

C. $CH_3 - C | | O - Cl$ $\quad\xrightarrow[\quad(2)H_2O,H^+\quad]{(1)Ph - MgBr\,(excess)}$

D.
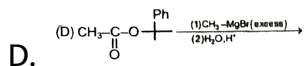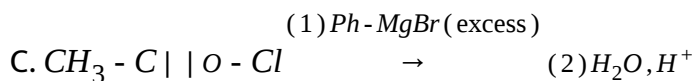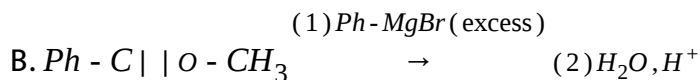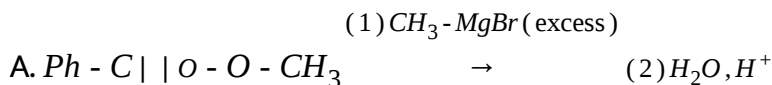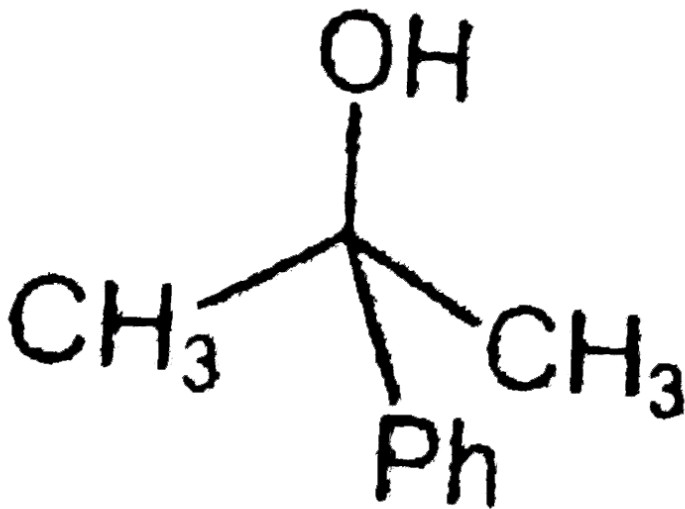
Answer: A::D

▶ Watch Video Solution

445. Grignard reagents are s*in*g*ma*- bonded organometallic compound. There exists covalent bond between carbon and magnesium atoms. Grignard reagent finds applications in the sysnthesis of variety of compounds. Gringnard reagent reacts as carbanion and the reaction of carbanion with the proton of an acid is acid- base reaction. Cabonyl compound (including ester) on interation with grignard reagent generates alkoxide ion and thus can be converted into alcohols. Grignard reagent react with almost all functional groups. Notable exceptions are tertiary amines aliphatic and aromatic $C = C$ bonds.

Q. Which of the following compounds gives benzene as a major product on reaction with $PhMgBr$ (1eq)

(A)

A.

B. $CH_3 - C \equiv CH$

(C)

C.

(D)
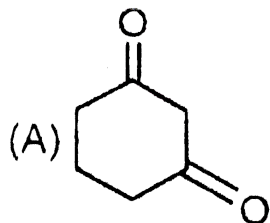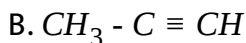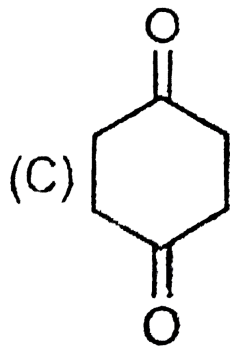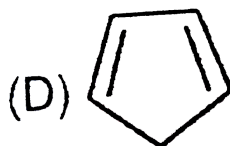
D.

Answer: A::B::D

▶ **Watch Video Solution**

---

446. Which of the following is/are correct statement(s)?

A. Hardy Schulze rule is related to coagulation.

B. Tyndall effect is shown by mainly lyophilic colloids

C. When liquid is dispersed in liquid, it is called gel

D. gold number is a measure of protective power of lyophilic colloid.

Answer: A::D

447. Select the correct statement(s)

A. Calamine and siderite and carbonates

B. Argentite and cuprites are oxides.

C. Zinc blende andiron-pyrite are sulphides

D. Malachite and azurite are ores of Cu.

Answer: A::C::D

$(a-x)^{-1}$

A

Q

O

$t(min)$
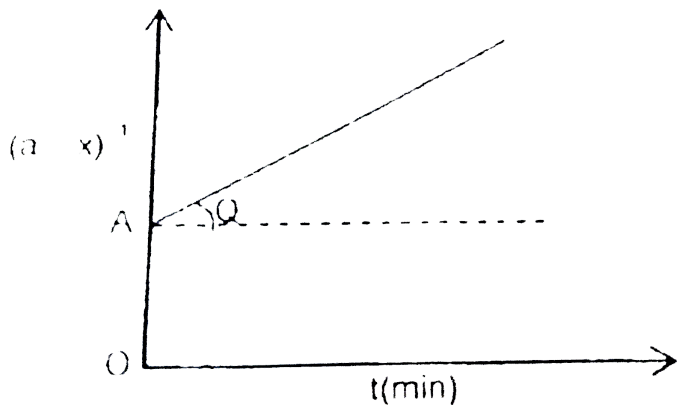
448.

Following is the graph between $(a-x)^{-1}$ and time for second order reaction $A \rightarrow 2B$, $Q = \tan^{-1}(0.5)$, $OA = 2Lmol^{-1}$. Here is the initial concentration of reactant and x is its amount reactedc at any time t. Hence rate at the start of the reaction is:

A. $0.125Lmol^{-1}mol^{-1}$

B. $0.25molL^{-1} \ min^{-1}$

C. $0.125molL^{-1} \ min^{-1}$

D. $0.25Lmol^{-1} \ min^{-1}$

Answer: C

Watch Video Solution

449. distinguishing reagent between silver and lead salts may be:

A. H_2S gas followed by H_2O_2

B. Hot dilute HCl solution

C. NH_4Cl (solid) $+ NH_4OH$ solution

D. $\left(NH_4\right)_2CO_3$ solution.

Answer: A::B::C

450. Which of the following statements(s) is/are true for XeF_6?

A. its partial hydrolysis gives $XeOH_4$

B. its reaction with silica gives $XeOF_4$

C. it can be prepared by the reaction of XeF_4 and O_2F_2

D. its reaction with XeO_3 gives $XeOH_4$

Answer: A::B::C

▶ Watch Video Solution

451. Which of the following statement(s) is/are correct for the extractive metallurgy of aluminium?

A. Red bauxite contains the impurities of Fe_2O_3, SiO_2 and TiO_2

B. Red bauxite is purified by Hall's and serpeck's process

C. Hall-heroult process is used for the electrolytic reduction of molten alumina dissolved in molten cryolite

D. In Hall-Heroult process carbon lining steel anode and graphite rods as cathode are used.

Answer: A::C

452. Select the correct statement(s)

A. Double chain silicats are known as amphiboles.

B. in cyclic silicates two oxygen atoms per tetrahedron are shared.

C. Orthosilicates contain discrete $\left(SiO_4\right)^{4-}$ units.

D. General formula of cyclic silicatge is $\left[Si_4O_{11}\right]_n^{6n-}$

Answer: A::B::C

Time (min.)	0	50	100
Conc. of α – maltose (M)	4.0	1.0	0.25

453.

α- maltose $\left(C_{12}H_{22}O_{11}\right)$ can be hydrolysed to glucose $\left(C_6H_{12}O_6\right)$ according to the following reaction.

$$C_{12}H_{22}\left(O_{11}(aq) + H_2O(l) \rightarrow 2C_6H_{12}O_6(aq)\right.$$
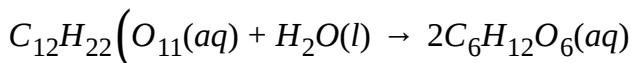
Given:

Standard enthalpy of formation of $C_{12}H_{22}O_{11}(aq)$ = - 2238 $\dfrac{kJ}{mol}$

Standard enthalpy of formation of $H_2O(l)$ = - 285 $\dfrac{kJ}{mol}$

Standard enthalpy of formation of $C_6H_{12}O_6(aq)$ = - 1263 $\dfrac{kJ}{mol}$

Which of the following statements (s) is/are true?

A. the hydrolysis of α- maltose is exothermic.

B. Heat liberated in combustion of 1.0 mol of α- moltose is greater

than the heat liberated in combustion of 2.0 mol of glucose.

C. Increasing temperature will increase the degree of hydrolysis of

α- maltose

D. The hydrolysis of α- maltose follow 1st order kinetics.

Answer: A::B::D

▶ Watch Video Solution

---

454. The xenate ion $\left(HXeO_4^-\right)$ undergoes disproportionation reaction to produce perxenate ion XeO_5^{4-}

$$2HXeO_4^- + 2OH^- \rightarrow XeO_6^{4-} + Xe + O_2 + 2H_2O$$
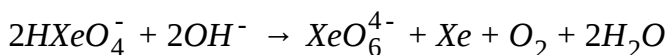
The shape of xenate ion and perxenate ions is respectively:

A. Pyramidal & square planar

B. Tetrahedral & octahedral

C. See- saw & octahedral

D. Tetrahedral & Square planar

Answer: C

▶ Watch Video Solution

455. Which of the following is/are correct name for the give polymer?

A.
$$(A) \; -\!\!\left[CH_2\!-\!\underset{\underset{CH_3}{|}}{CH}\right]_n$$
Polypropene

B.
$$(B) \; -\!\!\left[CH_2\!-\!\underset{\underset{C_6H_5}{|}}{CH}\right]_n$$
Polystyrene

C.
$$(C) \; -\!\!\left[NH\!-\!CO\!-\!NH\!-\!CH_2\right]_n$$
.Urea-formaldehyde Resin

D.
$$(D) \; -\!\!\left[OCH_2\!-\!CH_2\!-\!OOC \underset{}{\bigcirc} CO\right]_n$$
Bakelite
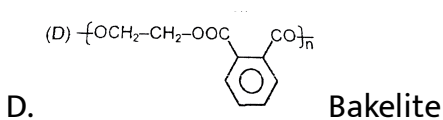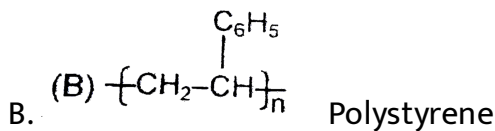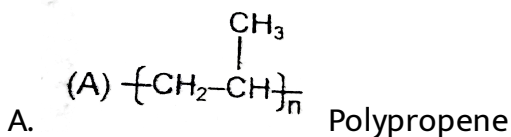
Answer: A::B::C

▶ View Text Solution

456. Select the correct statement(s)

A. $HOOC - CH_2 - NH - \overset{\overset{O}{\|}}{C} | CH_3 - CH - NH_2$ is a dipeptide of

Glycine & alanine, whose abbreviated name is GLY-ALA
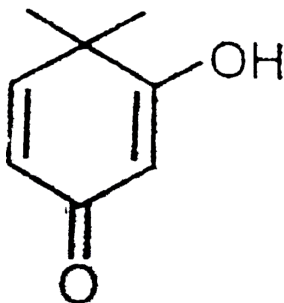
B. Compound show Keto-enol tautomerism

C. Phenol & benzoic acid can be distinguished by $NaHCO_3$

D. Order of basicity in aquaous medium $MeNH_2 < Me_2NH < Me_3N$

Answer: B::C

▶ **View Text Solution**

457.
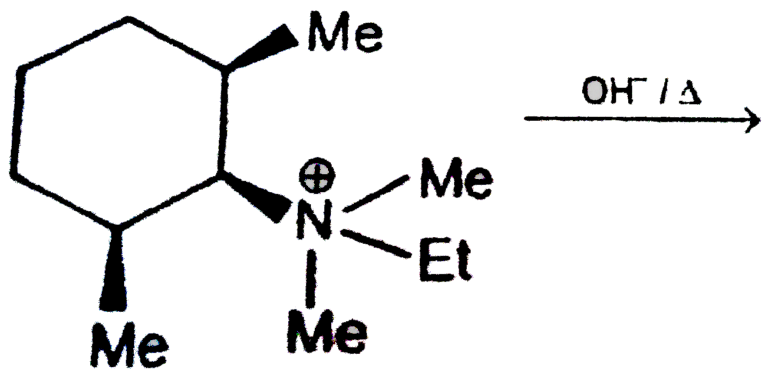
Which of the following possible (including by product) in above elimination reaction?

A.

(B)

B.

C. $CH_2 = CH_2$
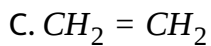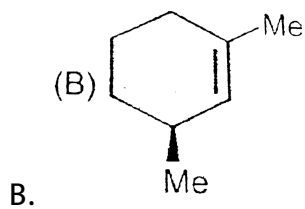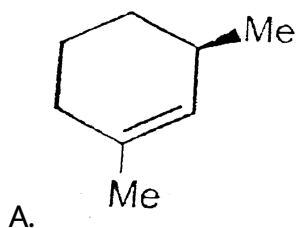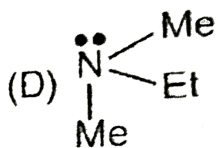
458. The product/ s of the following reaction is/are:
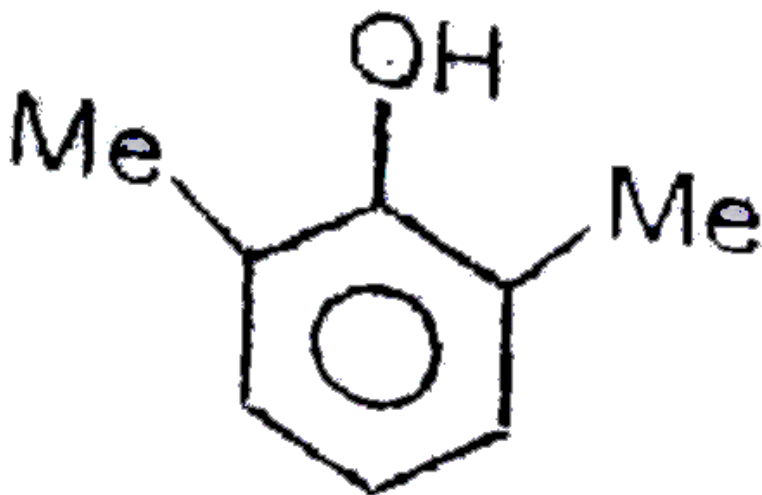
$(i)\,CHCl_3 + NaOH_1\,\Delta$ $\qquad$ $(iii)\,conc.\,NaOH\,(\,excess\,)_1\Delta$

$\qquad \rightarrow$ $\qquad (ii)H^\oplus$ $\qquad\qquad \rightarrow$ $\qquad (iv)H^\oplus$ (product/s)

A.

(A)

B.

(B)

C.
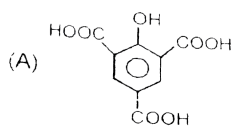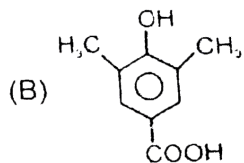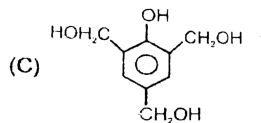
(C)

D.
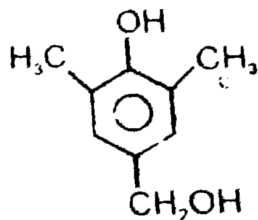
Answer: B::D

▶ **Watch Video Solution**

459. In the following reactions:

$PCl_5 + SO_2 \rightarrow P + Q$

$P + CH_3 - C||O - OH \rightarrow R + SO_2 + HCl$
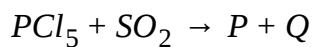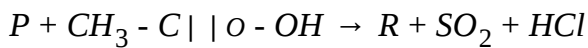
$R + (CH_3)_2 CdtoS + CdCl_2$ choose the correct options

A. Product S is acetone

B. P is $POCl_3$

C. P is $SOCl_2$

D. R is $CH_3 - C||O - Cl$

Answer: A::C::D

▶ **View Text Solution**
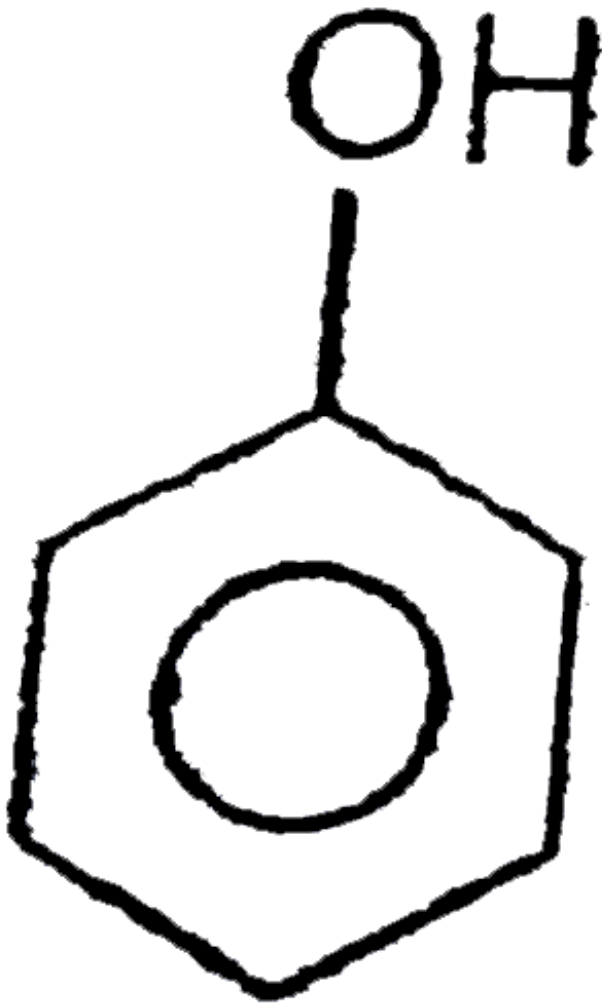
460.

$(i) CHCl_3 + NaOH, \Delta$
$\rightarrow$ $(ii) H^+ (P > Q) \%$ yield

Select the correct options:

A. Boiling point $(P > Q)$

B. Melting Point $(Q > P)$

C. water solubility, $(P < Q)$

D. acid strength $(Q < P)$

Answer: B::C::D

▶ **Watch Video Solution**

---

461. Two ions $A^{\oplus}$ and $B^{\ominus}$ have radii 88 and 200 pm, respectively. In the close-packed crystal of compound AB, predict coodination number of $A^{\oplus}$.

▶ **Watch Video Solution**

462. Let the plasma cell wall of shark is a semipermeable membrane. When these cells were kept in a series of $NaCl$ solution of different concentration at $25\,°C$ these cells remain intact in $0.7\,\%$ $\left(\dfrac{w}{w}\right)$ $NaCl$ solution, shrank in more concetrated solution and swelled in dilute solution. What is the osmotic pressure of the cell cytoplasm at $25\,°C$? given K_f of water $= 1.86 kgmol^{-1}K$ and water freezes from the $0.7\,\%$ $\left(\dfrac{w}{w}\right)$ salt solution at $-0.418\,°C$. Assume solution is dilute in each case. Give your answer to nearest integer. $\left(R = 0.0atm\dfrac{L}{molK}\right)$

> ▶ View Text Solution

---

463. $2SO_2(g) + O_2(g) \Leftrightarrow 2SO_3(g)$
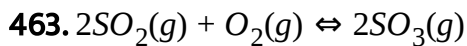
Starting with 2 mol of SO_2 and 1 mol O_2 in one litre flask. After some time equilibrium established. In another experiment same mol of SO_2 presetn at equilibrium required 1000 ml 0.4 M $KMnO_4$ ub acidic medium. The value of equilibrium constant K_C for the reaction is
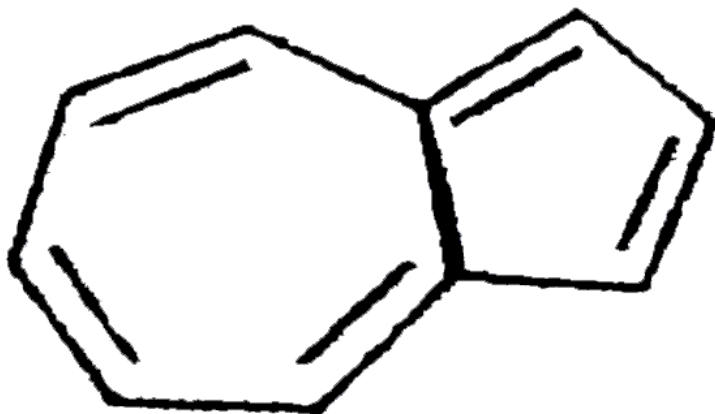
464.

How many uncharged resosnace structures are possible for given azulene (including given structure)?

Ph and CH₃ at top; H₃C and Ph at bottom of cyclobutane ring
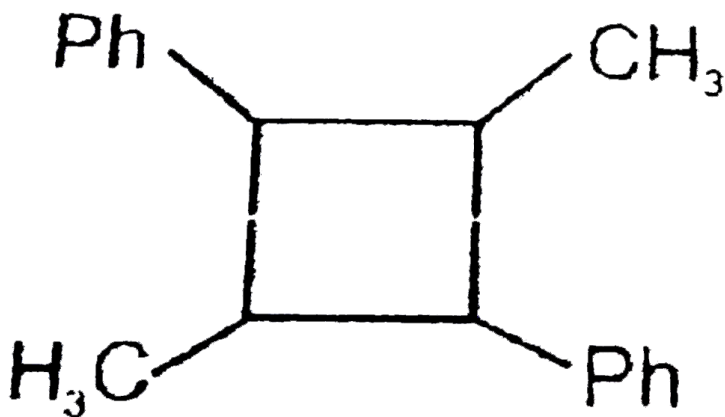
465.

Sum of total number of opticaly active and optical inactive isomers of

following compound.

▶ **Watch Video Solution**

466. Select the correct statements about FCC (ABCAB...) Structures.

A. Distance between nearest octahedral void and tetrahedral void

is $\dfrac{\sqrt{3}a}{4}$

B. Distance between two nearest octahedral void is $-\dfrac{1}{\sqrt{2}}$

C. Distance between two nearest tetrahedral void is $\dfrac{\sqrt{3}a}{2}$

D. distance between layer A and B is $2r\sqrt{\dfrac{2}{3}}$ (r = radius of atom)

Answer: A::B::D

▶ Watch Video Solution

467. Which of the following metal's ore is/are concentrated by leaching method?

A. Al

B. Fe

C. Au

D. Ag

Answer: A::C::D

▶ Watch Video Solution

468. Select correct statement(s)

A. Methoxy ethane give iodoethane and methanol with one equivalent anhydrous HI

B. Reaction $CH_3 + Br + AgF \rightarrow CH_3 - F + AgBr$ is known as swarts reaction.

C. optically active alkanol will show total retaintion of configuration in major product during its reaction with $SOCl_2$.

D. Bromoethane gives ethane nitrile with $AgCN$ as major product.

Answer: B::C

▶ Watch Video Solution

469. Which of the following is/are incorrect statement regarding glucose:

A. Glucose gives $+ve$ tollen's test

B. glucose pentaacetate can react with hydroxylamine which indicate the presence of free $-CHO$ group

C. Amylopectin is a branched chain polymer of α-D-glucose units. Where branching occurs by C_1 - C_6 glycosidec linkage.

D. Glucose doesnot get oxidised by bromine water, because bromine water is a mild oxidizing agent.

Answer: B::D

▶ **View Text Solution**

470.
(Anodic Cell)   (Cathodic Cell)

The most pupular electrochemical cell, daniel cell was originally developed by the English chemist john F daniel the general assembly of the cell is as given below An undergraduate student made a Daniel cell using $100cm^3$ of $0.100M CuSO_4$ ad $0.100M$ $ZnSO_4$ solution respectively. The two compartments are connected by suitable salt bridge.

[given

$E^{\circ}\left(Cu^{2+}/Cu\right) = 0.34V, E^{\circ}\left(Zn^{2+}/Zn\right) = -0.76V, \dfrac{2.30RT}{F} = 0.06, \log 2 = 0.3$]

Q. Calculate the emf (in volt) of the above cell.

A. 0

B. 1.1

C. 1.16

D. 1.04

Answer: B

Voltmeter

Anode of Zn
(−ve electrode)

Salt
Bridge

Cathode of Cu
(+ve electrode)

$ZnSO_4$
(Anodic Cell)

$CuSO_4$
(Cathodic Cell)

471.

The most pupular electrochemical cell, daniel cell was originally developed by the English chemist john F daniel the general assembly of the cell is as given below An undergraduate student made a Daniel cell using $100 cm^3$ of $0.100 M CuSO_4$ ad $0.100M$ $ZnSO_4$ solution respectively. The two compartments are connected by suitable salt bridge.

[given

$E\overset{\circ}{\left(Cu^{2+}/Cu\right)} = 0.34V, E\left(Zn^{2+}/Zn\right) = -0.76V, \dfrac{2.30RT}{F} = 0.06, \log 2 = 0.3$]

Q. A labmate of the student asked her for some solid $CuCl_2$. while she was lifting the bottle from a shelf, the lid of the bottle slipped and some amount of $CuCl_2$ fell in the $CuSO_4$ compartment at constant volume. She measured the emf of the cell again and found that it has increase by 9 mV. She used this data to calculate the amount of $CuCl_2$ that had spilled in the compartment. Calculate the mass of $CuCl_2$ that had spilled into the daniel cell? (molar mass of $CuCl_2 = 135\dfrac{g}{mol}$)

A. 1.35g

B. 13.5g

C. 27g

D. 2.7g

Answer: A

472. (i) $P + Cl_2 \xrightarrow{\Delta} Q$

(ii). $Q + H_2O \rightarrow R + HCl$

(iii). $BN + H_2O \rightarrow R + NH_3 \uparrow$

(iv). $Q = LiAlH_4 \rightarrow S + LiCl + AlCl_3$

(v). $S + H_2O \rightarrow R + H_2 \uparrow$

(vi). $S + NaH \rightarrow T$

(P,Q,R,S, and T do not represents their chemical symbols)

Q. Compound Q has:

(i). zero dipole mament

(ii) A planar trigonal structure

(III) An electron deficient compound

(IV) A Lewis base

Choose the correct code:

A. I,IV

B. I,II,IV

C. I,II,III

Answer: C

▶ **View Text Solution**

---

473. (i) $P + Cl_2 \xrightarrow{\Delta} Q$

(ii). $Q + H_2O \rightarrow R + HCl$

(iii). $BN + H_2O \rightarrow R + NH_3 \uparrow$

(iv). $Q = LiAlH_4 \rightarrow S + LiCl + AlCl_3$

(v). $S + H_2O \rightarrow R + H_2 \uparrow$

(vi). $S + NaH \rightarrow T$
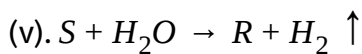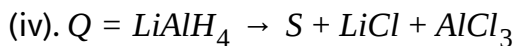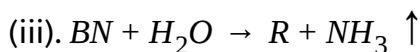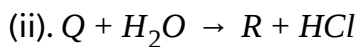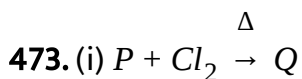
(P,Q,R,S, and T do not represents their chemical symbols)

Q. Compound T is used as a/an:

A. Oxidising agent

B. Complexing agent

C. Bleaching agent

D. Reducing agent

Answer: D

▶ View Text Solution
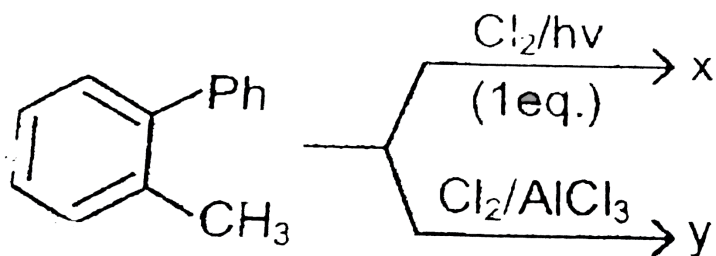
474.

Consider the following reactions to answer the next three questions

Q. Major product X and Y are respectively

A.

B.

C.

D.
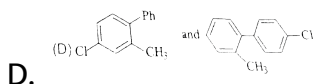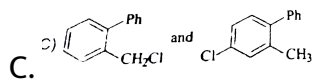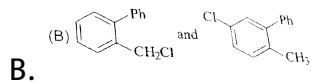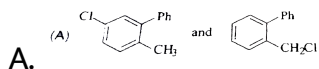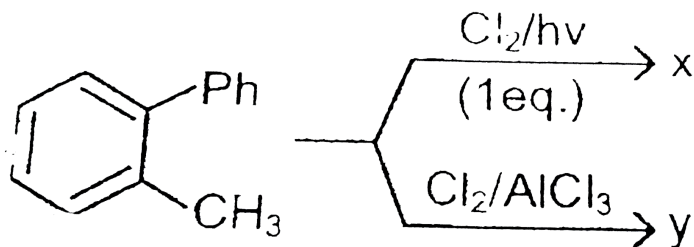
Answer: C

475.

Consider the following reactions to answer the next three questions

Q. If product X is treated with $AlCl_3$ it undergoes friedel-crafts reaction. The expected product is
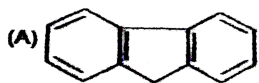
A.
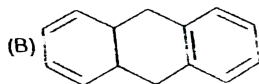
B.
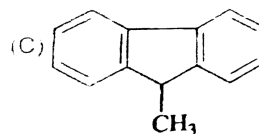
C.

D.
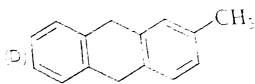
Answer: A

▶ View Text Solution

476. In an experiment, 50 mL of 0.1 M solution off a metallic salt $M(NO_3)$ reacted exactly with 25 mL of 0.1 M solution of $NaSO_3$ in the reaction SO_3^{2-} is oxidized to SO_4^{2-}. If in the original salt oxidation number fo the metal was 3, what would be the new oxidation number of metal?

▶ Watch Video Solution

477. In te decomposition of Ammonia it was found that at 50 torr pressure $t_{(1/2)}$ was 3.64 hour while at 100 torr $t_{(1/2)}$ was 1.82 hours. Then order of reaction would be:

---

478. At STP the density of a gas X is three times that of gas Y while molecule mass of gas Y is twice that of X. The ratio of pressures of X and Y will be:

---

479. The ionization energy of He^+ is x times that of H. The ionization energy of Li^{2+} is y times that of H. find $|y - x|$

---

480. A certain buffer solution contains equal concentartion of $X^{\ominus}$ and HX. The K_b for $X^{\ominus}$ is 10^{-10}. The pH of the buffer is

481. The depression in freezing point of $0.01m$ aqueous $CH_3C\infty H$ solution is $0.02046°$, $1m$ urea solution freezes at $-1.86°C$. Assuming molality equal to molarity, pH of CH_3COOH solution is

482. Consider the structure of Al_2Me_6 compound and find the value of $\dfrac{x - y}{z}$ where $x =$ maximum number of atoms that can lie in place having terminal $(Al - Me)$ bonds

$y =$ total number of $3c - 2e^-$ bonds

$z =$ total number of atoms that are sp^3 hydrized.

483. Find the value of x in the tremolite abestos:

$$Ca_2Mg_x\left(Si_4O_{11}\right)_2(OH)_2$$
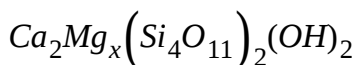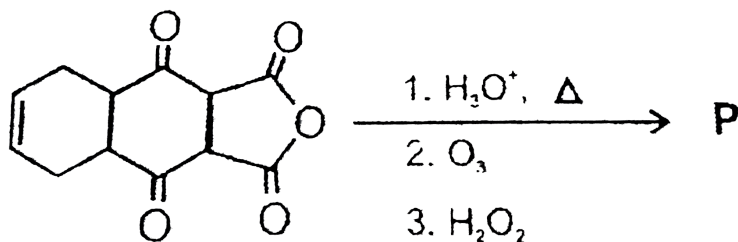
484. What is the degree of unsaturation in compound (x).

$$\text{C}_6\text{H}_5\text{OH} \xrightarrow[\text{H}_2\text{SO}_4]{\text{Na}_2\text{CrO}_4} X$$

485. The total number of carboxylic acid groups in te product P is:

$$\xrightarrow[\substack{2.\ \text{O}_3 \\ 3.\ \text{H}_2\text{O}_2}]{1.\ \text{H}_3\text{O}^+,\ \Delta} P$$

486. An organic compound (X) has molecular formula $C_7H_6O_2$ and it does not effervesces with $NaHCO_3$. A on treatment with excess of $HBr(aq)$ gives $Y\left(C_6H_6O_2\right)$ and CH_2Br_2. Y forms a violet coloured solution with $FeCl_3$. If X treated with Br_2Fe, how many different monobrominaiton product would result?

487. number of hyperconjugable hydrogen atoms present in major product.

488. The total number of Aldols (β-Hydroxy carbonyl compounds) are formed in te following reaction. (ignore stereoisomers)

$$PhCHO + CH_2CH = O + Ph\text{-}C|\,|\,o\text{-}CH_3 \quad \xrightarrow{Dil.NaOH \Delta}$$

489.

How many different possible planes of symmetry (POS) are present in

the following given compound.

490. Which of the following plots will obtained for a conductomeric titration of strong acid against a weak base?

(A)
Vol. of weak base

A.

(B)
Vol. of weak base

B.

(C)
Vol. of weak base

C.

(D)
Vol. of weak base

D.
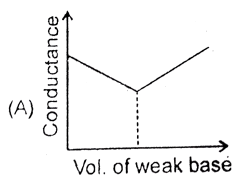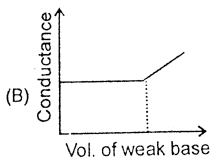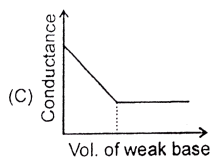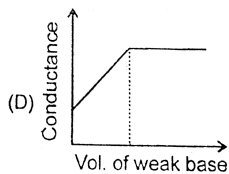
Answer: C

491. Freundlich adsorption isotherm is given by the expression $\frac{x}{m} = kP^{\frac{1}{n}}$ which of the following conclusions can be draw from this expression?

A. When $\frac{1}{n} = 0$, the adsorption is directly proportional to pressure

B. When $n = 1$, $\frac{x}{m}$ vs p graph is a line parallel to x-axis

C. When $\frac{1}{n} = 0$ the adsorption is independent of pressure

D. When $n = 2$, plot off $\frac{x}{m}$ vs p is a rectangular hyperbola

Answer: C

492. The correct figure representing isothermal and adiabatic compression of an ideal gas from the same initial state is:

A.

(A)

B.

(B)

C.

(C)

D.

(D)
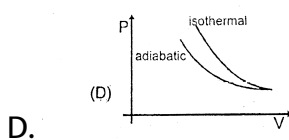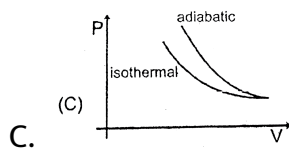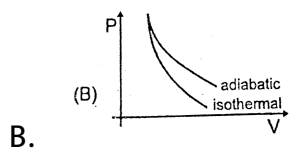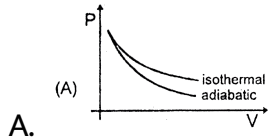
Answer: C

▶ **Watch Video Solution**

493. Which of the following reactions does not occur during calcination?

A. $CaCO_3 \rightarrow CaO + CO_2$

B. $CuSo_3 . Cu(OH)_2 \rightarrow 2CuO + H_2O \downarrow + CO_2 \downarrow$

C. $CuS + O_2 \rightarrow CuO + SO_2 \downarrow$

D. $CuSO_4 . 5H_2O \rightarrow CuSO_4 + 5H_2O \downarrow$
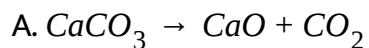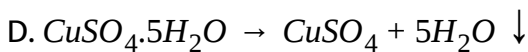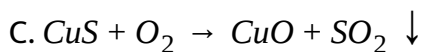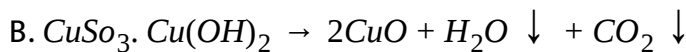
Answer: C

▶ Watch Video Solution

---

494. Which of the following compounds can show geometrical optical and conformational isomerism.

A. $Cl - CH = CH - CH_3$

B. $CH_3 - C \equiv C - CH(Cl) - CH_3$

(C)
C.

(D)
D.

Answer: D

---
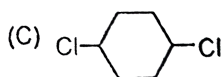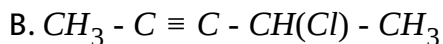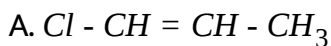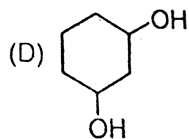
495. Which of the following is the strongest nucleophile?

A. $NaOH$

B. $NaSH$

(C) ONa

C.

(D) OH

D.
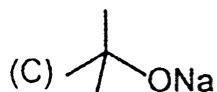
Answer: b

496. Which of the following are low spin complexes which follow EAN rule?

A. $Cr(CO)_6$

B. $\left[Cr(CN)_6\right]^{4-}$

C. $PtCl_6^{2-}$

D. $\left[Cu\left(NH_3\right)_3 CO\right]^{\oplus}$
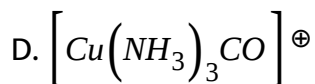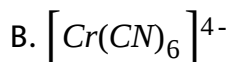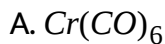
Answer: A::C::D

▶ **View Text Solution**

---

497. Which of the following statement(s) is/are correct?

A. In B_2 "s-p" mixing is present (significant)

B. Hybridisation for the central atoms in $OPCl_3$, OSF_4 and OIF_5 is respectively sp^3, sp^3d, sp^3d^2

C. In both N_2O_5 and N_2O_4 all type of $N - O$ bond lengths are equivalent.

D. In O_2^+ H.O.M.O. (Highest occupied molecuar orbital) has two nodal planes.

Answer: A::B::D

▶ View Text Solution

---

498. $\Lambda_m^0 H_2O$ is equal to ___

A. $\Lambda_m^0 \left(HNO_3 \right) + \Lambda_m^0 \left(NaNO_3 \right) - \Lambda_{m(NaOH)}^0$

B. $\Lambda_{m(HCl)}^0 + \Lambda_{m(NaOH)}^0 - \Lambda_{m(NaCl)}^0$

C. $\Lambda_m^0 \left(HNO_3 \right) + \Lambda_{m(NaOH)}^0 - \Lambda_m^0 \left(NaNO_3 \right)$

D. $\dfrac{\Lambda_m^0 \left(H_2SO_4 \right) - \Lambda_m^0 \left(K_2SO_4 \right)}{2} + \Lambda_{m(KOH)}^0$

Answer: B::C::D

499. Which of the following is/are oxide ores?

A. Cassiterite

B. Malachite

C. Chromite

D. Dolomite

Answer: A::C::D

500. Zn amalgam is prepared by elctrtolysis of aqueous $ZnCI_2$ using 9 gram Hg cathode how much current is to be pased through $ZnCI_2$ solution for 1000 seconds to prepare a Zn amalagam with 25% by weight ? (atomic masss Zn =65.4 g)

A. Current off 8.85 amp is passed in the process.

B. Current of 5.65 amp is passed in the process

C. Mass of Zn in Amalgam is $3gm$

D. Mass of Zn in Amalgam is $6gm$.

Answer: A::C::D

▶ Watch Video Solution

---

501. In which of the following electrolysis in aqueous medium, mass of anode decreases and pH of solution remains unchanged?

A. Electrolysis of aqueous $AgNO_3$ using silver anode and copper cathode

B. Electrolysis of aqeous $CuSO_4$ using pure copper anode and impure copper cathode.

C. Electrolysis of aqeous $AgNO_3$ using gold anode and silver cathode

D. Electrolysis of aqeous $CuSO_4$ using silver anode and platium cathode.

Answer: A::B::D

> ▶ **Watch Video Solution**

---

502. Which of the following reaction/s give same product?

A.

B.

C.

D.
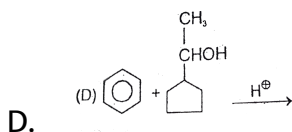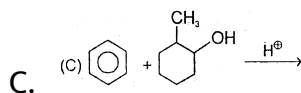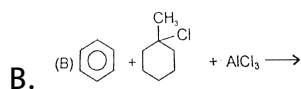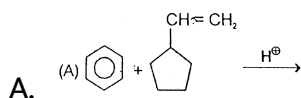
503. The correct statements among the following is/are

A. Stability of triphenyl methyl carbocation can be explained only

by resonance effect

B. Cyclopropeyl cation is more than tropylium cation

C. p-methoxy benzyl carbocationi is more stable than p-

nitrobenzyl carbocation

D. $1°$ Allyl carbocation is more stable than isopropyl cation.

Answer: A::C::D

504. Which of the following substrates is/are more reactive than ethyl bromide for S_N2 reaction?

    A. Br - CH_2 - Br

    B. OHC - CH_2 - Br

    C. CH_2 = CH - CH_2 - Br

    D. Ph - CH_2 - Br
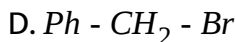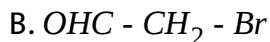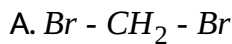
Answer: B::C::D

▶ View Text Solution

---

505. Choose the correct option(s)

A. $\xrightarrow{HOBr}$ Major products are enantiomers

(B)

Ph
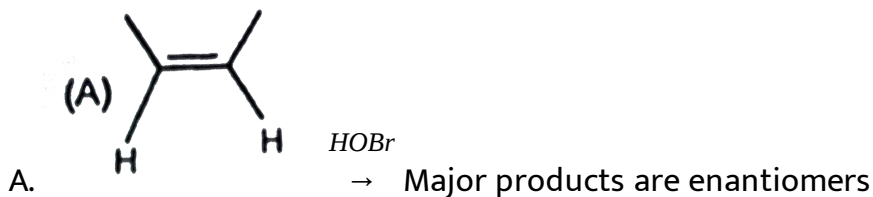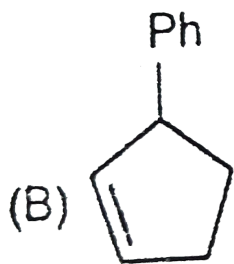
B. $\xrightarrow{H_3O^{\oplus}}$ Major products is optically active

C. $CH_2 = CH_2$ $\xrightarrow{OsO_4/NaHSO_3}$ product is $CH_2|OH - CH_2|OH$

(D)
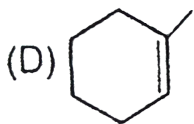
D. $\xrightarrow{MCPBA}$ products are diasteromers

Answer: A::C::D

▶ **View Text Solution**

506. Metallic gold frequently is found in aluminosilicate rocks and it is finely dispersed among other minerals. It may be extracted by treating the crushed rock with aerated sodium cyanide solution. During this process metallic gold is slowly converted t $\left[Au(CN)_2\right]^-$, which is soluble in water. After equlibrium has been reached, the

aqueous phase is pumped off and the metallic gold is recovered from it by reacting the gold complex with zinc, which is converted to $[Zn(CN)_4]^{2-}$, Gold in nature is frequently alloyed with silver is also oxidised by aerated sodium cyanide solution.

The correct ionic reaction for the process is//are:

A. $Au + 2CN^- \rightarrow Ar[(CN)_2]^-$

B. $Zn + 2CN^- rarZn[(CN)_2]^-$

C. $4Au + 8CN^- + 2H_2O + O_2(air) \rightarrow 4[Au(CN)_2]^-(soluble) + 4OH^-$

D. $Zn + 4CN^- \rightarrow Zn[(CN)_4]^{2-}$
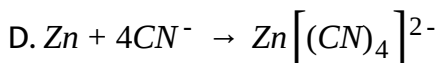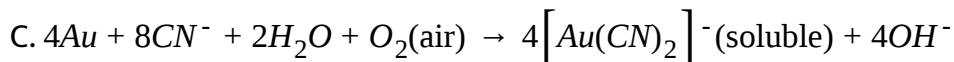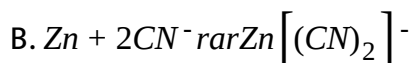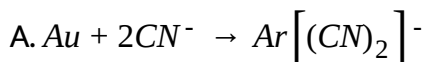
Answer: C

▶ **View Text Solution**

507. Metallic gold frequently is found in aluminosilicate rocks and it is finely dispersed among other minerals. It may be extracted by treating the crushed rock with aerated sodium cyanide solution.

During this process metallic gold is slowly converted t $[Au(CN)_2]^-$, which is soluble in water. After equlibrium has been reached, the aqueous phase is pumped off and the metallic gold is recovered from it by reacting the gold complex with zinc, which is converted to $[Zn(CN)_4]^{2-}$, Gold in nature is frequently alloyed with silver is also oxidised by aerated sodium cyanide solution.

Which of the follwing is/are correct for cyanide process of extraction of gold?

A. Sodium cynaide is sweet in taste and is also used in making chocolates

B. Sodium cyanide if escapes into ground water then it produces hydrogen cyanide which is toxic to many animals.

C. It is an example of pyrometallurgy.

D. It is an example of leaching process

Answer: B::D

View Text Solution

508.
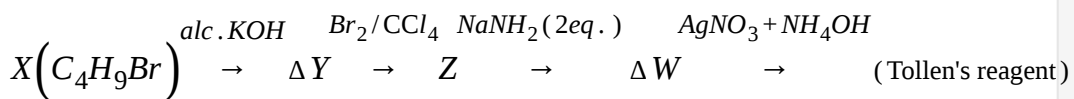
$$X\left(C_4H_9Br\right) \xrightarrow[\quad]{alc.\,KOH} \underset{\text{white ppt}}{\Delta Y} \xrightarrow[\quad]{Br_2/CCl_4} Z \xrightarrow[\quad]{NaNH_2\,(2eq.\,)} \Delta W \xrightarrow[\quad]{AgNO_3+NH_4OH} (\text{Tollen's reagent})$$

Reductive ozonolysis of Y yields

A. CH_3CH_2CHO and $HCHO$

B. 2 moles of CH_3CHO

C. CH_3COCH_3 and $HCHO$

D. CH_3CH_2COOH and $HCOOH$

Answer: A

▶ Watch Video Solution

509.

$$X\left(C_4H_9Br\right) \xrightarrow{alc\,.\,KOH} \Delta Y \xrightarrow{Br_2/CCl_4} Z \xrightarrow{NaNH_2\,(2eq.)} \Delta W \xrightarrow{AgNO_3+NH_4OH} (\text{Tollen's reagent})$$
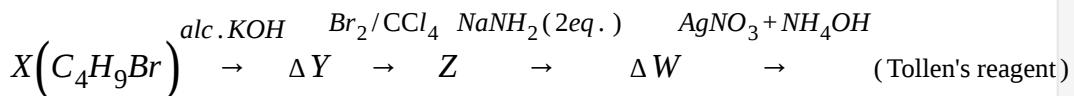
white ppt

Which of the following statement(s) is//are incorrect?

A. Y and W are chain isomers

B. Y and W are functional isomers

C. W can be converted into Y with H_2/Pt

D. W can be converted into Y with Lindlar catalyst

Answer: A::B::C

▶ **Watch Video Solution**

510. If 0.1 molar solution of glucose (Molecular weight = 180) is

separated from 0.1 molar solution of cane sugar (Molecular weight

= 242) by a semi -permeable membrane, then which one of the following statements is correct?

A. Water will flow from glucose solution into cane sugar solution.

B. Cane sugar will flow across the mebrane into glucose solution.

C. Glucose will flow across the membrane into cane sugar solution.

D. There will be no net movement across the semi-permeable membrane.

Answer: D

> ▶ Watch Video Solution

511. Amongst the following ions which one has the highest magnetic moment value?

(i). $\left[Cr\left(H_2O\right)_6\right]^{3+}$

(ii). $\left[Fe\left(H_2O\right)_6\right]^{2+}$

(iii). $\left[Zn\left(H_2O\right)\right]^{2+}$

A. $\left[Cr\left(H_2O\right)_6\right]^{3+}$

B. $\left[Fe\left(H_2O\right)_6\right]^{2+}$

C. $\left[Zn\left(H_2O\right)_6\right]^{2+}$

D. $\left[Cu\left(NH_3\right)_4\right]^{2+}$
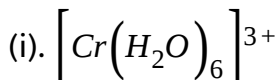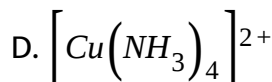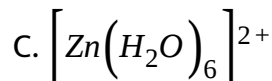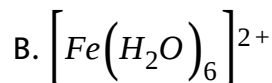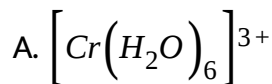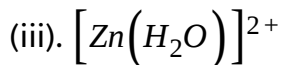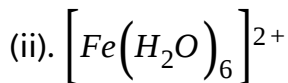
Answer: B

▶ Watch Video Solution

512. The oxidation number of cobalt in $K\left[Co(CO)_4\right]$ is

A. $+1$

B. $+3$

C. -1

D. -3

Answer: C

---

513. Choose the incorrect statement about corrosion on the metal surface.

A. In the corosion of iron, reduction of oxygen while oxidation of

   metal take place.

B. Rusting is reduced in highly alkaline medium.

C. Mg can act as sacrifical electrode.

D. CO_2 gas can prevent the metal surface from corrosion.

Answer: D

514. The standard electrode potential for Daniel cell is $1.1V$. Calculate the standard Gibbs energy of the reaction (In KJ/mol)

$$Zn_{(s)} + Cu^{2+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$$
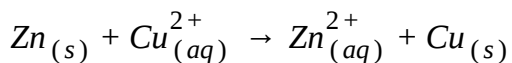
A. 106.15

B. 212.3

C. 193

D. 403

Answer: B

▶ Watch Video Solution

515. Electrode potential for Mg electrode varies according to the equation

$$E_{Mg^{2+} \mid Mg} = E^{\ominus}_{Mg^{2+} \mid Mg} - \frac{0.059}{2}\log\frac{1}{\left[Mg^{2+}\right]}$$

The graph of $E_{Mg^{2+} \mid Mg}$ vslog$\left[Mg^{2+}\right]$ is

A.

(1)

B.

(2)

C.

(3)

D.

(4)
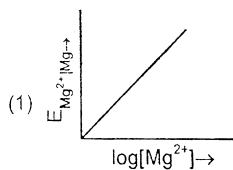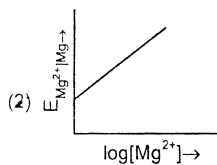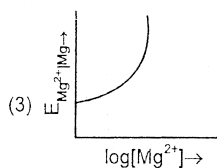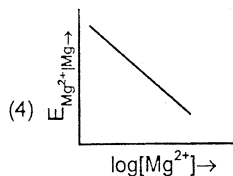
Answer: B

▶ Watch Video Solution

516. The number of moles of water which must be electrolyzed to produce $22.4L$ of O_2 at $273K$ and 2 atmospheric pressure is

A. 1

B. 2

C. 4

D. none of these

Answer: C

517. Choose the incorrect statement from the following:

A. In the metallurgy of Cu, matte obtained from roasting consist of Cu_2S(major) + FeO

B. At temperature below $983K$ (approx) CO is chief reducing agesnt in blast furnance.

C. In zone refining impurities moves in the direction of heater.

D. Electrolytic reduction of Al_2O_3 is known as Hall-Heroult process

Answer: A

518. Select in incorrect match

A. $Hg, Cu, Pb \Rightarrow$ Self reduction

B. $Mn_3O_4, B_2O_3 \Rightarrow$ Reduction by aluminium

C. $Zr, Ti, Ni \Rightarrow$ Vapour phase refining

D. Molten $MgCl_2 + CaCl_2 + NaCl \Rightarrow$ Hoop's process (electrolysis)

Answer: D

519. Select the incorrect statement.

A. The geometry of phosphorus in H_3PO_2, H_3PO_3 and H_3PO_{34} is tetrahedral

B. H_3PO_2, H_3PO_3 and H_3PO_4 are tribasic acids

C. $NH_3 < PH_3 > AsH_3 < SbH_3$: increasing acidic character.

D. $CO_2 < SiO_2 < SnO_2 < PbO_2$: increasing oxidising power.

Answer: B

520. Silicones repel water due to:

A. Low surface area

B. Strong Si - O - Si bonds

C. High vender Waal's forces

D. The presence of alkyl group pointed towards surface

Answer: D

▶ **Watch Video Solution**

521. The colour developed when Na_2S is added to $Na_2\left[Fe(CN)_5(NO)\right]$ is,

A. Violet

B. Yellow

C. Red

D. Black

Answer: A

522. Select incorrect statement

A. The oxidation state of iron in the complex $\left[Fe\left(H_2O\right)_5 NO\right]SO_4$

is +1

B. Sodium nitroprusside test is not performed by free H_2S

C. KBr in heating with MnO_2 and concentrated H_2SO_4 liberates

both Br_2 and SO_2 gases as major products.

D. All the statements are correct.

Answer: C

523. Which of the following interface cannot be obtained?

A. liquid-liquid

B. solid-solid

C. liquid-gas

D. gas-gas

Answer: D

> ▶ **Watch Video Solution**

---

524. Which of the following statement is true?

A. Lower the gold number, more will be protective power

B. Higher the gold number more will be the protective power

C. Higher the coagulation value, more will be coagulation power

D. none of these

Answer: A

(i)

$$\xrightarrow[\text{(2)}H_2O]{\text{(1) LiAlH}_4} A,$$

(ii)

$$\xrightarrow[\text{(2)}H_2O]{\text{(1) LiAlH}_4 \text{(excess)}} B +$$

525.
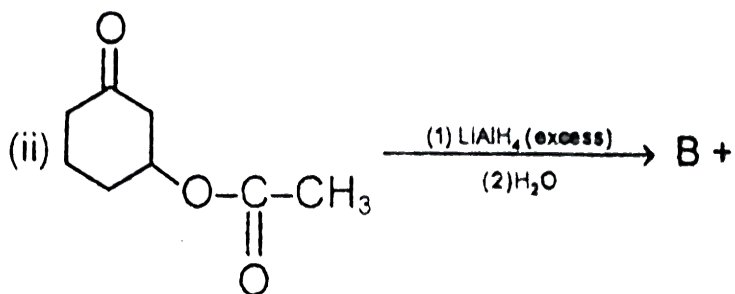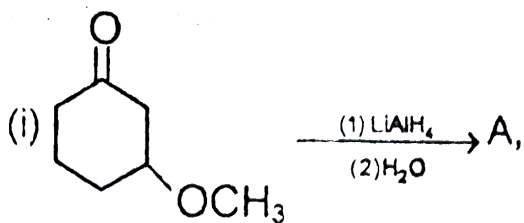
$CH_3 - CH_2 - OH$

In the given reaction A & B are respectively:

(1) Both

A.

(2) A is , B is

B.

(3) A is , B is

C.

(4) A is , B is

D.
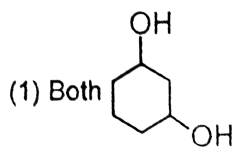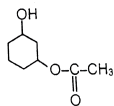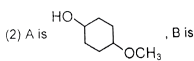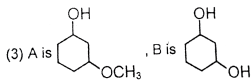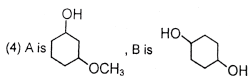
Answer: C

▶ **Watch Video Solution**

---

526. Which of the following reaction correctly reports the major product?

A. $CH_3C| \, |O - O - \overset{\overset{\displaystyle CH_3}{|}}{C} \, |CH_3 - CH_3 \qquad \xrightarrow[\text{(ii)} H_2O]{\text{(i)} CH_3MgBr \, (\text{excess})}$

B.

$$(i)O_2$$
$$CH_3 - CH | CH_3 - CH_2 - MgBr \quad \rightarrow \quad (i)H_2OCH_3 - CH | CH_3 - CH_2 - OH$$

C.

$$(i)CO_2$$
$$CH_3 - CH_2 - CH_2 \_ MgBr \quad \rightarrow \quad (ii)H_2OCH_3 - CH_2 - CH_2 - CH_2 | OH$$

(i) / (ii) H₂O

D. $CH_3 - CH_2 - MgBr$

$$CH_3 - CH_2 - CH | OH - CH_3$$
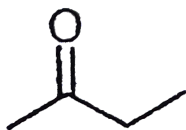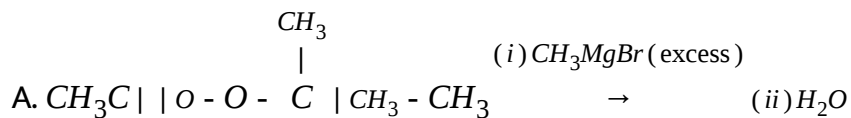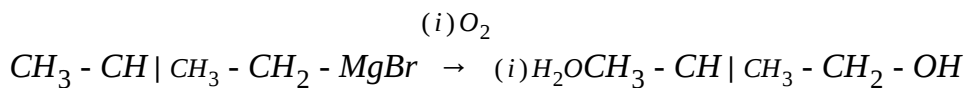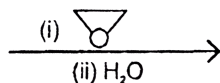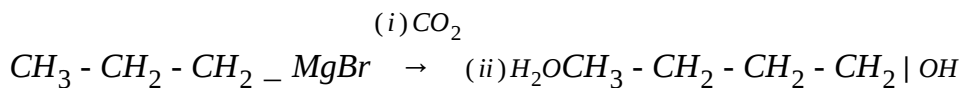
Answer: B

▶ Watch Video Solution

---

527. Rate of S_N1 & S_N2 reactions for the isomers of C_4H_9Br is

i. n- Butylbromide

ii isobutylborimide

ii s-Butylbromide

iv. t-Butylbromide

a. $i > ii > iii > iv$ for S_N2

b. $i > ii > iii > iv$ for S_N1

c. $iv > iii > ii >$ for S_N2

d. $iv > iii > ii > i$ for S_N1

A. a & b

B. c & d

C. a & d

D. b & c

Answer: C

▶ Watch Video Solution

528. How many position isomers are possible of trichlorocyclohexane

which can show geometrical isomerism.

A. 2

B. 3

C. 4

D. 6

Answer: B

▶ Watch Video Solution

529. Which of the following reaction correctly reports the major product?

A.

B.

C.

D.
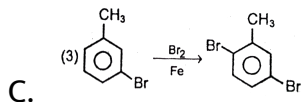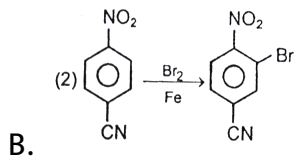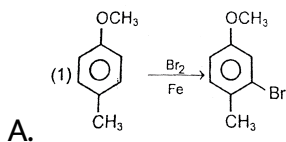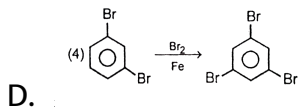
Answer: C

▶ View Text Solution

530. The correct order of $S_N2/E2$ ratio for the % yield of product of the following halide is,

$$\overset{\overset{\displaystyle Ph}{\displaystyle |}}{P.CH_3 - CH_2 - C|_I - CH_3}$$

Q. $CH_3 - CH|_{Ph} - CH|_I - CH_3$

R. $CH_3 - CH_2 - I$

S. $CH_3 - CH - CH|_I - CH_3$

    A. $R > S > Q > P$

    B. $R > Q > S > P$

    C. $P > R > S > Q$
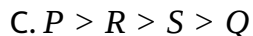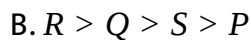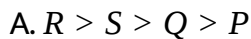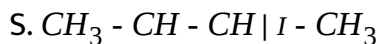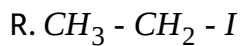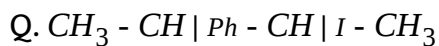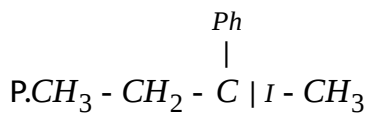
D. $Q > P > R > S$

Answer: A

▶ Watch Video Solution

531. Which of the following is correct order?

A. $-NH_2 >   - NO_2(- I$effect$)$

B. $-F >   - Br(+ M$effect$)$

C. $-CHO >   - CN - (- M$effect$)$

D. $-CH_2CH_3 >   - COO^-(+ I$effect$)$

Answer: B

▶ Watch Video Solution

532. $CH_3 - C | CH_3 = CH_2 \xrightarrow{HBr} \text{Peroxide} CH_3 - CH | CH_3 - CH_2Br$ reaction

intermediate of this reaction is:

A. $CH_3 - \overset{\cdot}{C} | CH_3 - CH_2Br$

B. $CH_3 - \overset{\cdot}{CH} | CH_3 - CH_2$

C. $CH_3 - \overset{\cdot}{C} | CH_3 - CH_3$

D. $CH_3 - \overset{\overset{Br}{|}}{C} | CH_3 - \overset{\cdot}{CH_2}$
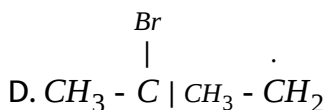
Answer: A

▶ **Watch Video Solution**

---

533. In which of the following reaction CH_4 will be obtained?

i. $CH_3 - MgBr + CH_3 - C \equiv CH$

(ii) $CH_3 - MgBr + CH_2 \overset{\diagup COOH}{\diagdown COOH}$

ii.

iii. $CH_3 - MgBr + CH_3OH$

(iv) $CH_3 - MgBr + CH_2$
$$\begin{array}{c} \overset{O}{\overset{\|}{C}} - CH_3 \\ C - CH_3 \\ \overset{\|}{O} \end{array}$$
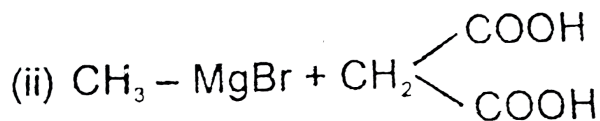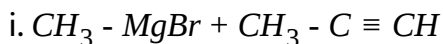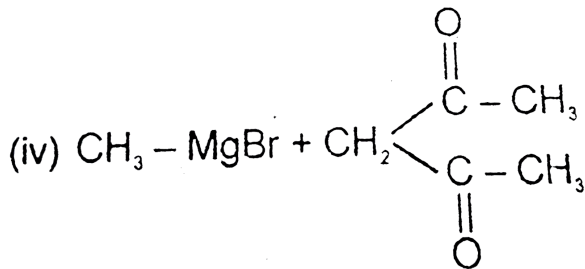
iv

A. i, ii & iii

B. i, ii, iii & iv

C. iii & iv

D. iii & i, iv

Answer: B

▶ Watch Video Solution

534. S_N1 reaction underoges through carbocation intermediate as follows:
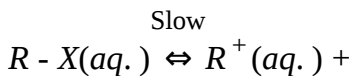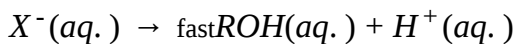
$$R - X(aq.) \overset{Slow}{\rightleftarrows} R^+(aq.) +$$

$$X^-(aq.) \xrightarrow[\text{fast}]{H_2O} ROH(aq.) + H^+(aq.)$$

[R=t-Bu, iso-Pr, Me] $(X = Cl, Br, I)$

The correct statements are

I. The decreasing order of rate of S_N1 reaction is

$t - BuX > iso - PrX > EtX > MeX$

II. The decreasing order of ionisation energy is

$MeX > EtX > iso - PrX > t - BuX$

III. The decreasing order of energy of activation is

$t - BuX > iso - PrX > EtX > MeX$

    A. I & II are correct

    B. I & III are correct

    C. II and III are correct

    D. I, II & III are correct

Answer: A

> ▶ **Watch Video Solution**

535. In Mond's process following chemcial changes occurs:

$$Ni_{(\text{Impure})} + CO \xrightarrow{330-350K} [P]$$

$$[P] \xrightarrow{450-470K} Ni_{(\text{Pure})} + CO$$
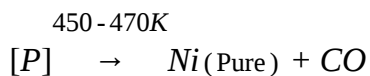
Coordination number of Ni in $[P]$ is......

536. $Na_2[PtBrClI](CN)\big]$

No of geometrical isomers $= x$

No of optical isomers $= y$

No of ions produced in

aqueous solution $= z$

Fine the value of $x + y + z$
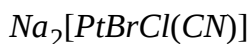
$Na_2[PtBrCl(CN)]$

537. How many of the following gases/vapours are colourless?

$CO_2, SO_2, H_2S, NO_2, HCl, Br_2, I_2, CO, Cl_2$

▶ Watch Video Solution

538. How many reactions show correct major product?

(a) 1-Bromo-3-chlorocyclobutane

$$\xrightarrow{\text{2Na/dry ether}}$$ ▱

(b) [cyclohexyl-CH₂Cl] $\xrightarrow[\substack{(2)\text{ CuI} \\ (3)\text{CH}_3-C:}]{(1)\text{Li}}$ [1-methylcyclohexane derivative]

(c) $H\!\equiv\!\!H \xrightarrow[873K]{\text{Red hot iron}}$ [1,3,5-trimethylbenzene]

(d) HO—C(=O)—CH₂—CH₂—C(=O)—OH $\xrightarrow[\text{electrolysis}]{\text{KOH}}$ H–C≡C–H

(e) $CH_3CCl_3 \xrightarrow[\Delta]{Ag} CH_3\text{–}C\equiv C\text{–}CH_3$

(f) [CH₃-CH₂-CHBr-CHBr-CH₃] $\xrightarrow[\text{(2) NaNH}_2\text{(1 eq.)}]{\text{(1) alc.KOH(1 eq.)/}\Delta} CH_3\text{–}C\equiv CH$

▶ View Text Solution

alc. KOH / Δ → Number of
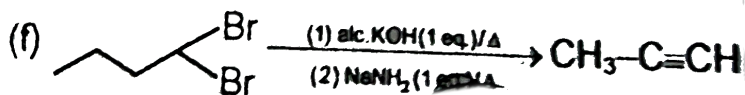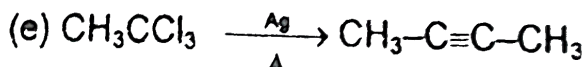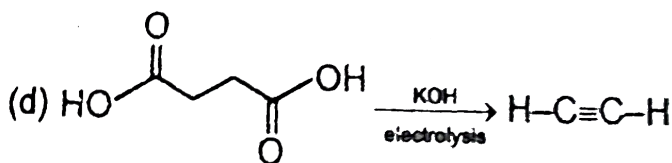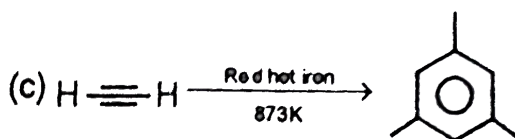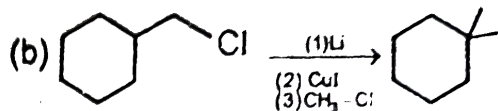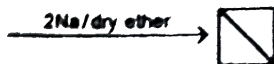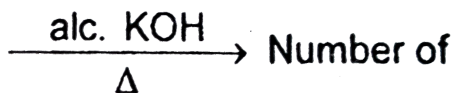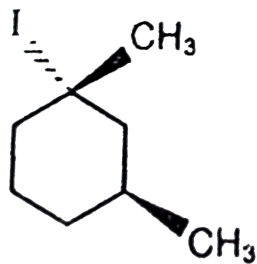
539.

Number of possible alkene isomers will be:

▶ Watch Video Solution

540. Select the correct statements about FCC (ABCAB...) Structures.

A. Distance between nearest octahedral void and tetrahedral void is $\dfrac{\sqrt{3}a}{4}$

B. Distance between two nearest octahedral void is $\dfrac{a}{\sqrt{2}}$

C. Distance between two nearest tetrahedral void is $\dfrac{\sqrt{3}a}{2}$

D. Distance between layer A and B is $2r\sqrt{\dfrac{2}{3}}$ ($r =$ radius of atom)

Answer: A::B::D

---

541. Which of the following metal's ore is/are concentrated by leaching method?

A. Al

B. Fe

C. Au

D. Ag

Answer: A::C::D

---

542. Select correct statement(s)

A. Methoxy ethane give idoethane and methanol with one equivalent anhydrous HI

B. Reaction $CH_3 - Br + AgF \rightarrow CH_3 - F + AgBr$ is known as swarts reaction.

C. Optically active alkanol will show total retaintion of configuration in major product during its reaction with $SOCl_2$

D. Bromoethane gives ethane nitrite with $AgCN$ as major product.

Answer: B::C

▶ View Text Solution

---

543. Which of the following is/are incorrect statement regarding glucose:

A. glucose gives $+ve$ tollen's test

B. glucose petaacetate can react with hyroxylamine which indicate

the presence of free $-CHO$ group

C. Amylopectin is a branched chain polmer of α - D- glucose unis,

where branching occurs by C_1 - C_6 glycosidic linkage.

D. Glucose doesnot get oxidised by bromine water, becase

bromine water is a mild oxidizing agent.

Answer: B::D

▶ **View Text Solution**

Anode of Zn
(−ve electrode)

Voltmeter

Salt
Bridge

Cathode of Cu
(+ve electrode)

$ZnSO_4$
(Anodic Cell)

$CuSO_4$
(Cathodic Cell)

544.

The most pupular electrochemical cell, daniel cell was originally

developed by the English chemist john F daniel the general assembly

of the cell is as given below An undergraduate student made a Daniel cell using $100cm^3$ of $0.100MCuSO_4$ ad $0.100M$ $ZnSO_4$ solution respectively. The two compartments are connected by suitable salt bridge.

[given

$$E^{\circ}\left(Cu^{2+}/Cu\right) = 0.34V, E\left(Zn^{2+}/Zn\right) = -0.76V, \frac{2.30RT}{F} = 0.06, \log2 = 0.3\right]$$

Q. Calculate the emf (in volt) of the above cell.

A. 0

B. 1.1

C. 1.16

D. 1.04

Answer: B

▶ Watch Video Solution

Anode of Zn
(−ve electrode)

Voltmeter

Salt
Bridge

Cathode of Cu
(+ve electrode)

ZnSO₄
(Anodic Cell)

CuSO₄
(Cathodic Cell)

545.

The most pupular electrochemical cell, daniel cell was originally developed by the English chemist john F daniel the general assembly of the cell is as given below An undergraduate student made a Daniel cell using $100 cm^3$ of $0.100 M CuSO_4$ ad $0.100M$ $ZnSO_4$ solution respectively. The two compartments are connected by suitable salt bridge.

[given

$$E^{\circ}\left(Cu^{2+}/Cu\right) = 0.34V, E\left(Zn^{2+}/Zn\right) = -0.76V, \frac{2.30RT}{F} = 0.06, \log 2 = 0.3\,]$$

Q. A labmate of the student asked her for some solid $CuCl_2$. while she was lifting the bottle from a shelf, the lid of the bottle slipped and some amount of $CuCl_2$ fell in the $CuSO_4$ compartment at constant volume. She measured the emf of the cell again and found that it has increase by 9 mV. She used this data to calculate the amount of $CuCl_2$

that had spilled in the compartment. Calculate the mass of $CuCl_2$ that

had spilled into the daniel cell? (molar mass of $CuCl_2 = 135\dfrac{g}{mol}$)

A. 1.35g

B. 13.5g

C. 27g

D. 2.7g

Answer: A

▶ Watch Video Solution
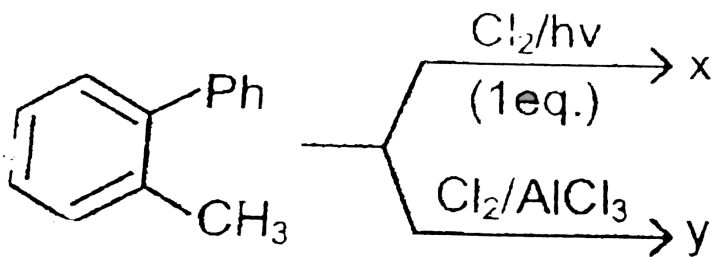
546.

Consider the following reactions to answer the next three questions

Q. Major product X and Y are respectively

A.

B.

C.

D.
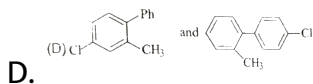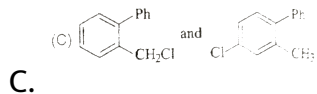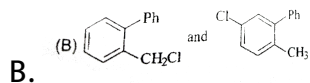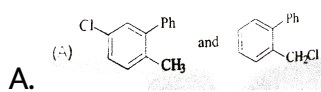
Answer: C

▶ Watch Video Solution

---

547. Consider the following reactions to answer the next question:
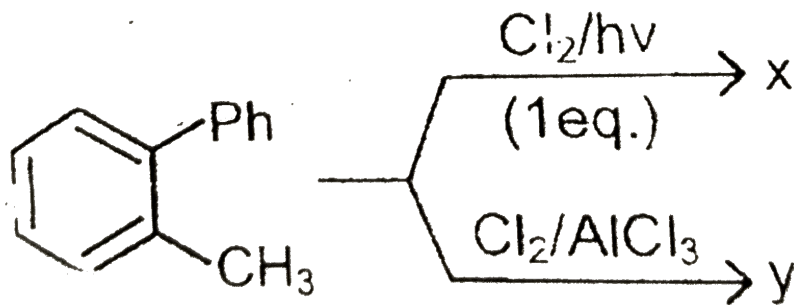
$$\xrightarrow[\text{(1eq.)}]{\text{Cl}_2/h\nu} X$$

$$\xrightarrow{\text{Cl}_2/\text{AlCl}_3} Y$$

If product X is treated with $AlCl_3$, it undergoes Friedel-Crafts reaction.

The expected product is

A.
(A)

B.
(B)

C.
(C)
CH_3

D.
(D)
CH_3
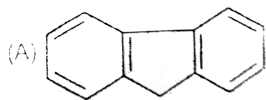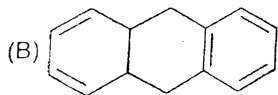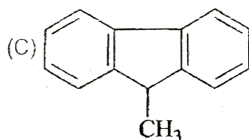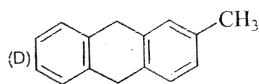
Answer: A

▶ View Text Solution

---

548. In an experiment $50ml$ of $0.1(M)$ solution of a salt is reacted with

$25ml$ of $0.1(M)$ solution of sodium sulphite. The half equation for the

oxidation of sulphite ion is $SO_3^{2-}(aq) + H_2O \rightarrow SO_4^{2-}(aq) + 2H^+(aq) + 2e^-$ If the oxidation number of metal in the salt was 3, what would be the new oxidation number of metal?
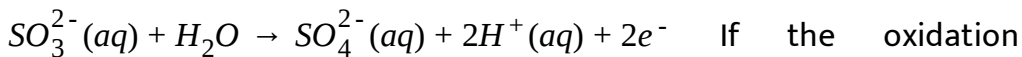
▶ Watch Video Solution

549. In te decomposition of Ammonia it was found that at 50 torr pressure $t_{(1/2)}$ was 3.64 hour while at 100 torr $t_{(1/2)}$ was 1.82 hours. Then order of reaction would be:

▶ Watch Video Solution

550. At STP the density of a gas X is three times that of gas Y while molecule mass of gas Y is twice that of X. The ratio of pressures of X and Y will be:

A. `

B.

C.

D.

Answer: 6

▶ **Watch Video Solution**

---

551. The ionization energy of He^+ is x times that of H. The ionization energy of Li^{2+} is y times that of H. find $|y - x|$

▶ **Watch Video Solution**

---

552. A certain buffer solution contains equal concentartion of $X^\ominus$ and HX. The K_b for $X^\ominus$ is 10^{-10}. The pH of the buffer is

▶ **Watch Video Solution**

553. Depression of freezing point of 0.01 molal aq. CH_3COOH solution is 0.02046 $°$. 1 molal urea solution freezes at $-1.86°C$. Assuming molarity equal to molarity , pH of CH_3COOH solution is :

554. Consider the structure of Al_2Me_6 compound and find the value of $\dfrac{x - y}{z}$ where $x =$ maximum number of atoms that can lie in place having terminal $(Al - Me)$ bonds

$y =$ total number of $3c - 2e^-$ bonds

$z =$ total number of atoms that are sp^3 hydrized.

555. Find the value of x in the tremolite abestos:

$Ca_2Mg_x\left(Si_4O_{11}\right)_2(OH)_2$
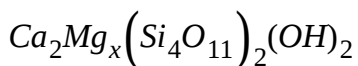
556. What is the degree of unsaturation in compound (x).

$$\text{Phenol} \xrightarrow[H_2SO_4]{Na_2CrO_4} X$$
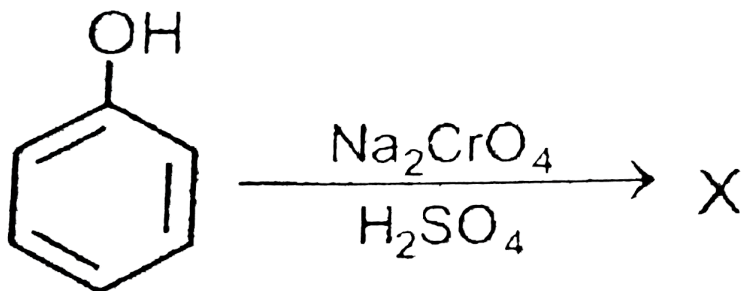
557. The total number of carboxylic acid groups in te product P is:

$$\xrightarrow[\substack{2. \ O_3 \\ 3. \ H_2O_2}]{1. \ H_3O^+, \ \Delta} P$$

558. An organic compound (X) has molecular formula $C_7H_6O_2$ and it does not effervesces with $NaHCO_3$. A on treatment with excess of $HBr(aq)$ gives $Y\left(C_6H_6O_2\right)$ and CH_2Br_2. Y forms a violet coloured solution with $FeCl_3$. If X treated with Br_2Fe, how many different monobrominaiton product would result?

▶ Watch Video Solution

559.
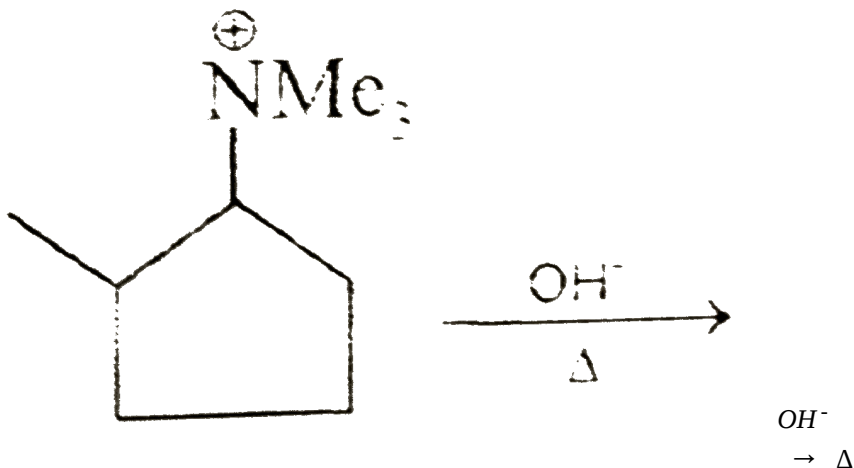
number of hyperconjugate hydrogen atoms present in major product.

▶ View Text Solution

560. The total number of Aldols (β - Hydroxy carbonyl compounds) are formed in the following reaction. (Ignore stereoisomers)

$$PhCHO + CH_3CH = O + Ph\text{-}C| \, |O\text{-}CH_3 \xrightarrow{Dil.NaOH.\Delta}$$
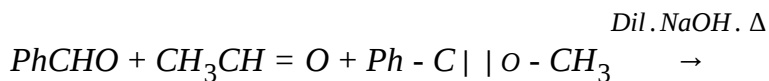
> ▶ View Text Solution
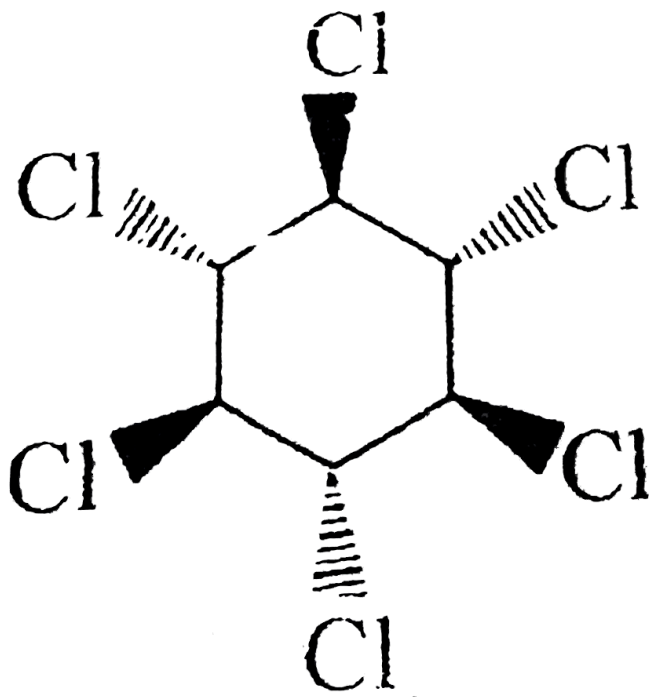
561.

How many different possible planes of symmetry (POS) are present in the following given compound.

562. Which of the following pairs contain molecular solids but different nature of intermolecular forces?

A. Ice, $NaCl$

B. $NaCl$, KCl

C. SiO_2, graphite

D. Ice and dry ice

Answer: D

563. Addition of 1 mol of B of 8 mole of A increases vapour pressure of A. If A and B form ideal soltion, then

A. A is more volatile than B

B. B is more volatile than A

C. volatility cannot be predicted on the basis of the given data

D. Lower boiling azeotrope will be formed

Answer: B

> ▶ **View Text Solution**

564. For a hypothetical reaction $X \rightarrow Y$, the value of rate constant is $0.75 \sec^{-1}$. If the concentration of X is reduced to half, then value of the constant is

A. $0.375 \sec^{-1}$

B. $0.75 \sec^{-1}$

C. $1.5 \sec^{-1}$

D. $0.1875 \sec^{-1}$

Answer: B

---

565. In an adsorption experiment a graph between $\log \frac{x}{m}$ versus $\log P$ was fond to be linear with a slope of $45°$ $\Big)$. The intercept on the log $\frac{x}{m}$ axis was found to 0.70. Calculate the amount of gas adsorbed per gram of charcoal under a pressure of 1 atm [log5 = 0.70]

A. 5

B. 2

C. 3

D. 0

Answer: A

566. A_m° value cannot be determined by extraploting, the plot between A_m verses $C^{1/2}$ for the compound.

A. KCl

B. K_2SO_4

C. NH_4OH

D. $NaNO_3$

Answer: C

▶ View Text Solution

567. When $NaBH_4$ is dissolved in water

A. Na^+ and BH_4^- ions are formed which are stable

B. It decomposes with evolution of H_2

C. BH_4^- is formed initially decomposed to give $H^\ominus$ ion which prevents further decomposition.

D. $NaOH$ and H_3BO_3 is formed

Answer: B

▶ Watch Video Solution

568. In which of the following cases metal obtained by carbon reduction is in liquid state?

A.

B.

C.
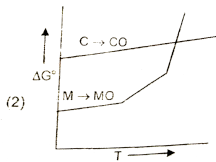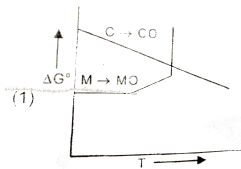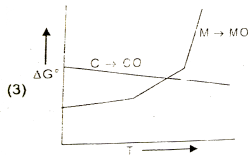
D. none of these

Answer: C

▶ **View Text Solution**

---

569. In solid N_2O_3 and solid N_2O_5, N - O hybridization in cationic part are respectively:

A. sp^2 and sp

B. sp and sp^2

C. sp and sp

D. none of these

Answer: C

570. A substance which gives a brick red flame and breaks down on heating giving oxygen and brown gas is:

    A. Calcium carbonate

    B. Magnesium carbonate

    C. Magnesium nitrate

    D. Calcium nitrate

Answer: D

571. Which of the following pairs can be distinguished by action of heat?

i. K_2CO_3 and $CaCO_3$

ii. Na_2CO_3 and $Mg(NO_3)_2$

iii. $Mg(NO_3)_2$ and $NaNO_2$
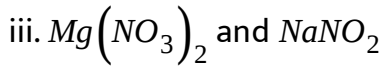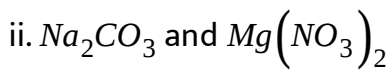
A. i and ii

B. i and iii

C. i, ii, iii

D. none of these

Answer: C

▶ Watch Video Solution

572. The ratio of uncertainity in wave length and uncertainity in velocity is equal to

A. $\dfrac{-\lambda}{v}$

B. $\dfrac{h}{mv}$

C. $\dfrac{h^2}{mv^2}$

D. $\dfrac{\lambda^2}{v}$

Answer: A

573. A magnetic moment of $1.73BM$ will be shown by one amongst the following

A. $\left[Ni(CN)_4\right]^{2-}$

B. $TiCl_4$

C. $\left[CoCl_6\right]^{4-}$

D. $\left[Cu\left(NH_3\right)_4\right]^{2+}$
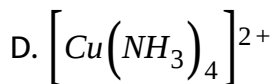
Answer: D

574. Solubilities of $Ni(OH)_2$ and $AgCN$ are S_1 and S_2. If $K_{sp}\left[Ni(OH)_2\right] = 2 \times 10^{-15}$

$K_{sp}[AgCN] = 6 \times 10^{-17}$, then

A. $S_1 > S_2$

B. $S_1 < S_2$

C. $S_1 = S_2$

D. Data is insufficient

Answer: C

▶ **Watch Video Solution**

575. The compound $X\left(C_7H_9N\right)$ reacts with benzensulfonyl chloride to give $Y\left(C_{13}H_{13}NO_2S\right)$ which is insoluble in alkali. The compound X is-

A.

B.

(2)

C.

(3)

D.

(4)

Answer: A

> ▶ Watch Video Solution

---

576. $CH_3 - \overset{\overset{O}{||}}{C} - CH_3 \xrightarrow{X_2} OH^{\ominus}CHX_3 + CH_3 - \overset{\overset{O}{||}}{C} - O^{\ominus}$
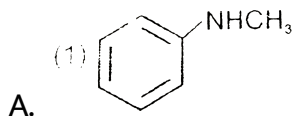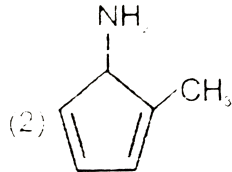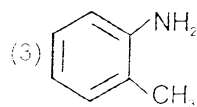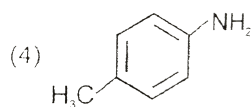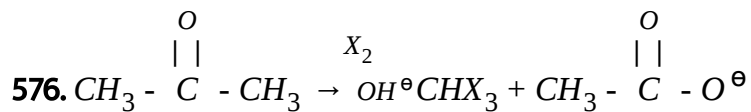
The rate of haloform reaction reaction is fastest with

A. $X_2 = Cl_2$

B. $X_2 = Br_2$

C. $X_2 = I_2$

D. All at same rate $r_{Cl_2} = r_{Br_2} = r_{I_2}$
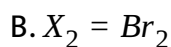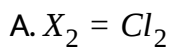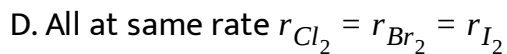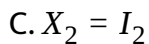
Answer: D

577. Gabriel phthalimide synthesis is preferred for the synthesis of

A. Aliphatic primary amine

B. Secondary amine

C. Tertiary amine

D. Aromatic primary amine

Answer: A

578. In structure of D.N.A and R.N.a nucleotides are joined together by phosphodiester linkage between

    A. 5′ and 2′ carbon atoms of the pentose sugar

    B. 5′ and 3′ carbon atoms of the petose suggar

    C. 5′ and 1′ carbon atoms of pentose sugar

    D. 3′ and 1′ carbon atoms of pentose sugar

Answer: B

579. Major product of mononitration of the following compound is :

A. (1) NO₂

B. (2) NO₂

C. (3) NO₂

D. (4) O₂N
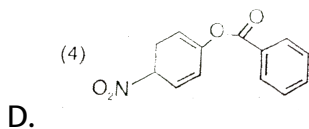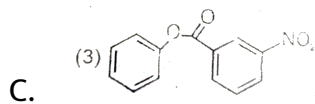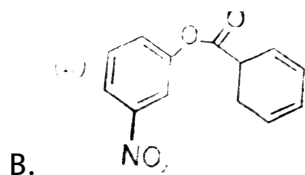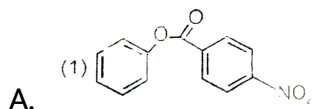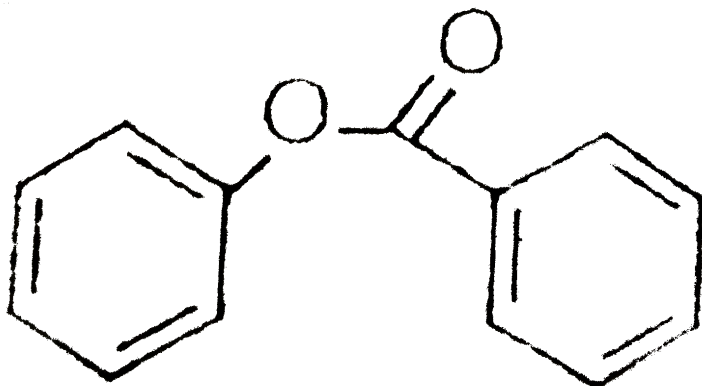
Answer: D

580. Which among the following is biodegradable polymer

A. Nylon -6

B. Nylon-2,6

C. Buna-S

D. Nylon-6,6

Answer: B

581. The statement that ranitidine is an antacid has been given because?

A. It decrease the production of stomach acid

B. It neutralize excess stomach acid

C. It dilute the stomach acid

D. None of the above is true

Answer: A

▶ **Watch Video Solution**

---

582.   Alkene
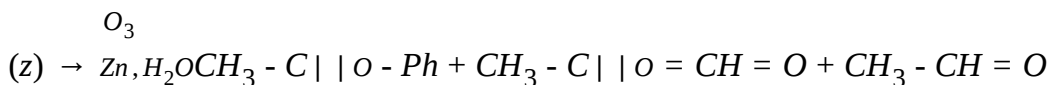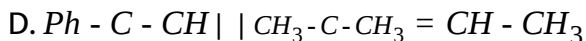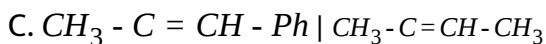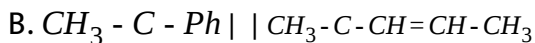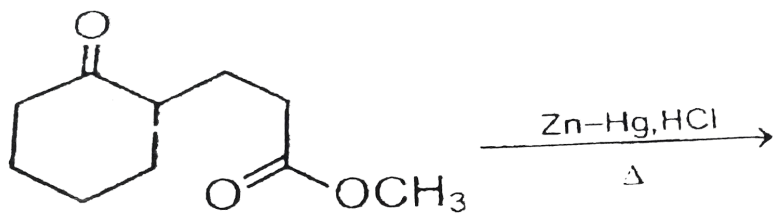
$$(z) \xrightarrow{O_3}{Zn, H_2O} CH_3 - C\,|\,|O - Ph + CH_3 - C\,|\,|O = CH = O + CH_3 - CH = O$$

Alkene (Z) can be

A. $CH_3 - C - CH\,|\,|\,CH_3\text{-}C\text{-}CH_3 = CH - Ph$

B. $CH_3 - C - Ph\,|\,|\,CH_3\text{-}C\text{-}CH=CH\text{-}CH_3$

C. $CH_3 - C = CH - Ph\,|\,CH_3\text{-}C=CH\text{-}CH_3$

D. $Ph - C - CH\,|\,|\,CH_3\text{-}C\text{-}CH_3 = CH - CH_3$

Answer: B

$Zn-Hg, HCl$

Δ

583.

$Zn - Hg . HCl$

→ Δ   product of the reaction will be:

A.

(1)

B.

(2)

C.

(3)

(4)

D.

Answer: C

> ▶ **Watch Video Solution**

$$\text{NaOH} \xrightarrow{(1_{eq})} \text{CH}_3\text{-OT}_S \xrightarrow{(1_{eq})} \text{Products}$$

584.
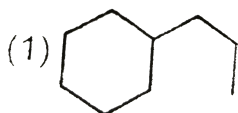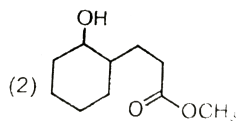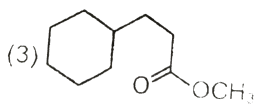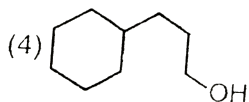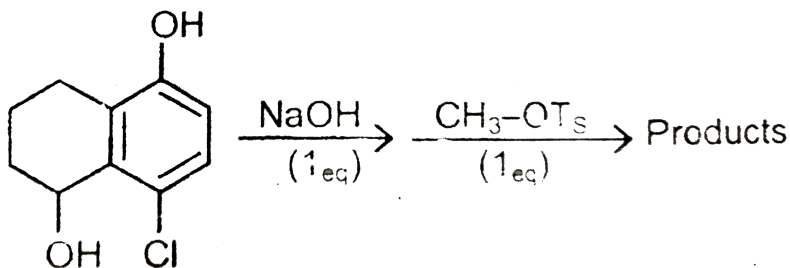
$\rightarrow \underset{eq}{1} \xrightarrow{NaOH} \underset{eq}{1} \xrightarrow{CH_3\text{-}OT_s}$ Products The predominant product is

A.

(2)

B.

(3)

C.

(4)

D.
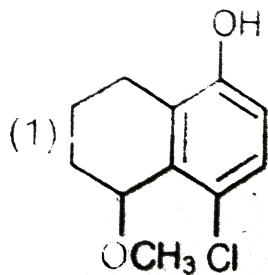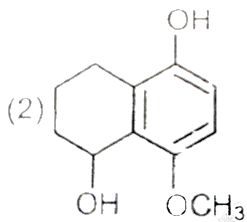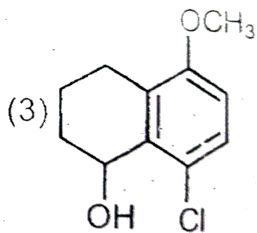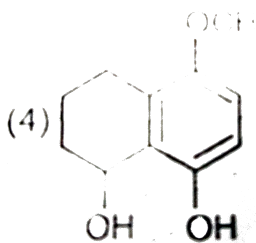
Answer: C

> ▶ Watch Video Solution

---

585. The denticity of the ligand $N\left(CH_2CH_2NH_2\right)_3$ is

> ▶ Watch Video Solution

586. Number of moles of $K_2Cr_2O_7$ required to oxidised 12 moles of ethanol to acetic acid in acidic meidum will be

587. Number of positively charged sols amont the following is

$Al_2O_3. xH_2O, CrO_3. xH_2O, As_2S_3, CdS,$ starch, $TiO_2,$ Haemoglobin, $Fe_2O_3. xH_2O,$ Gold eosin

588. Total number of isomeric molecules obtained on dichlorination of cyclopentane

589. $CH_3 - \overset{\overset{\displaystyle Cl}{\displaystyle |}}{C} | Cl - CH_3$ to $CH_3 - C \equiv CNa$ conversion by using $NaNH_2/Liq.\ NH_3$, Number of moles of $NaNH_2$ required will be

▶ Watch Video Solution

590. $40.25g$ of Glauber's salt $\left(Na_2SO_4.10H_2O\right)$ is dissolved in water to obtain $500mL$ of solution of density $1077.5gdm^{-3}$. The molality of Na_2SO_4 in solution is about:

A. $0.48molkg^{-1}$

B. $0.24molkg^{-1}$

C. $0.12molkg^{-1}$

D. $0.84molkg^{-1}$

Answer: B

▶ Watch Video Solution

591. The angular momentum of an electron in an orbital is given as:

A. $L = n\left(\dfrac{n}{2\pi}\right)$

B. $L = l\left(\dfrac{h}{2\pi}\right)$

C. $L = \sqrt{l(l+1)}\left(\dfrac{h}{2\pi}\right)$

D. $L = m\left(\dfrac{h}{2\pi}\right)$

Answer: C

▶ **Watch Video Solution**

592. Silicones repel water due to:

A. low surface area

B. Strong Si - O - Si bonds

C. High vander Waals forces

D. The presence of alkyl group pointed towards surface.

Answer: D

▶ **Watch Video Solution**

---

593. The values of Vander waals constant a for the gases N_2, CO_2 and CH_4 are 1.390, 3.640 and $2.2253 L^2$ atm mol^{-2} respectively. The gas which can be most easily be liquified is,

A. CH_4

B. N_2

C. CO_2

D. Nothing can be predicted

Answer: C

▶ Watch Video Solution

594. Among the following species, identify the isostuctural pairs

NF_3. NO_3^-, BF_3, H_3O, HN_3

A. $\left[NF_3, NO_3^-\right]$ and $\left[BF_3, H_3O^+\right]$

B. $\left[NF_3, N_3H\right]$ and $\left[NO_3^-, BF_3\right]$

C. $\left[NF_3, H_3O^+\right]$ and $\left[NO_3^-, BF_3\right]$

D. $\left[NF(3), H_3O^+\right]$ and $\left[N_3H, BF_3\right]$
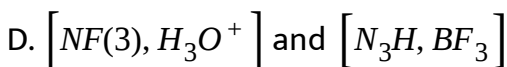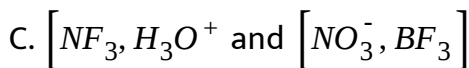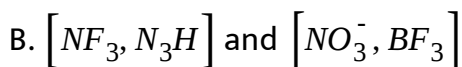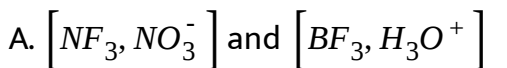
Answer: C

595. For the decomposition reaction
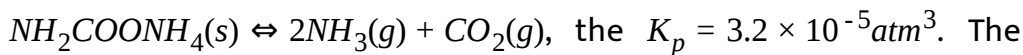
$NH_2COONH_4(s) \Leftrightarrow 2NH_3(g) + CO_2(g)$, the $K_p = 3.2 \times 10^{-5} atm^3$. The total pressure of gases at equilibrium when 1.0 mol of $NH_2COONH_4(s)$ was taken to start with will be:

A. 0.25*atm*

B. 0.12*atm*

C. 0.04*atm*

D. 0.06*atm*

Answer: D

▶ Watch Video Solution

596. The maximum pH of a solution which is having $0.10M$ in Mg^{2+} and from which $Mg(OH)_2$ is not precipated is: (Given $K_{sp}Mg\big)(OH)_2 = 4 \times 10^{11}M^3\big)\{log2 = 0.30\}$

A. 10.3

B. 3.7

C. 7.5

D. 9.3

Answer: D

597. The IUPAC name of $\left[Ni\left(NH_3\right)_4\right]\left[NiCl_4\right]$ is

A. Tetrachloridonickel(II)Tetraamminenickel(II)

B. Tetraamminenickel(II) tetrachloridonickel(II)

C. Tetraamminenickel(II) tetrachloridonickelate(II)

D. Tetrachloridonickel(II) tetraamminenickelate(0)

Answer: C

598. Which of the following statements is not correct?

A. The complexes $[Ni(CO)_4]$ and $[NiCl_4]^{2-}$ have nickel in the different oxidation states.

B. The complexes $[Ni(CO)_4]$ and $[NiCl_4]^{2-}$ differ in the magnetic properties.

C. The complexes $[Ni(CO)_4]$ and $[NiCl_4]^{2-}$ differ in the primary valency of nickel

D. The complexes $[Ni(CO)_4]$ and $[NiCl_4]^{2-}$ differ in the state of hybridization

Answer: D

▶ Watch Video Solution

599. Electrode potential for Mg electrode varies according to the equation

$$E_{Mg^{2+} \mid Mg} = E^{\ominus}_{Mg^{2+} \mid Mg} - \frac{0.059}{2} \log \frac{1}{\left[Mg^{2+}\right]}$$

The graph of $E_{Mg^{2+} \mid Mg}$ vslog$\left[Mg^{2+}\right]$ is

A.

(1)

B.

(2)

C.

(3)

D.

(4)
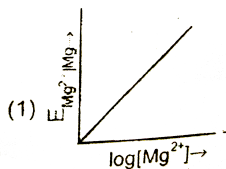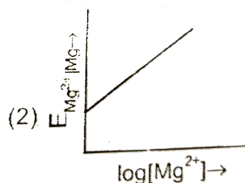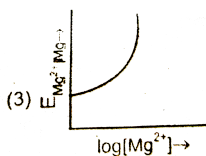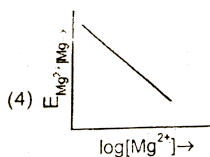
Answer: B

▶ Watch Video Solution

600. The standard free energy change of the reaction

$$Cu^{2+} + Sn(s) \rightarrow Cu(s) + Sn^{2+}$$
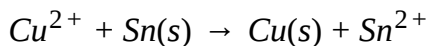
Given : $E^{\circ} = 0.48V$) is:

A. $-31.8 KJmol^{-1}$

B. $-62.1 KJmol^{-1}$

C. $-79.2 KJmol^{-1}$

D. $92.64 KJmol^{-1}$

Answer: D

▶ Watch Video Solution

601. The coagulation of $100mL$ of a colloidal solution of gold is completely prevented by adding $0.25g$ of starch to it before adding $10mL$ of $10 \% NaCl$ solution. The gold number of starch is

A. 24

B. 240

C. 120

D. 360

Answer: A

 Watch Video Solution

602. Which of the following statement is incorrect?

A. In Hall-Heroult process, the electrolyte used is a molten mixture

   of alumina, crylite and fluorspar.

B. Lead is extracted from its chief ore galena by self reduction.

C. Electrolytic refining of Al cannot be carried out in aqueous

   medium.

D. Silver (impurity) is extracted out as cathode mud during electrolytic refining of copper.

Answer: D

 View Text Solution

---

603. For an exothermic reaction $A \rightarrow B$, the activation energy is $65kJmol^{-1}$ and enthalpy of reaction is $42kJmol^{-1}$. The activation energy for the reaction $B \rightarrow A$ will be:

A. $23kJmol^{-1}$

B. $107kJmol^{-1}$

C. $65kJmol^{-1}$

D. $42kJmol^{-1}$

Answer: B

 Watch Video Solution

604. How many of the following quantities show increase in their value of increasing temperature?

a. Extent of physisorption of gases on solids.

b. Electrical conductivity of an electrolyte solution.

c. Electrical conductivity of an electrolyte solution.

d. Ionic product of water.

e. Vapour pressure of a pure and liquid.

f. Vapour pressure of an ideal solution which follows Rault's law, (keeping composition same)

g. Solubility of gases in liquids.

h. Reducing power of carbon monoxide for extraction of metals

Correct answer:

   A. 5

   B. 4

   C. 6

D. 3

Answer: B

605. For non ideal solution (positive deviation) which of the following is incorrect?

A. $\Delta S = $ - ve

B. $\Delta V_{mixing} = $ + ve

C. $\Delta G_{mixing} = $ - ve

D. $\Delta H_{mixing} = $ + ve

Answer: A

606. Henry's law constant for CO_2 in water is $2.5 \times 10^8 Pa$ at $298K$. Calculate mmole of CO_2 dissolved in $14g$ water at $2.5atm$ pressure at $298K$.

[Take $1atm = 10^5 N/m^2$ or Pa]

A. 12

B. 8

C. 4

D. 2

Answer: B

▶ Watch Video Solution

607. Identify the reactants (X) and (Y) for the following reaction, respectively.

$(X) + (Y)$ $\xrightarrow{NaNH_2}$ 4 - Decyne Alkyl halide Alkyne

A. $CH_3(CH_2)_4CH_2 - Cl + CH_3 - C \equiv CH$

B. $CH_3(CH_2)^2CH_2 - Cl + CH_3 - (CH_2)_2 - C \equiv CH$

C. $CH_3(CH_2)_2CH_2 - Cl + CH_3(CH_2) - C \equiv CH$

D. $CH_3 - CH_2 - CH_2 - Cl + CH_3(CH_2)_4 - C \equiv CH$
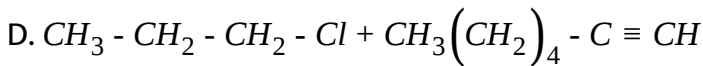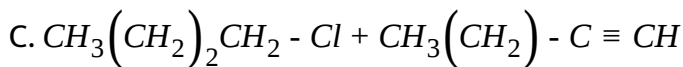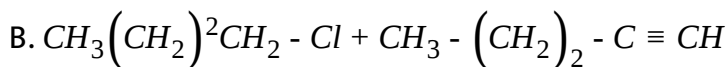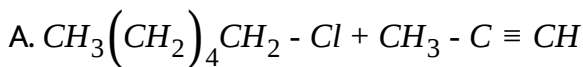
Answer: D

▶ View Text Solution

608. Cis-2-butene $\xrightarrow[\substack{OsO_4}{}]{} \xrightarrow[NaHSO_3]{HIO_4}$ products is/are:

A. $CH_3 - CH = 0$

B. $CH_3 - COOH$

C. $CH_3 - \overset{\overset{O}{\|}}{C} - \overset{\overset{O}{\|}}{C} - CH_3$

D. $CH_3 - \overset{\overset{O}{\|}}{C} - CH_3$
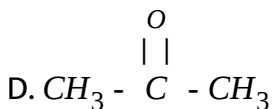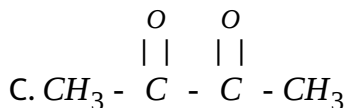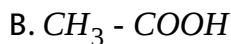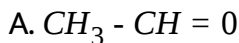
Answer: A

609. Which of the following compound gives fastest S_N2Ar reaction?

A.

(1) — chlorobenzene with Cl substituent

B.

(2) — with Cl, NO_2, NO_2

C.

(3) — with NO_2, Cl, NO_2, NO_2

D.

(4) — structure with Cl at top, NO$_2$ at bottom
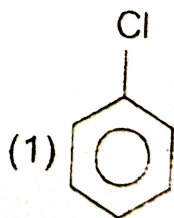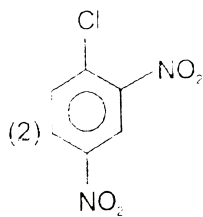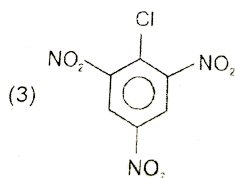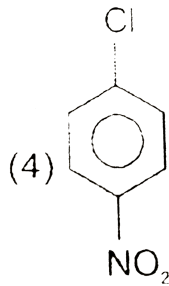
Answer: C

▶ **View Text Solution**

---

610. Out of the following which reaction give nonpolar product?

A. $CH_3 - C \equiv C - CH_3 \quad \xrightarrow{\begin{array}{c} H_2 - Pd/CaCO_3 \\ \text{Lead Acetate} \end{array}}$

B. $CH_3 - C \equiv C - CH_3 \quad \xrightarrow{Na/NH_3(l)}$

C. $CH_3 - C \equiv C - C_2H_5 \quad \xrightarrow{Na/NH_3(l)}$

D. $CH_3 - C | | O - Cl \quad \xrightarrow{\begin{array}{c} H_2 - Pd/BaSO_4 \\ \text{Quinoline} \end{array}}$

Answer: B

$$\xrightarrow{H_3O^\oplus} X + Y$$
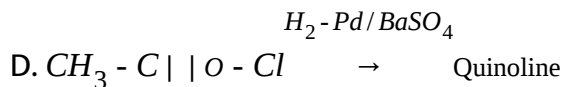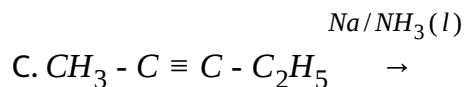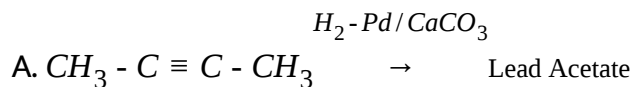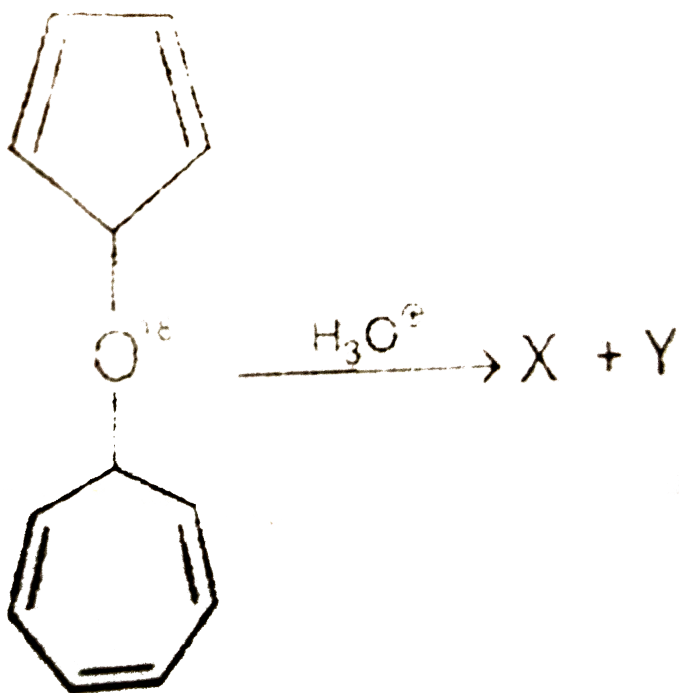
611.

The products X and Y are

A.

(1)

B.

(2)

C.

(3)

D.

(4)
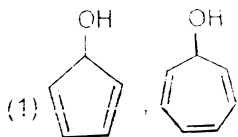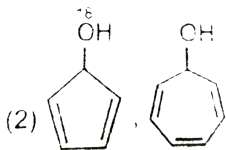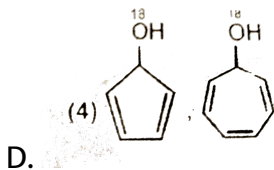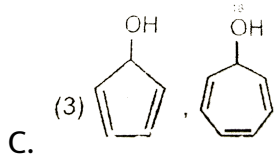
Answer: B

▶ Watch Video Solution

---

612. Arrange the following compounds in order of decreasing reactivity towards S_N1 reaction

(i)

(ii)

(iii)
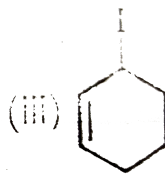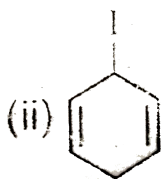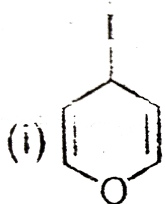
A. $ii > iii > i$

B. $i > ii > iii$

C. *iii > ii > i*

D. *i > iii > ii*

Answer: B

> ▶ Watch Video Solution

---

613. The treatment of ethene with cold alkaline potassium permanganate produces,

A. ethylene glycol

B. formaldehyde

C. formic acid

D. carbon dioxide and water

Answer: A

> ▶ Watch Video Solution

614. Which of the following statement is/are correct about the mechanism of his reaction?
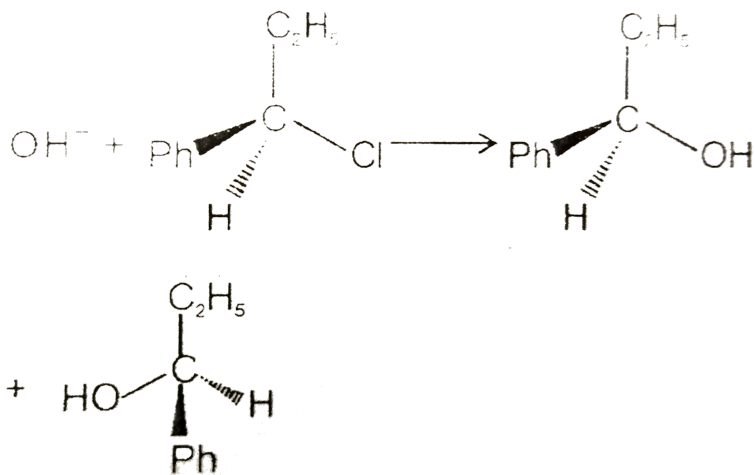
A. A carbocation will be formed as an intermediate in the reaction.

B. The rate of reaction depends on the concentration of alkyl halide only.

C. Reaction proceeds through S_N1 mechanism

D. All of these

Answer: D

Watch Video Solution

'P' + 'Q' (dicarboxylic acid)
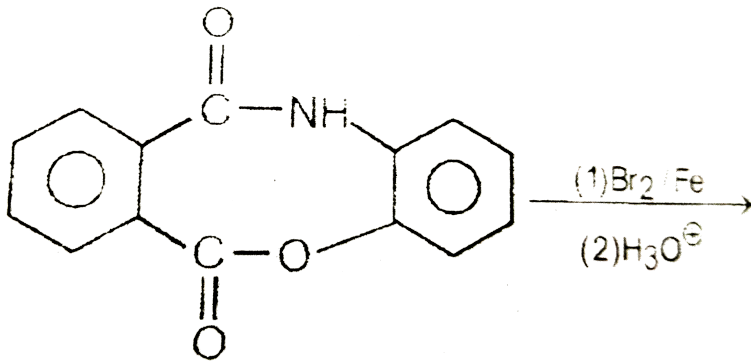
615.

$'P' + 'Q'$ (dicarboxylic acid)

$'P'$ may be:
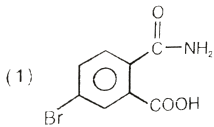
A.
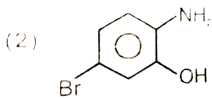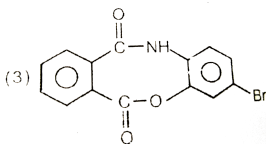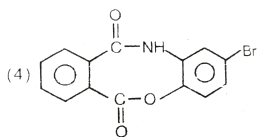
(1)

B.

(2)

C.

(3)

D.

Answer: B

---

616. S_N1 reaction underoges through carbocation intermediate as follows:
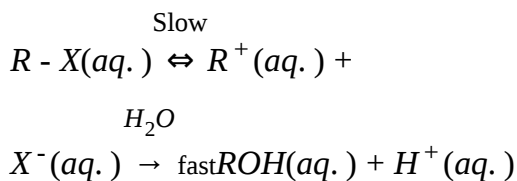
$$R - X(aq.) \overset{\text{Slow}}{\Leftrightarrow} R^+(aq.) +$$

$$X^-(aq.) \xrightarrow{H_2O} {}_{\text{fast}}ROH(aq.) + H^+(aq.)$$

[R=t-Bu, iso-Pr, Me] $(X = Cl, Br, I)$

The correct statements are

I. The decreasing order of rate of S_N1 reaction is

$t - BuX > iso - PrX > EtX > MeX$

II. The decreasing order of ionisation energy is

$MeX > EtX > iso - PrX > t - BuX$

III.   The   decreasing   order   of   energy   of   activation   is

t - BuX > iso - PrX > EtX > MeX
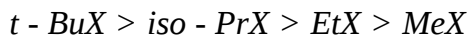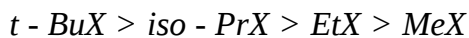
A. I & II are correct

B. I & III are correct

C. II and III are correct

D. I,II & III are correct

Answer: A

▶ Watch Video Solution
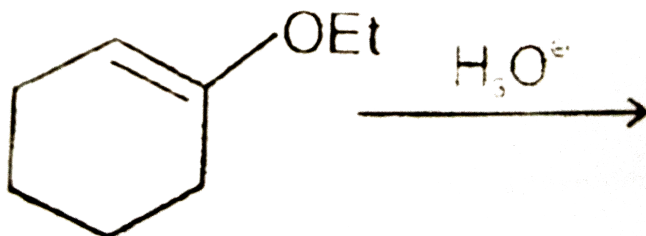
617.

Product obtained in above reaction are:

A.

(1) EtOH.

B.

(2) , CH_3-CHO

C.

(3) CH_3COOH.

D.

(4) EtOH,
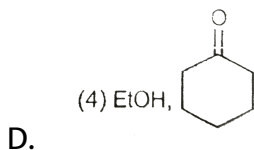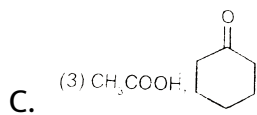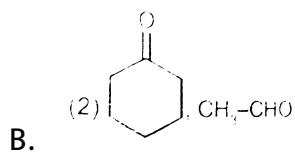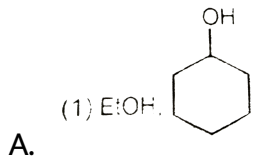
Answer: D

▶ **View Text Solution**

---

618. Secondary alcohols on heating with copper at $300°C$ give,

A. Alkenes

B. Aldehydes

C. Ketones

D. tert-alcohols

Answer: C

> ▶ **Watch Video Solution**

---

619. A 0.2 molal aqueous solution of a weak acid (HX) is 20 percent ionised. The freezing point of this solution is (Given $K_f = 1.86.\ ^\circ CKgmol^{-1}$ for water):

A. $-0.45\ ^\circ C$

B. $-0.90\ ^\circ C$

C. $-0.31\ ^\circ C$

D. $-0.53\ ^\circ C$

Answer: A

620. For a linear plot of $\log P$ v/s $\log x$ for solubility (x) of a gas in a given solvent under pressure (P) which of the following statement is correct? (K_H is Henry's constant).

A. K_H appears as intercept and slope is 1

B. $\log k_H$ appears as slope and intercept is 1

C. $\log k_H$ appears as intercept and slope is1

D. Intercept is0 and slope is $\log k_H$

Answer: C

621. Consider the following aqueous solution

A. $0.1M$ Glucose solution

B. $0.1 M Na_2SO_{4(aq)}$

C. $0.1 M NaCl_{(aq)}$

D. $0.1 M Na_3PO_{4(aq)}$
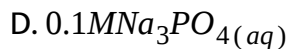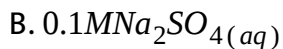
Answer: A

▶ View Text Solution

622. Calculate the cryoscopic constant in $\left(KKgmol^{-1}\right)$ of cyclohexane. Given that its heat of fusion is $2630 J/mol$ and it freezing point is $6.6°C$.

A. 20.76

B. 28.33

C. 23.15

D. 18.15

Answer: A

623. The vapour pressure of the solution of two liquids $A\left(p^{\circ} = 80mm\right)$ and $B\left(p^{\circ} = 120mm\right)$ is found to be $100mm$ of Hg when $x_A = 0.4$. The result shows that:

A. solution exhibits ideal behaviour

B. $\Delta H_{solution} < 0$

C. solution shows positive deviation

D. solution will show positive deviation for lower concentration and negative deviation for higher concentration

Answer: B

624. The spin magnetic moment of cobalt in the compound $Hg\left[Co(SCN)_4\right]$ is

A. $\sqrt{3}$

B. $\sqrt{8}$

C. $\sqrt{15}$

D. $\sqrt{24}$

Answer: C

▶ Watch Video Solution

625. Chemical formula for in iron(III) hexacyanoferrate(II) is

A. $Fe\left[Fe(CN)_6\right]$

B. $Fe_2\left[Fe(CN)_6\right]$

C. $Fe_4\left[Fe\left(CN_6\right)\right]_3$

D. $Fe\left[Fe\left(CN_6\right)\right]_3$
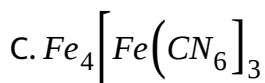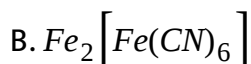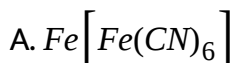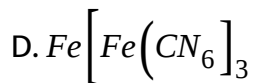
Answer: C

▶ **Watch Video Solution**

---

626. Which complex shown minimum of three types of isomerism?

A. $\left[Co(en)_2\left(NO_2\right)(SCN)\right]Cl$

B. $\left[Co(en)_3\right]Cl_3$

C. $\left[Co\left(NO_2\right)_3\left(NH_3\right)_3\right]$

D. $\left[CoCl\left(NH_3\right)_5\right]^{2+}$
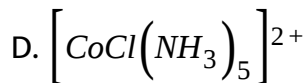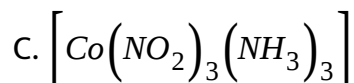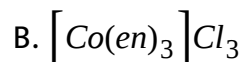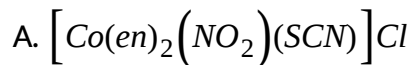
Answer: A

▶ **Watch Video Solution**

627. Co^{3+} ion forms octahedral complex with ligands like F^- and NH_3

as $\left[CoF_6\right]^{3-}$ and $\left[Co(NH_3)_6\right]^{3+}$.

These two complexes differ in:

    A. No. of unpaired electron(s)

    B. Hybridisation

    C. Δ_0(Crystal field splitting)

    D. All of these

Answer: D

▶ Watch Video Solution

628. Which of the following compound will not produce methane gas

on reaction with CH_3MgBr.

    A. H_2O

(B)

B.

C. $H_3C - CH_2 - C \equiv CH$

(D)

D.
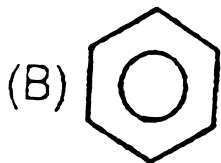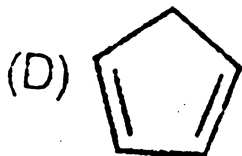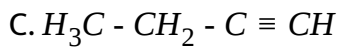
Answer: B

> ▶ Watch Video Solution

629. Which of the following compond represent correct configuration?

(A)

A.

(B)

'S'

B.

(C)

'E'

C.
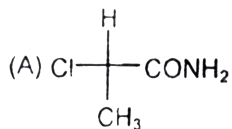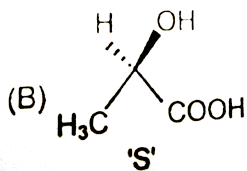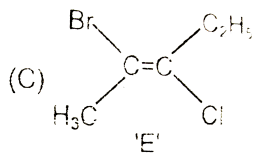
D. None of these

Answer: C

▶ Watch Video Solution

---

630. Correct Nucleophilicity order is

A. $NO_3^- > CH_3COO^- > CH_3O^- > PhO^-$

B. $CH_3O^- > PhO^- > NO_3^- > CH_3COO^-$

C. $CH_3COO^- > PhO^- > CH_3O^- > NO_3^-$

D. $CH_3 - O^- > Ph - O^- > CH_3COO^- > NO_3^-$

Answer: D

---
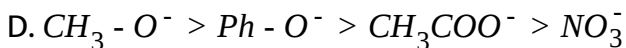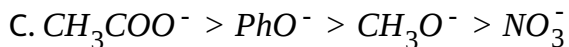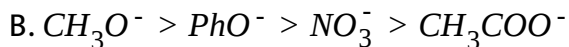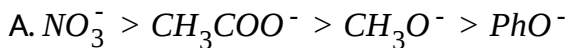
631. Which reaction is not an example of nucleophilic addition reaction?

A. $CH_3 - CHO \xrightarrow[(2)H_2OH_3C]{(1)LiAID_4} - \overset{\overset{\displaystyle OH}{|}}{C} \mid H - D$

B. $H_3C - CHO \xrightarrow{HCN} H_3C - \overset{\overset{\displaystyle OH}{|}}{CH} - CN$

C. $H_3C - CHO \xrightarrow[(2)H_2OH_3C]{(1)CH_3MgBr} - \overset{\overset{\displaystyle OH}{|}}{CH} - CH_3$

D. $H_3C - COOCH_3 \xrightarrow{NH_2^-} -CH_3O^-H_3C - CONH_2$
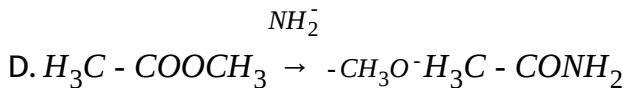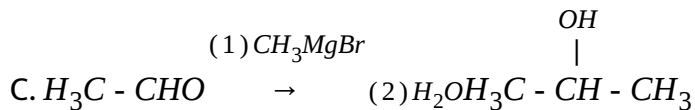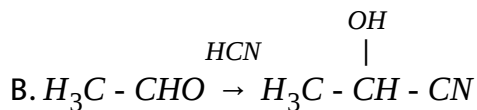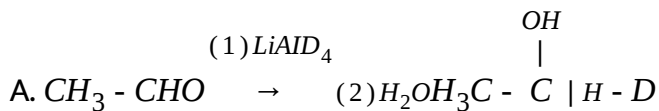
Answer: D

632. Select the incorrect pair

A. (A) ⟶ Electrophile

B. (B) ⟶ Nucleophile

C. $: CH_2 \rightarrow$ Nucleophile

D. $CH_3 \rightarrow$ Electron deficient species
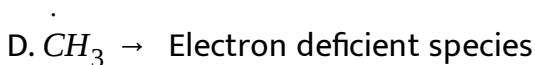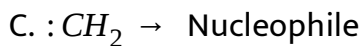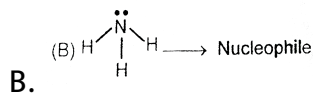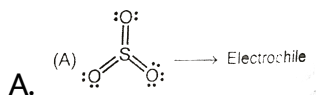
Answer: C

▶ **Watch Video Solution**

---

633. Incorrect order of the following with respect to nucleophillic addition reaction of carbonyl compound is

A. Reactivity $HCHO > CH_3CHO > CH_3COCH_3$

B. Reactivity $PHCHO > HCHO$

C. Electrophilicity   of   carbonyl   carbon

$HCHO > CH_3CHO > CH_3COCH_3$

D. Electrophicityy of carbonyl carbon: $HCHO > PhCHO$

Answer: B

▶ **Watch Video Solution**

---

634. An aqueous glucose solution has boiling point of $374.19K$. Another aqueous glucose solution has a freezing point of $272.22K$. Find the molality ratio of two solution. Boiling point and freezing point of H_2O $373.15K$ and $273.15K$ respectively.

▶ **Watch Video Solution**

---

635. How many type of isomerism is exhibited by the complex $\left[Co\left(NH_3\right)_4\left(NO_2\right)_2\right]Cl$?
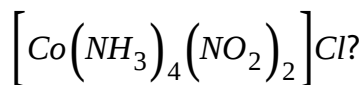
636. When $36.0g$ of a non -volatile, non-electrolyte solution an empirical formula CH_2O is dissolved inn$1.20Kg$ of water. The solution freezes at $-0.93°C$. What is the no. of oxygen atoms present per molecule of solute? K_f of $H_2O = 1.86Kkgmol^{-1}$, Freezing point of $H_2O = 273K$

637. Two solutions of non-volatile and non-electrolyte solute A and B are prepared separately. The molar mass ratio $\dfrac{M_A}{M_B} = \dfrac{1}{3}$. Both are prepared as 5% by weight solution in water. Then what is the ratio of freezing point depresions, $\dfrac{\left(\Delta T_f\right)_A}{\left(\Delta T_f\right)_B}$ of the solutions?

638. A six co-ordinate complex has the formula $CoCl_3.5NH_3.H_2O$. Electrical coductance measurements indicate the presence of three ions in one formula unit. How many moles of $AgCl$ will be percipated with excess $AgNO_3$ solution with two mole of complex?

> ▶ **Watch Video Solution**

639. For $\left[Ma_2b_2c_2\right]$ no. of isomer with resultant dipole moment not equal to zero are

> ▶ **Watch Video Solution**

640. Find the number of correct statement

(i) $\Delta_t = 0.44\Delta_0$ and $\Delta_{SP} = 1.3\Delta_0$

(ii) Complex $\left[Pt\left(NH_3(Br)(I)(Py)\right)\right]$ has three geometrical isomers

(iii) $\left[Cr\left(C_2O_4\right)(3)\right]^{3-}$ exhibit both Geometrical and optical isomerism

(iv) *EAN* of ferrocene is 34

(v)   *IUPAC*   name   of $\left[Co(NH_3)_6\right]\left[CO(NH_3)_2(NO_2)_4\right]_3$ is

Hexaamminecobalt (III) diammineetranitrito-*N* Cobalt (III)

> ▶ View Text Solution

---

641. *CFSE* for the complex $\left[Ir(NH_3)_6\right]^{3+}$ is:

$$\left[\left(-0.4 \times x_{t_{2g}}\right)\Delta_0 + \left(0.6 \times y_{eg}\right)\Delta_0 + ZP\right]$$

Find the addition of $x + y$

> ▶ View Text Solution

---

642. In $[Fe(edta)]^-$ number of 5 membered rings is

> ▶ View Text Solution

643. How many reactions show correct major product:

(i)
C_6H_5—C(=O)—Cl + CH_3COOH → C_6H_5—C(=O)—O—C(=O)—CH_3 + HCl

(ii)
amide + HCl → acyl chloride + NH_3

(iii) Ph—C(=O)—^{18}O—Ph $\xrightarrow{dil.H_2SO_4}$ $\xrightarrow{conc.H_2SO_4}$ C_6H_5—$C^{18}OOH$ + C_6H_5OH

(iv)
$\xrightarrow{CH_3ONa}$ ester + CH_3COONa

(v)
$\xrightarrow{NaNH_2}$ amide + ONa product
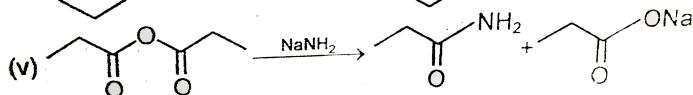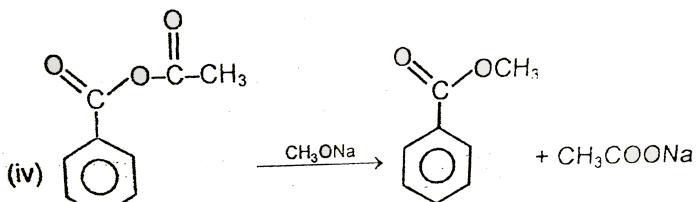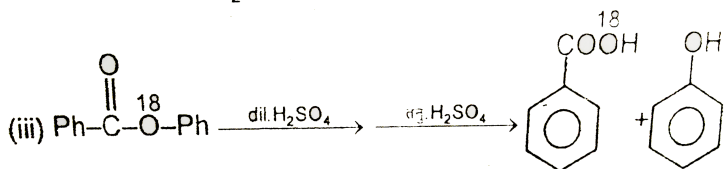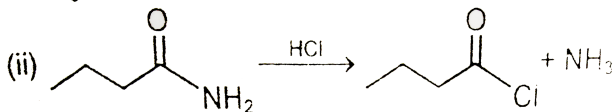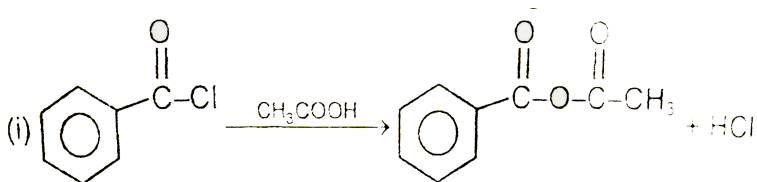
Watch Video Solution

---

644. How many position isomers are possible of trichlorocyclohexane which can show geometrical isomerism.

Watch Video Solution

645. Pure enantiomer of lactic acid has an optical rotation of $+1.6°$. A sample of lactic acid has an optical rotatin of $+0.8°$. The enantiomer exces is $X \times 10^1\%$. Find X

646. On which position grignard reagent will react first in
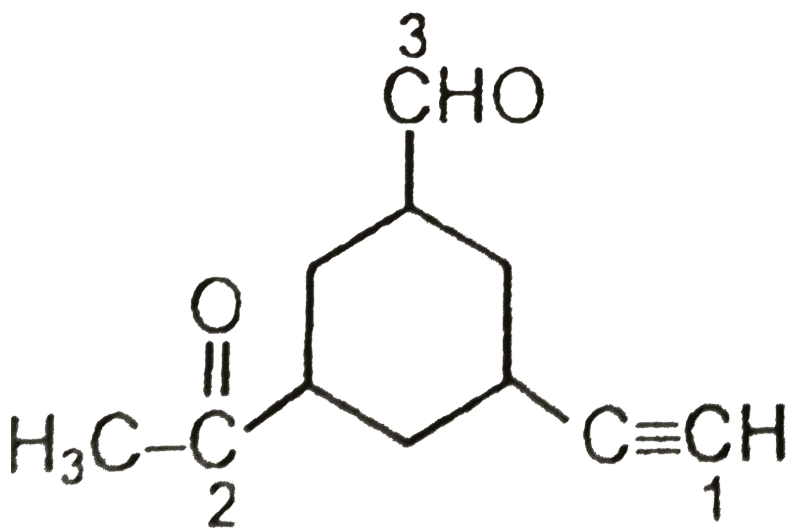
647. Number of geometrical isomers possible of
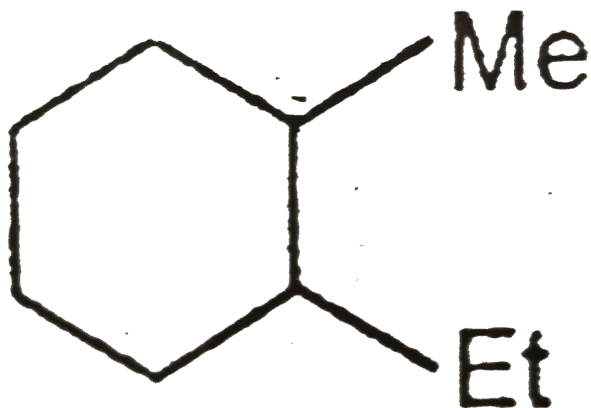
▶ Watch Video Solution

---

648. Which of the following galvanic cells no liquid junction potential?

A. Zn - $(c_1)Hg|Zn$ - SO_4solution$|Zn$ - $(c_2)Hg$

B. $H_2 | (c_1)H_2SO_4$solution $|$ $|CuSO_4$solution$(c_2)|Cu$

C. $Ag|AgCl|HCl$solution$|(c_1)|HCl$solution$|AgCl | Ag(c_2)$
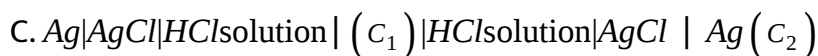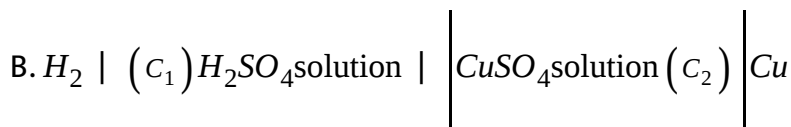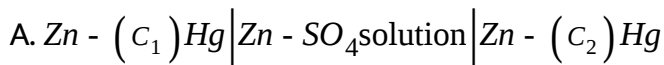
D. none of these

Answer: A

 Watch Video Solution

649. The function of a salt bridge is to:

A. Maintain electrical neutrality of both half cells

B. Increase the cell potential at the positive electrode

C. Decrease the cell potential at the negative electrode

D. Eliminate the impurities present in the electrolyte.

Answer: A

 Watch Video Solution

650. From the fllowing half-cell reactions and their standard potentials ,what is the smallest possible standard e.m.f for spontaneous reactions?

$$PO_4^{3-}(aq) + 2H_2O(l) + 2e^- \rightarrow HPO_3^{2-} + 3OH^-(aq), E\,^\circ = -1.05V$$

$$PbO_2(s) + H_2O(l) + 2e^- \rightarrow PbO(s) + 2OH^-(aq), E\,^\circ = +0.28V$$

A. +0.00

B. +0.74

C. +0.56

D. +0.28

Answer: D

▶ Watch Video Solution

---

651. Consider the following standard electrode potentials and calculate $\log K_{eq}$ at $25\,^\circ C$ for the indicated disproportion reaction.

[Take $\dfrac{2.303RT}{F} = 0.06V$]

$3MN^{2+}(aq)arrMn(s) + 2Mn^{3+}(aq)$

$Mn^{3+}(aq) + e^- \rightarrow Mn^{2+}(a), E° = 1.51V$

$Mn^{2+}(aq) + 2e^- \rightarrow Mn(s), E° = -1.185V$
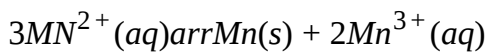
A. -21.15

B. -48.24

C. -89.83

D. none of these

Answer: C

▶ Watch Video Solution

---

652. Given the following limiting molar conductivies at $25°C$, , Hcl, $426\Omega^{-1}cm^2mol^{-1}$, $NaCl$, $126\Omega^{-1}cm^2mol^{-1}$, NaC(sodium crotonate) $,83\Omega^{-1}cm^2mol^{-1}$. What is the ionization constant of

crotonic acid? If the conductivity of a $0.001M$ crotonic acid (HC) solution is $3.83 \times 10^{-5}\Omega^{-1}cm^{-1}$?

A. 1.11×10^{-6}

B. 1.11×10^{-5}

C. 1.11×10^{-4}

D. 1.11×10^{-7}

Answer: B

▶ Watch Video Solution

653. In the tet of NO_3^- ion, the dark brown ring complex $\left[Fe\left(H_2O\right)_5(NO)\right]SO_4$ is formed which of the following is false for this complex?

A. The brown ring complex is formed between nitric oxide (formed as a result to reduction of the nitrate ion by the Fe^{2+} ions) and

Fe^{2+} ions

B. Iron and NO both have $+1$ charge

C. The complex species can be represented as

$$\left[Fe^+\left(H_2O\right)_5(NO)\right]^{2+}$$
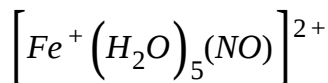
D. Iron has $+2$ oxidation state and NO is neutral

Answer: D

▶ View Text Solution

654. Which of the following will not give positive chromyl chloride test?

A. Sodium chloride, $NaCl$

B. Mercuric chloride, $HgCl_2$

C. Zinc chloride $ZnCl_2$

D. Aniline hydrochloride$C_6H_5NH_2 . HCl$

Answer: B

▶ **Watch Video Solution**

---

655. H_2S and SO_2 can be distinguished by:

A. Litmus paper

B. MnO_4^-

C. $\left(CH_3COO\right)_2 Pb$

D. none of these

Answer: C

▶ **Watch Video Solution**

656. Froth flotation process used for the concentration of sulphide ore.

A. Is based on the difference in wettability of different minerals

B. Uses sodium ethyl xanthate, $C_2H_5OCS_2Na$ as collector

C. Uses $NaCN$ as depressant in the mixture of ZnS and PbS where ZnS forms soluble complex and PbS forms froth

D. all are correct statements

Answer: D

▶ **Watch Video Solution**

657.

$HO\text{-}\underset{\text{(ring structure)}}{\bigcirc}\text{-}OH \xrightarrow[\text{Pyridine}]{SOCl_2} \xrightarrow[\text{पिरिडीन}]{SOCl_2}$ Product is : (उत्पाद है :)
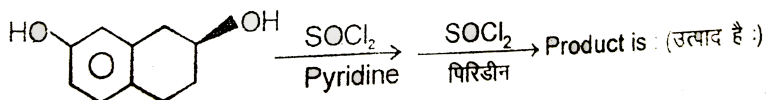
$SOCl_2$
$\xrightarrow[\text{Pyridine}]{}$ **Product is:**

A.

(A)

B.

(B)

C.

(C)

D.

(D)
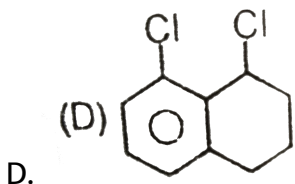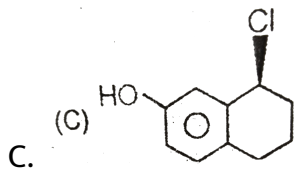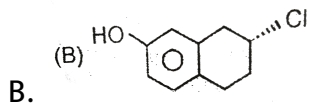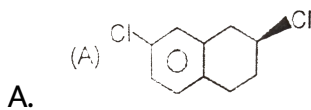
Answer: B

▶ **View Text Solution**

---

658. In which reaction major product is correct ?

A.

(A) $\xrightarrow{\text{aq. NaOH}}$

B. $Ph - CH_2 - CH_2 - Br \quad \xrightarrow{CH_3OH} \quad Ph - CH \,|\, OH - CH_3$

C.

D.
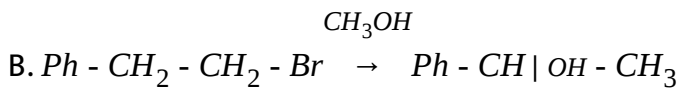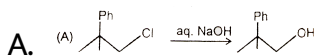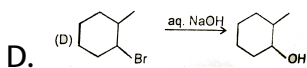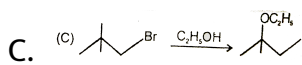
Answer: C

> ▶ Watch Video Solution

659. The product (P) of the following reaction is:

A. (A)

B. (B)

(C)

C.

(D)

D.
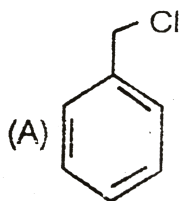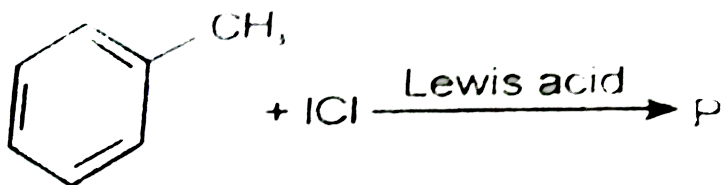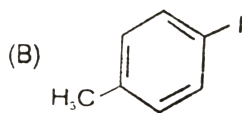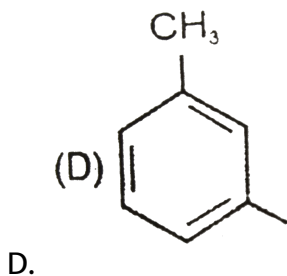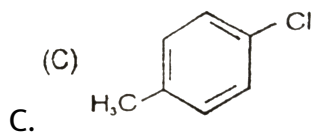
Answer: B

▶ Watch Video Solution

---

660. Which of the following is not correct for the reactivity order mentioned in brackets.

A. $CH_3 - C \equiv C - CH_3 > CH_3C = C - CH_3$ (towards Hydrogenation reaction)

B. $CH_3 - C \equiv C - CH_3 < CH_3 - C = C - CH_3$ (towards electrophilic

addition reaction)

C. (towards electrophilic substitutions)

D. (towards nucleophilic substitution(S_nAr))
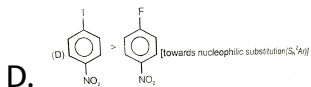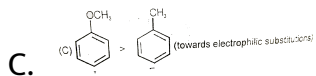
Answer: D

▶ View Text Solution

---

661. The product obtained from the following sequence of reactions is

$$H_3 - C \equiv CH \quad \xrightarrow{HgSO_4}{H_2SO_4}A \quad \xrightarrow{NaBH_4} \quad B$$
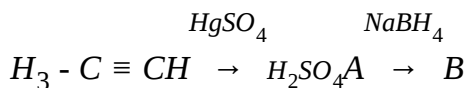
A. propanal

B. 2-propanol

C. 1-propanol

D. propane

Answer: B

662.

O_2N—⬡—C≡C—⬡—CH_3 $\xrightarrow{HOBr/H^{\oplus}}$; The major product is : मुख्य उत्पाद है—

$HOBr/H^{(\oplus)}$
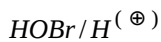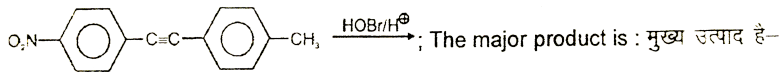
→ , The major product is

A.
(A) O_2N—⬡—C(Br)(Br)—C(C)—⬡—CH_3

B.
(B) O_2N—⬡—C(O)—C(Br)(Br)—⬡—CH_3

C.
(C) O_2N—⬡—CH(OH)—CH(OH)—⬡—CH_3

D.
(D) O_2N—⬡—C(Br)(OH)—C(Br)(OH)—⬡—CH_3
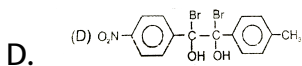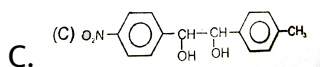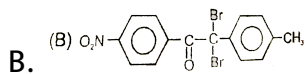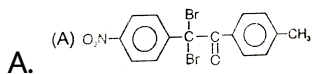
Answer: A

663. How long (in hours) will it take to produce 0.3 mole of HNO_2 by following reaction if an average current of 2 amp passes through the cell? $NO_3^- + 3H_3O^+ + 2e^- \rightarrow HNO_2 + 4H_2O, E^\circ = 0.94V$

664. Out of the following the number of metals that can not be obtained by electrolysis of the aqueous solution of their sals are

$Ag, Mg, Cu, Al, Au, Ca, Na$

665. Molar conductivity of aqueous solution of HA is $200 Scm^2 mol^{-1}$, pH of this solution is 4

Calculate the value of $pK_a(HA)$ at $25\,^\circ C$.

Given $\wedge_M^\infty(NaA) = 100 scm^2 mol^{-1}$,

$$\Lambda_M^\infty (HCl) = 425 Scm^2 mol^{-1},$$

$$\Lambda_M^\infty (NaCl) = 125 Scm^2 mol^{-1}$$

666. The standard reduction potential of a silver chloride electrode (metal-sparingly soluble salt electrode) is 0.029 V and for silver electrode is 0.80V. If the moles of AgCl that can dissolve in 10 L of a 0.01 M NaCl solution is represted as 10^{-z} find the value of Z.

667. B_3^{3-} + $Conc. H_2SO_4 - CH_3 - CH_2 - OH \xrightarrow{ignite} (A)$
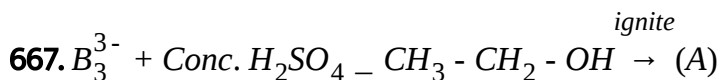
What is the oxidation number of central atom that is responsible for green flame in compound (A)?

668. Find the total number of acidic radical which prodce with dil HCl

$SO_4^{2-}, I^-, NO_2^-, SO_3^{2-}, HCO_3^-$
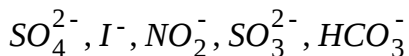
> ▶ View Text Solution

669. $Na_2SO_3, NaCl, Na_2C_2O_4, Na_2CrO_4, NaNO_2, CH_3CO_2Na$ are separately treated with $AgNO_3$ solution. In how many many cases is/are white ppt. obtained?

> ▶ View Text Solution

670. How many of the following compounds will liberate NH_3 on heating?

$(NH_4)_2SO_4, (NH_4)_2CO_3, NH_4Cl, NH_4NO_3, (NH_4)_2Cr_2O_7$
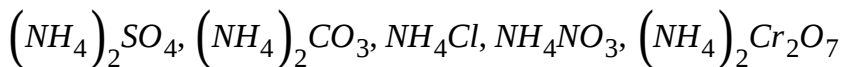
> ▶ View Text Solution

671. Find the number of basic flux from the given compounds :

SiO_2, MgO, Cab, FeO, B_2O_3, $CaCO_3$.

672. $9.65C$ of electric current is passed through fused anhydrous magnesium chloride. The magnesium metal is completely converted into a Grignard reagent. The number of moles of the Grignard reagent obtained is $A \times 10^{-5}$ then value of A is

673.

$$\xrightarrow{CH_3I(1\ eq\ )} \xrightarrow{Ag_2O(moist.)} \xrightarrow{\Delta} P \text{ (Major product)} +3° \text{ amine}$$

$CH_3(1eq.)Ag_2O(moist.) \quad \Delta$

$\rightarrow \qquad \rightarrow \qquad \rightarrow P$ ("Major product") $+3°$ amine
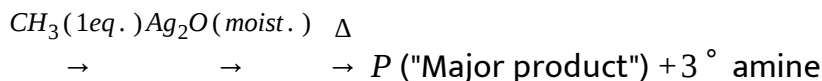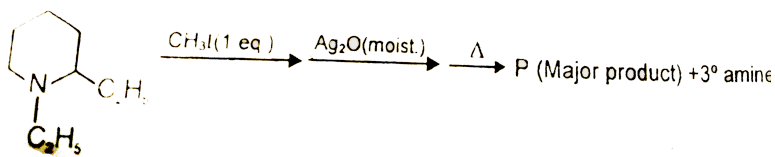
Write the number of carbon atoms in P (major product) in given reaction?

674. How many reactions form one of the product is grignard reagent in given reactions?

(P) $CH_3 - C \equiv C - H + CH_3 - MgBr \rightarrow$

(Q) $CH_3 - CH = O + CH_3 - MgBr \rightarrow$

(R) $CH_3 - CH_2 - Cl + Mg \xrightarrow{THF}$

(P) $CH_3-C \equiv C-H + CH_3 \cdots Mg \cdots$,

(Q) $CH_3-CH=O + CH_3-MgBr$,

(R) $CH_3-CH_2-Cl + Mg \xrightarrow{\text{THF}}$
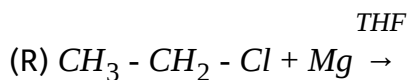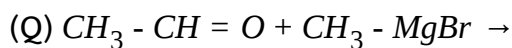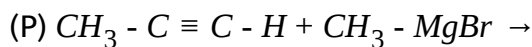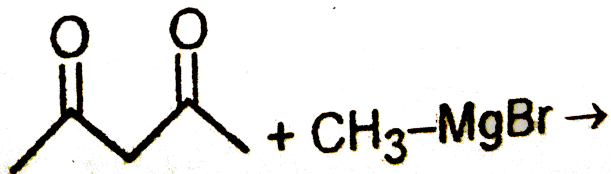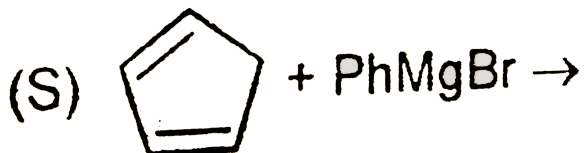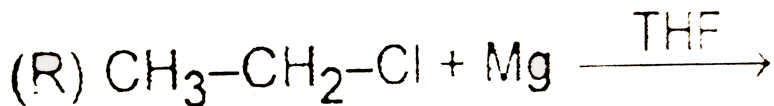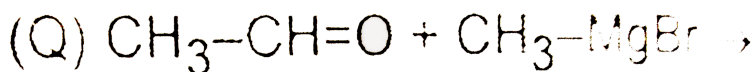
(S) + PhMgBr →

 + CH_3-MgBr →

(S)

$+ PhMgBr \rightarrow$

(T) $+ CH_3 - MgBr \rightarrow$

▶ View Text Solution
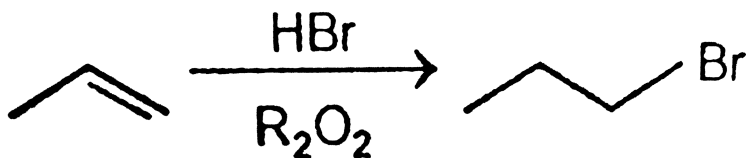
675.

Write the number of intermediate which is involved in the given

reaction is:

1. For Carbocation

2. For Free radical

3. For Carbanion

4. For Cyclicbrominium ion

    A. Carbocation

    B. Free radical

    C. Carbanion

    D. Cyclicbrominium ion

Answer: B

▶ Watch Video Solution

676. The number of possible isomers (including stereoisomers) on monochlorination $\left(Cl_2/hv\right)$ of the following compound is:
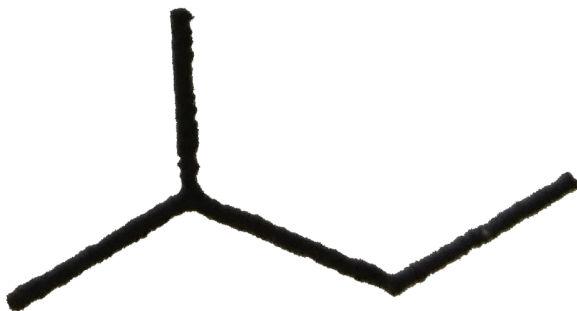
Watch Video Solution
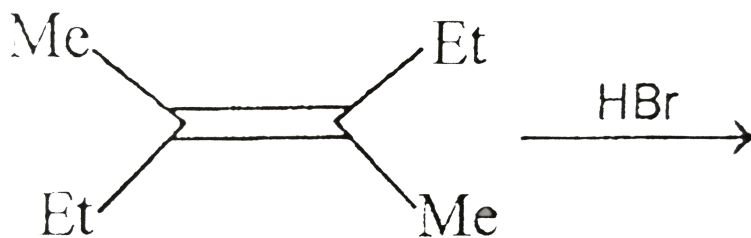
677.

How many products will be formed in above reaction?

Watch Video Solution

1. $10dm^3$ of N_2 gas and $10dm^3$ of gas X contain the same number of molecules at the same temperature, the gas (X) may be

    A. SO_3

    B. N_2O

    C. CO_2

    D. SO_2
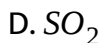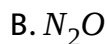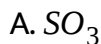
Answer: A::B::C::D

> ▶ **Watch Video Solution**

2. By doing which of the following the Rutherford's closest distance of approach (calculated by using alpha-particles) decreases ?

    A. By increasing the initial speed of alpha-particles

B. By decreasing the kinetic energy of alpha-particles

C. By using silver foil ($Z = 47$) in place of gold foil ($Z = 79$)

D. By using metal foil ($Z > 79$) in place of gold foil ($Z = 79$)

Answer: A::C

> ▶ **Watch Video Solution**

---

3. Following graph is plotted between characteristics $'X'$ and $'Y'$ for three spices A, B and C.
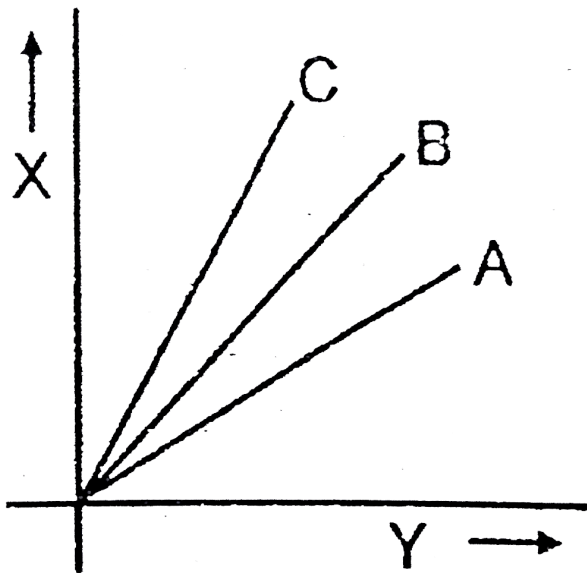
Now select the correct statement(s), relted to the above graph :

A. If $'X'$ is the velocity of electron and $'Y'$ is $\dfrac{1}{n}$ (where $'n'$ is n^{th}

Bohr orbit of three hydrogen like species A, B and C), then radii

of these species must increase in the order $C < B < A$.

B. If $'X'$ is the de-Brogile wavelength (λ) of three charges species

A, B and C (having same amount of charge) and $'Y'$ is $\dfrac{1}{\sqrt{V}}$

(where $'V'$ is acceleration potential difference), then the mass

of these species must increase in the order $A < B < C$.

C. If $'X'$ is the velocity of electron and $'V'$ is $\dfrac{1}{n}$ (where $'n'$ is n^{th} Bohr orbit of three hydrogenlike species A, B and C), then radii of these species must increase in the order $A < B < C$.

D. If $'X'$ is the de-Broglie wavelength (λ) of these chrges spcies A, B and C (having same amount of charge) and $'Y'$ is $\dfrac{1}{\sqrt{V}}$ (where $'V'$ is accelerating potential difference), then the mass of these species must increase in the order $C < B < A$.

Answer: A::D

▶ **Watch Video Solution**

---

4. For Be^{3+} ion. Which of the following statement(s) is/are INCORRECT ?

A. Ionisation energy $= 122.4eV$.

B. The potential energy of electron in 1st excited satate is $-217.6eV$

.

C. The frequency of revolution of electron in 2nd orbit of Be^{3+} is

hall of the frequency of revoluation of electron in ground state

of H - atom.

D. 2nd excitation potential $= 193.4V$.

Answer: A::B::C

▶ **Watch Video Solution**

5. Highly excited states for hydrogen like atom (alos called Ryburg

states) with nucleus Charge Ze are defined by their principal qunatum

number n, where $n < \ < 1$. Which of the following statement(s) is (are)

true?

A. Relative change in the radii of two consecutive orbits does not depend on Z

B. Relative change in the radii of two consecutive orbits veries as $1/n$

C. Relative change in the energy of two consecutive orbits varies as $1/n^3$

D. Relative change in the angular momentum of two consecutive orbits varies as $1/n$

Answer: A::B::D

> ▶ Watch Video Solution

6. Which of the following is incorrect *IUPAC* name ?

A. 3 - Methylenebutan-2 - one.

B. 2 - Bromecyclohex-5 - ene-1 - sulphonic acid.

C. 4 - Bromo-2 - chloropentan-3 - *ol*.

D. N - cyclohexyl-N - methylprop-2 - *en* - 1 - amine.

Answer: A::B::C

7. Which of the following has correct numbering.

(A)

A.

(B)

B.

(C)

C.

(D)

D.
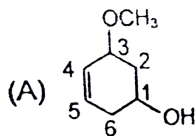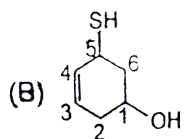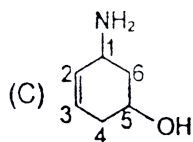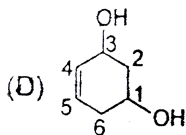
Answer: B::D

> ▶ Watch Video Solution

---
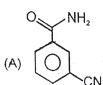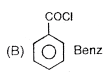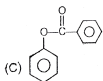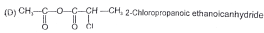
8. Which of the following is/are correct?

A. Pentane & Neopentane are chain isomers.

B. Diethylamine & Sec-butylamine are funcational isomers.

C. Methyl formate & Acetic acid are funcational isomers.

D. Propanone & Propanal are funcational isomers.

Answer: A::B::C::D

> ▶ Watch Video Solution
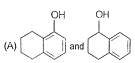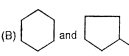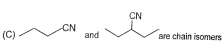
9. Which of the following *IUPAC* name is/are correct ?

A. (A) 3-Cyanobenzenamide

B. (B) Benzenecarbonylchloride

C. (C) Phenylbenzenecarboxylate

D. (D) CH₃—C—O—C—CH—CH₂ 2-Chloropropanoic ethanoicanhydride

Answer: B::C::D

▶ Watch Video Solution

---

10. Select the correct relationship.

A. (A) and are functional isomers

B. (B) and are chain isomers

C. (C) and are chain isomers

D. (D) and are metamers
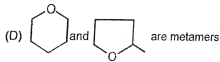
Answer: A::B::D

11. A H - like species emitted a photon corresponding to the first line of Lyman series. The photon liberated a photoelectron from He^+ ion in ground state. The de-brogile wavelength of the photoelectron is 2Å . Select the correct statement (s).

A. Atomic number of H - like species is 2.

B. Atomic number of H - like species is 3.

C. Kinetic energy photonelectron is $27.5eV$

D. Kinetic energy of photonelectron is $37.5eV$

Answer: B::D
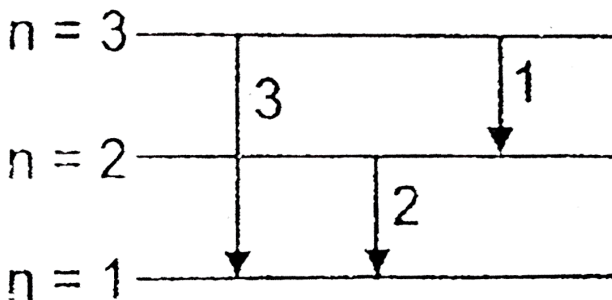
12.

For the above transitions in a H - like species, select the correct relation(s) :

A. $\bar{v}_3 = \bar{v}_1 + \bar{v}_2$

B. $v_3 = \dfrac{v_1 v_2}{v_1 + v_2}$

C. $\lambda_3 = \lambda_1 + \lambda_2$

D. $\lambda_3 = \dfrac{\lambda_1 \lambda_2}{\lambda_1 + \lambda_2}$

Answer: A::D

1. What is power (in watt) of a light source emitting 3.125×10^{18} photons per second, while the wavelength of light is $620nm$? (use $hc = 12400eV\text{Å}$)

▶ Watch Video Solution

2. The mangnitude of pontential energy of electron in n^{th} excited state of He^{+} ion is $\dfrac{8}{81}$ time the kinetic energy of electron of excited state of Li^{2+} ion. Find $'n'$

▶ Watch Video Solution

3. Light form a discharge tube containing H atoms falls on the sodium metal surface. The kinetic energy of the fastest moving photoelectron emitted from sodium is $0.73eV$. If these photons are

emitted in H - atom due to the transition from engergy level $\left(n_2\right)$ to $\left(n_1\right)$ and the work function of sodium metal is $1.82eV$. then the minimum value of $\left(n_1 + n_2\right)$ is ....

4. A gaseous mixture contains $SO_3(g)$ and $CH_4(g)$ in $12.5:1$ ratio by mass. Calculate X where $X =$ Ratio of total number of atoms present in $SO_3(g)$ to total number of atoms presents in $CH_4(g)$ in the mixure.

5. For which orbit number of He^+ value of radius equal to 1.058Å ?

6. Number of tertiary bromide of formula $C_5H_{11}Br$ are (X)

number of tertiary bromide of formula $C_6H_{13}Br$ are (Y)

Report your answer as $X + Y$

> ▶ Watch Video Solution

7. Calculate sum of structural methyl esters and carboxylic acids with molecular formula $C_5H_{10}O_2$.

> ▶ Watch Video Solution

8. How many of following compound have same general formula C_nH_{2n-6}.

(i) (ii) (iii)

(iv) (v) (vi)

(vii) (viii)

(ix) (x)
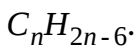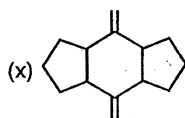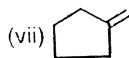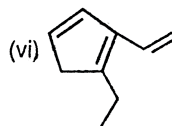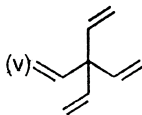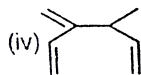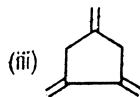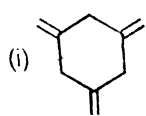
> ▶ Watch Video Solution

9. How many ethyl groups are attached as substitutents to parent chain in the following compound ?
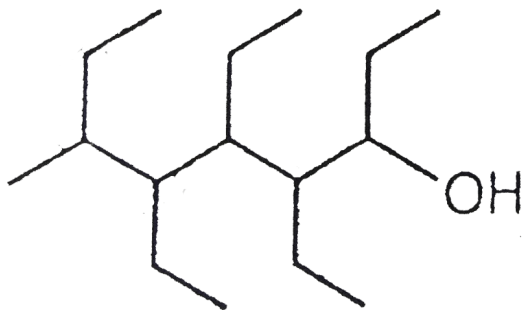
10. How many sp^2 - $sp^2 C$ - $C\sigma$ bonds are present in acetophenone.

11. Consider one He^+ ion in excited state $(n = 5)$. Which of the following of the following observations will hold true as per the Bohr's model.

A. 10 emission spectral lines will be seen.

B. The ionization energy needed is less than $2eV$.

C. The longest emitted wavelength is less than $10/R$ ($R =$ Rydberg's constant).

D. The electronic separation from the centre of nucleus is more than 6Å.

Answer: D

▶ **Watch Video Solution**

---

12. Which of the following statement(s) is/are INCORRECT ?

A. All spectral belonging to Paschen series in He^+ spectrum lie in visible region.

B. If ligbht of frequency v falls on a metal surface having work funcation hv_0, photoelectric effect can take place only if $v \geq v_0$.

C. A metal with lesser work function produce more number of photoelectron if intensity and frequency of radiation is same as that for metal with more work function.

D. As temperature of a blackbody is increased the intensity at smaller increases and that at longer wavlength decreases.

Answer: A::C::D

▶ **Watch Video Solution**

13. Which of the following option(s) is/are independent of both n and Z for H - like species?

$U_n =$ Potential energy of electron in n^{th} orbit

$KE_n =$ Kinetic energy of electron in n^{th} orbit

l_n = Angular momentam of electoron in n^{th} orbit

v_n = Velcity of electron in n^{th} orbit

f_n = Frequency of electron in n^{th} orbit

T_n = Time period of revolution of electron in n^{th} orbit

A. $\dfrac{r_n}{U_n}$

B. $r_n \times KE_n \times l_n$

C. $\dfrac{U_n \times T_n}{l_n}$

D. $\dfrac{l_n \times f_n}{v_n^2}$

Answer: C::D

14. In which of the following reaction, number of carbon stoms in parent chain of reactants are same as number of carbon atoms of parant chain in product ?

	Reactant		Product	

A. (A) ~ $\xrightarrow{Cl_2/h\nu}$ (CI) + HCl

B. (B) ~~Cl $\xrightarrow{KCN}$ ~~CN + KCl

C. (C) ~~ $\xrightarrow{H_2O/H^+}$ ~~OH

D. (D) CH$_2$-CN $\xrightarrow{H_3O^+}$ CH$_2$-COOH
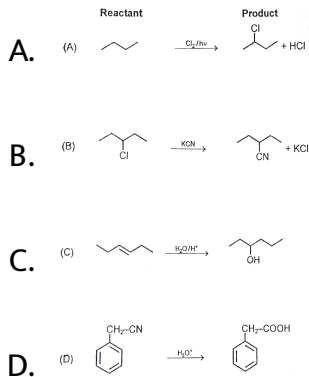
Answer: A::C::D

> ▶ **View Text Solution**

---

15. $C_4H_{11}N$ can represent :

A. Total structural amines are eight

B. 1° amines are four

C. 2° amines are three

D. 3° amine is one

Answer: A::B::C::D

16. Prefix are correctly named for which of the following side-chain attached to the present chain/ring?

A. , Prefix : Ethanoyloxy.

B. , Prefix : Methoxycarbonyl

C. , Prefix : cyano

D. , Prefix : Carbamoyl
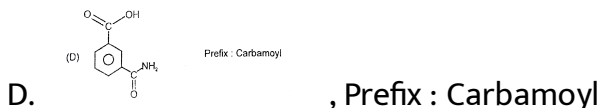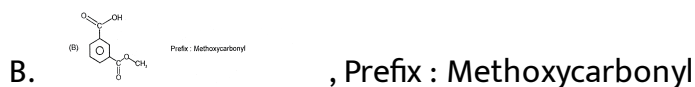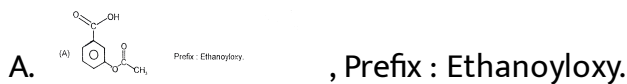
Answer: A::B::D

17. The correct statement(s) about the following compound is//are :

$$N-CH_3$$
$$CH_3$$
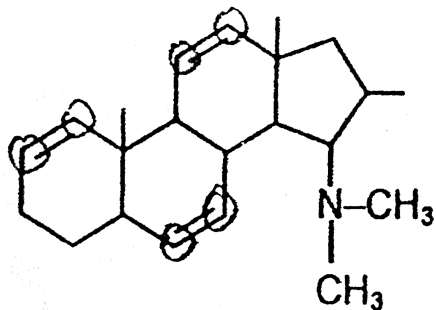
(A) Number of sp^2 C-atoms is 6

(C) 3°-Amine functional group is present.

A. Number of $sp^2 C$ - atom is 6

B. Number of allylic hydrogens is 5

C. 3° - Amine functional group is present.

D. It is a homocyclic compound.

Answer: A::B::C::D

▶ Watch Video Solution

18. Which of the following following *IUPAC* names are correct :

A.
(A) CH₂—CH—CH₂—CH₃ 3-(Aminomethyl)butanamine
   NH₂ CH₃   NH₂

B.
CH₂Cl
(B) CH₂—CH—CH₂ 1,3-Dichloro-2(chloromethyl)propane
   Cl   Cl

C.
(A) CH₂—CH—CH₂—CH₃ 3-(Aminomethyl)butanamine
   NH₂ CH₃   NH₂
              , 4 - formyl-2 - sulphobenzoic acid

D.
(D) HO 2-bromo-6-chlorophenol
   Br   Cl
              , 2 - bromo-6 - chlorophenol
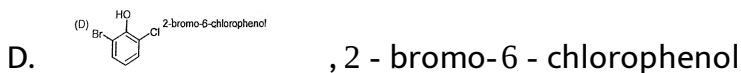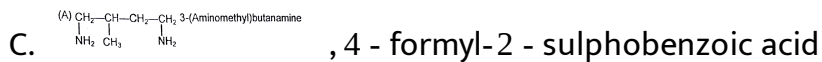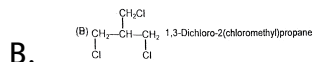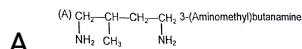
Answer: B::C::D

▶ **View Text Solution**

PART - III CHEMISTRY

---

1. Which of the following compound contains maximum number of oxygen atoms ?

    A. 4.4 gram CO_2

B. 1 gram $C_6H_{12}O_6$

C. 2 gram O_2

D. 10 gram $H_2C_2O_4$

Answer: D

▶ **Watch Video Solution**

2. Ration of time revolution of electron in second excited state of He^+

and second state of H is $\dfrac{3^x}{2^y}$.

$(x + y)$ is

A. 9

B. 7

C. 8

D. none of these

Answer: C

3. A light radiation is subjected to a metal sheet that total energy subjected is constant and number of photons subjected are varying. Calculate work funcation (in eV) of the metal from the graph. Assume 100% absorption of photons. (Total energy subjected $= 12eV$)
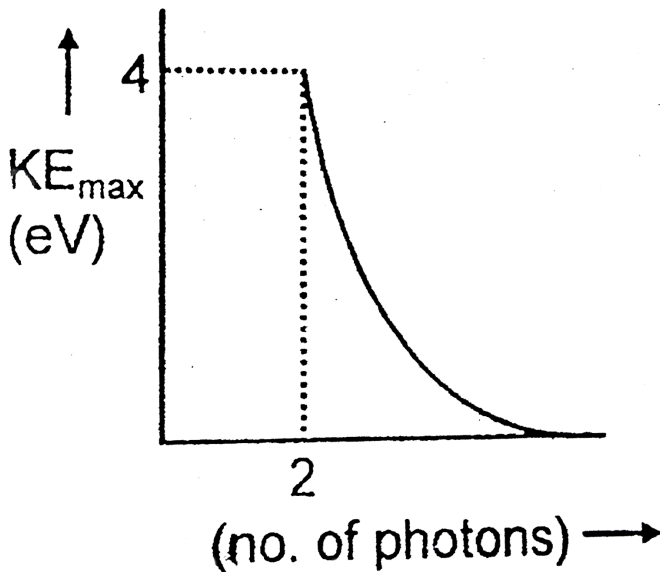
A. $1eV$

B. $2eV$

C. $4eV$

D. None of these

Answer: B

▶ **Watch Video Solution**

4. IUPAC name of the compound is :
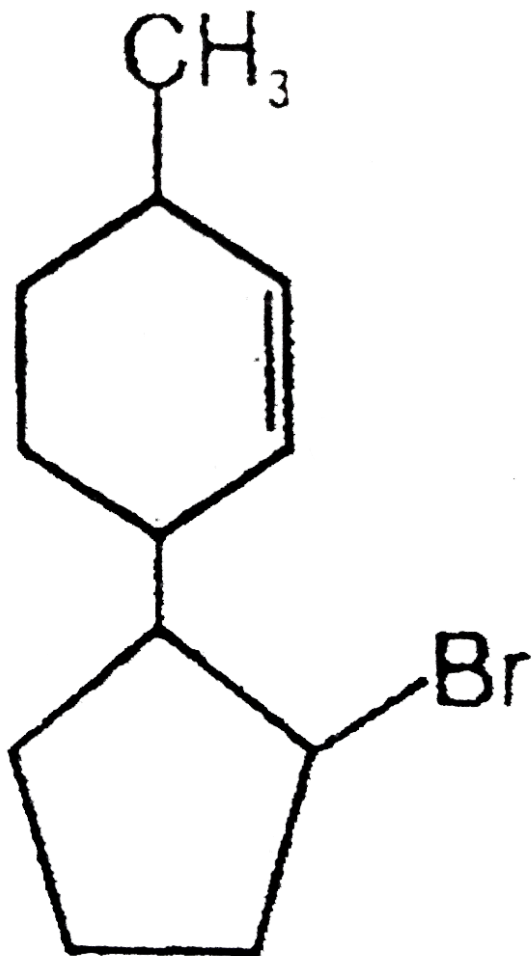
A. 3-(2-bromo cyclopentyl)-6-methylcyclohex-1-ene

B. 3-methyl-6-(2-bromo cyclopentyl) cyclohex-1-ene

C. 1-methyl-4-(2-bromo cyclopentyl) cyclohex-2-ene

D. 4-methyl-1-(2-bromo cyclopenthyl) cyclohex-2-ene

Answer: A

5. Which of the following is crotonaldehyde ?

A.

B.

C.

D.
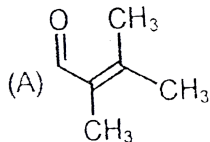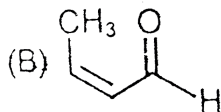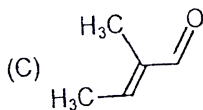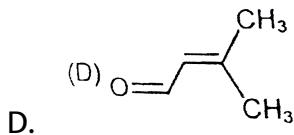
Answer: B

> ▶ Watch Video Solution

---

6. When a sample of N_2 gas is passed through a liquid (N_2 is insoluble in the liquid) part of the liquid vaporises and these vapors are carride off with the N_2 gas. It ws found that under identical conditions of T & P, vapour density of wet N_2 is higher than that of dry N_2.

Liquid through which N_2 gas was passed can be [assume N_2 to be insoluble in all]:

A. C_6H_5OH

B. $CHCl_3$

C. C_2H_5OH
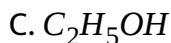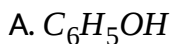
D. H_2O

▶ **Watch Video Solution**

---

7. When a sample of N_2 gas is passed through a liquid (N_2 is insoluble in the liquid) part of the liquid vaporises and these vapors are carride off with the N_2 gas. It ws found that under identical conditions of T & P, vapour density of wet N_2 is higher than that of dry N_2.

If vapour density of the wel N_2 is 15 then molar mass of the other liquid is

[Given : vapour contains 50 mole % of N_2]

A. 32 gram

B. 32 amu

C. 34 gram

D. 34 amu

Answer: A

8. It is known fact that gases expand to fill all available volume and their final pressure becomes equal at every point in connected systeam.
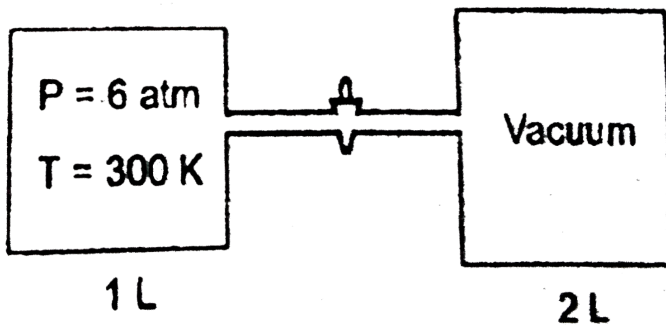
in the given arrangement, temperature is maintained constant and the knob is opened. After the gas spreads in the second chamber also, the pressure will be:

A. 3 atm

B. 2 atm

C. 6 atm

D. 12 atm

Answer: B

9. It is known fact that gases expand to fill all available volume and their final pressure becomes equal at every point in connected systeam.
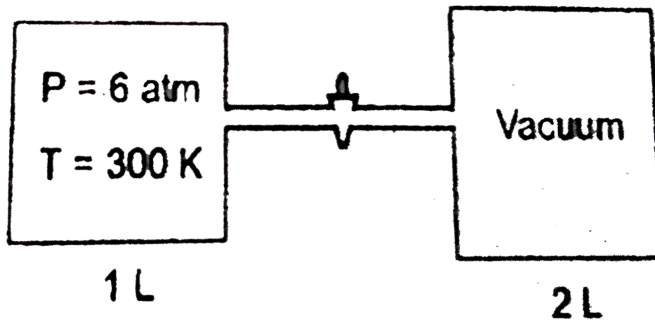
If the gas in the above part weigh 15.36g, then select the correct statement(s) :

$$\left(R = \frac{1}{12} l.\, atm/mol.\, K \right)$$

A. The gas may be SO_2

B. The gas may be CH_4

C. Moles of gas is $\dfrac{6}{25}$

D. Moles of gas is 0.96

Answer: A::C

10. Adenine is a substituted form of a heterocyclic nitrogenous base Purine. Adenine is found in both polymers DNA and RNA. Adenine is composed of the elements carbon, hydrogen and nitrogen and has molecular mass of $13.5a\mu$. Upon analysis, it was found that the ratio of % (by $w.t.$) of carbon to that of total % (by wt) of hydrgoen and nitrogen was found to be $4:5$ respectively. The ratio of number of N atoms to hydrogen atoms is $1:1$.

Now, answer the following questions:

In one molecule of adenine :

A. % of C by mass $= \dfrac{400}{9}$

B. % of N by number $= \dfrac{100}{3}$

C. There are 15 atoma

D. Total number of C atoms is double of number of Nitrogen atoms.

Answer: A::B::C

▶ **Watch Video Solution**

---

11. Adenine is a substituted form of a heterocyclic nitrogenous base Purine. Adenine is found in both polymers DNA and RNA. Adenine is composed of the elements carbon, hydrogen and nitrogen and has molecular mass of $13.5 a\mu$. Upon analysis, it was found that the ratio of % (by $w.\,t.$) of carbon to that of total % (by wt) of hydrgoen and

nitrogen was found to be $4:5$ respectively. The ratio of number of N atoms to hydrogen atoms is $1:1$.

Now, answer the following questions:

The amount of glucose $\left(C_6H_{12}O_6\right)$ obtained when all the carbon in $36mg$ of adenine is converted into glucose is :

A. $0.22m$ mole

B. $0.26m$ mole

C. $48mg$

D. $40mg$

Answer: A::D

12. Valence shell electron pair repusin theory ($VSEPR$) can be used to perdict the approximate shape of molecules. Electrons in bonds and in lone pairs can ve thought of as charge cloud that repel one another

and stay as far apart possible, thus causing molecules to assume specific shapes.

The repulsive interacions of electro paris decrease in the order :

Lone pair-lone pair $>$ Lone pair -bond pair $>$ Bond pair -bond pair.

These replusions effect result in deviations from idealized shapes and alternative in bond aegles in molecules.

The species which has pyramidal shape is :

A. ICl_3

B. SO_3

C. PCl_3

D. $\overset{..}{N}H_3$
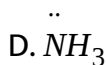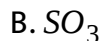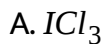
Answer: C::D

13. Valence shell electron pair repusin theory ($VSEPR$) can be used to perdict the approximate shape of molecules. Electrons in bonds and in lone pairs can ve thought of as charge cloud that repel one another and stay as far apart possible, thus causing molecules to assume specific shapes.

The repulsive interacions of electro paris decrease in the order :

Lone pair-lone pair $>$ Lone pair -bond pair $>$ Bond pair -bond pair.

These repulsions effect result in deviations from idealized shapes and ateration in bond angles in molecules

Which of the following is linear ?

   A. $I_3{}^-$

   B. $ICl_2{}^+$

   C. $HgCl_2$

   D. XeF_2
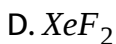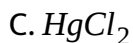
Answer: A::C::D

14. HCN and HNC molcules are formed by the same atoms.

Which of the following properties are identical for HCN abd HNC molecules ?

    A. The number of σ bonds.

    B. The number of π bonds.

    C. The number of lone pairs.

    D. Formal charge on H atom.

Answer: A::B::C::D

15. HCN and HNC molcules are formed by the same atoms.

What is correct about HCN ?

A. Central atom is carbon

B. Formal charge on carbon atom is zero

C. Central atom is nitrogen

D. Hybridisation of C is sp

Answer: A::B::D

▶ Watch Video Solution

---

16. The energy levels in a certain single electron species are all 800 % higher in magnitude than corresponding levels of atomic hydrogen. A cartain transition of the electron from the nth excited state to the next higher level is possible with a photonn of wavelength $72nm$. Find the value of n .

Given : $\left(\dfrac{1}{R} = 90nm\right)$

▶ Watch Video Solution

17. The slope of $'P'$ v/s T plot at constant volume for a fixed amount of an ideal gas aus $0.01atm/K$. Then what will be the value of pressure of gas (In atm) at $300K$ temperature ?

18. Consider the reaction

$C_6H_{12}O_6 + 12H_2SO_4 \rightarrow 6CO_2 + 12SO_2 + 18H_2O$
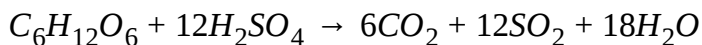
How many of the following conclusion are corerct based on this equation?

(A) Mass ratio of $C_6H_{12}O_6$ and H_2SO_4 present is $1:12$

(B) Mole ratio of $C_6H_{12}O_6$ and H_2SO_4 present is $1:12$

(C) Mass ratio of $C_6H_{12}O_6$ and H_2SO_4 reacted is $1:12$.

(D) Mole ratio of H_2SO_4 and CO_2 in reaction mixture is $2:1$

(E) Mass ratio of H_2SO_4 and CO_2 in reaction mixrture is $2:1$

(F) Mole ratio of H_2O and $C_6H_{12}O_6$ present in reaction mixture is $18:1$

(G) Mole ratio of SO_2 and CO_2 formed $2:1$

(G) Sum of number of moles of H_2SO_4 and SO_2 in the reaction mixture is always constant.

(I) Sum of number of moles of moles of $C_6H_{12}O_6$ and CO_2 present in the reaction mixture is always constant.

▶ View Text Solution

19. Calculate the molecular weight of a gas X which diffuses four times as fast as another gas Y, which in turn diffuses twice as fast as another Z. Molecular weight of the gas Z is 128.

▶ Watch Video Solution

20. Total number of electrons having $n + l = 4$ in $V(23)$ atom in its ground state is

▶ Watch Video Solution

21. How many of the following elements show $+2$ as their most stable oxidation state ?

Sc, Sn, Zn, Be, Pb, Co, Ag, Ti, Fe

> ▶ Watch Video Solution

22. How many of following anions have 1.5 bond order ?

IO_4^-, CH_3COO^-, CO_3^{2-}, NO_3^-, BrO_2^-, NO_2^-, $HCOO^-$, SO_3^{2-}, ClO_2^-, SO_4^{2-} and PO_4^{3-}

> ▶ Watch Video Solution

23. How many of the following have sp^3 hydridisation around the central atom ?

(a) H_2O, (b) CH_3, (c) BCl_3, (d) BF_4^-, (e) $BeCl_2(g)$

(f) PCl_4^+, (g) XeF_2, (h) CO_2, (i) NH_4^+, (j) PCl_3

> ▶ Watch Video Solution

24. Cl - O band order in perchlorate ion is M and number of resonating structures are N, report your answer as $(M \times N)$

25. Write the sum of lone pairs of electron on central atom of SF_4, CF_4, XeF_4, XeF_2 and ClF_3.

26. A hydrogen like atom in ground state absorbs n photon having the same energy and its emits exacity n` photon when electrons transition takes placed .Then the energy of the absorbed photon may be

A. $91.8 eV$

B. $40.8eV$

C. $48.4eV$

D. None of these

Answer: A::B

27. Which of the following gases will have the same rate of effusion under identical conditions ?
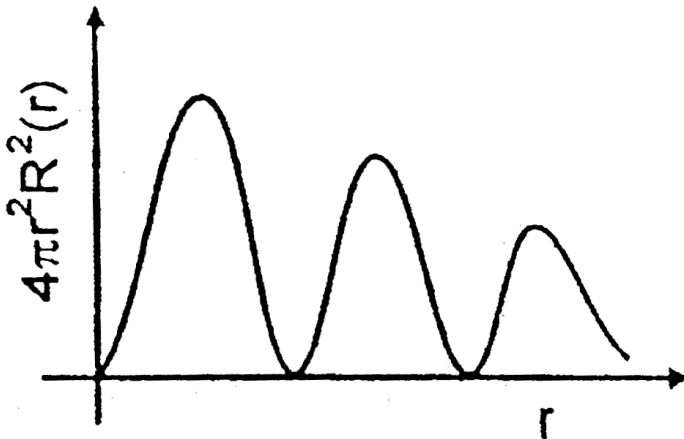
A. C_2H_4

B. C_3H_8

C. CO_2

D. N_2O

Answer: B::C::D

28. Given the H - atom $R_{n,l} = \dfrac{1}{9\sqrt{3}}\left(\dfrac{1}{a_o}\right)^{3/2}\left(6 - 6\sigma + \sigma^2\right)e^{-\sigma/2}$

where $\sigma = \dfrac{2Zr}{na_o}$, $a_o = 0.53\text{Å}$

Select the correct statement for the given orbital ?

A. Orbital is $3s$

B. Graph for the given orbital is : 🖼️

C. Distance between radial nodes is equal to $3\sqrt{3}a_o$

D. None of these

Answer: A::C

---

29. If 2 litre of 9.8 % $w/wH_2SO_4(d = 1.5g/mL)$ solution is mixed with 3 litre of $1MKOH$ solution then the concentration ofv H^+ if solution is acidic or concentration of OH^- if solution is basic in the final solution is:

A. 0

B. $\dfrac{3}{10}N$

C. $\dfrac{3}{5}N$

D. $\dfrac{2}{5}M$

Answer: C

30. Select correct option(s): (Use $R = \dfrac{25}{3} J/mol - K$)

A. C_{rms} of C_2H_6 at $27°C$ is $500 m/s$.

B. $C_{rms} : C_{av} : C_{mp}$ for same gas under similar condition is

$$\sqrt{3} : \dfrac{\sqrt{8}}{\pi} \sqrt{2}$$

C. Rate of effusion of $2:1$ molar ratio of H_2 and O_2 is $4:1$ at constant temperature

D. Rate of effusion of $4:1$ molar ratio of He and SO_2 is $16:1$ at constant temperature

Answer: A::D

▶ **Watch Video Solution**

31. A flask of $4.48L$ capacity contains a mixture of N_2 and H_2 at $0°C$ and $1atm$ pressure. If thed mixture is made to react to form NH_3 gas

at the same temperature, the pressure in the flask reduces to $0.75atm$.

Select statement(s) :

A. Initially total moves of gases in the mixture is $0.2mol$.

B. Initially total moves of gases in the mixture is $0.4mol$.

C. The partial pressure of NH_3 gas in the final mixture is $0.33atm$.

D. The partial pressure of NH_3 gas in the final mixture is $0.25atm$.

Answer: B::C

▶ **Watch Video Solution**

---

32. A gas absorbs a photon of $310nm$ and emits three photons. If energy of emitted photons is in the raio $1:2:1$ then select correct statement(s) :

A. The wave length of emitted photons is in the ratio $1:2:1$

B. The wave length of emitted photons is in the ratio $2:1:2$

C. The wave length of emitted photons is in the ratio $1240nm$.

D. The wavelength of least energatic photon is $1310nm$.

Answer: B::C

> ▶ Watch Video Solution

33. A mixture contaning $1mol$ each of CO and O_2 is exploded to produce CO_2. Which of the following is/are correct ?

A. If $\%$ yield of reaction is 80 % , only 0.8 mole CO_2 is formed.

B. Oxygen is limiting reagent.
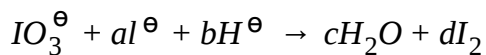
C. Volume of final gaseous mixture is $33.6L$ at STP, if $\%$ yield is

100 %

D. $\%$ excess of excess reagent is 40 % , if $\%$ yield is 100 %

Answer: A::C

34. In the balanced chemical reaction

$$IO_3^{\ominus} + al^{\ominus} + bH^{\ominus} \rightarrow cH_2O + dI_2$$

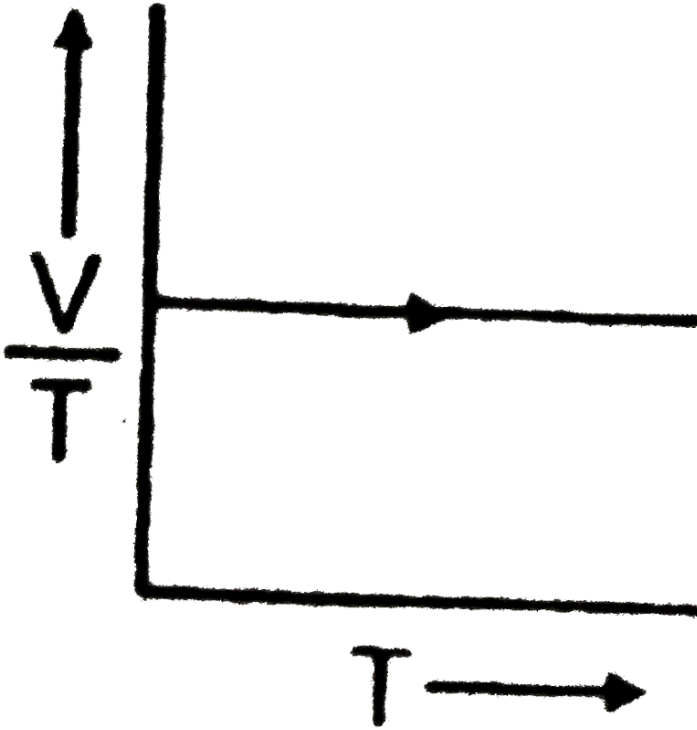$a, b, c,$ and d, respectively, correspond to

    A. $a = 5$

    B. $c = 3$
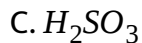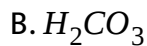
    C. $d = 5$

    D. $b = 6$

Answer: A::B::D

35.

Select the correct statement(s) about given graph .

A. Expansion takes place

B. Process is not isothermal

C. Process is not isobaric

D. Process is not isochoric

Answer: A::B::D

36. Names of which of the following end in *-ous* acid ?

A. HNO_2

B. H_2CO_3

C. H_2SO_3

D. HPO_3

Answer: A::C

37. Which of the following is/are correact for the formation of π bond

?

A. overlapping of p_x - p_x(Z internuclear axis)

B. overlapping of p_z - p_z orbitals(Z internuclear axis)

C. overlapping of p_y - p_y orbitals(Z internuclear axis)

D. overlapping of s - p_z orbitals (Z internuclear axis)

Answer: A::C

▶ **Watch Video Solution**

38. Which of the following will result in zero overlap if molecular axis

is x - axis ?

A. 1s - $2p_x$

B. 2s - $2p_z$

C. $2p_x$ - $2p_x$

D. 1s - $2p_y$

Answer: B::D

39. In which of the following species, bonding is taking place in excited state ?

A. $BeCl_2(g)$

B. CCl_4

C. NF_3

D. PCl_5

Answer: A::B::D

40. Which of the following is/are correctly matched ?

A. H_2CrO_4 Chromic acid

B. HPO_3 Metaphosphoric acid

C. HNO_4 Peroxy nitric acid

D. $HClO_3$ Perchloric acid

Answer: A::B::C

▶ **Watch Video Solution**

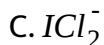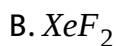41. Which of the following does not exist ?

A. ClO_4^-

B. SnO_3^{2-}

C. SO_4^{2-}

D. $ZnBr$

Answer: D

42. Which of the following molcules have three lone pairs around central atom -

A. I_3^-

B. XeF_2

C. ICl_2^-

D. CIF_3

Answer: A::B::C

43. In CO_3^{2-}, CO_3 and CCl_4 hybridisation of carbon atoms are respectively.

A. sp^3, sp, sp^2

B. sp, sp^2, sp^3

C. sp^2, sp, sp^3

D. sp^2, sp^3, sp
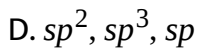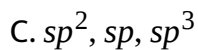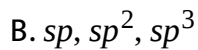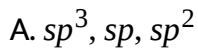
Answer: C

▶ **Watch Video Solution**

44. Which of the follwing is/are isoelectronic species ?

A. NCN^{2-}

B. CO_2

C. N_3-

D. OCN^-

Answer: A::B::C::D

45. Which statement is/are true regarding to atomic radius.

A. Atomic radius of gallium slightly less than aluminium.

B. Size increase from Li to Cs.

C. Except group 3, size of $4d$ series elements are approximentely

equal to size of $5d$ series elements.

D. Atomic radii of Ag and Au are nearly the same.

Answer: A::B::C::D

46. Consider the following redox reaction :

$H_2O + AX + BY \rightarrow HA + YO + BX_2$ (unbalanced)
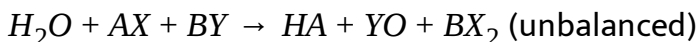
It is also known that oxidation number of X is -2 and neither X nor

water is involved in the redox process. (In compound BY, B is cation and consider its oxidation number < 4).

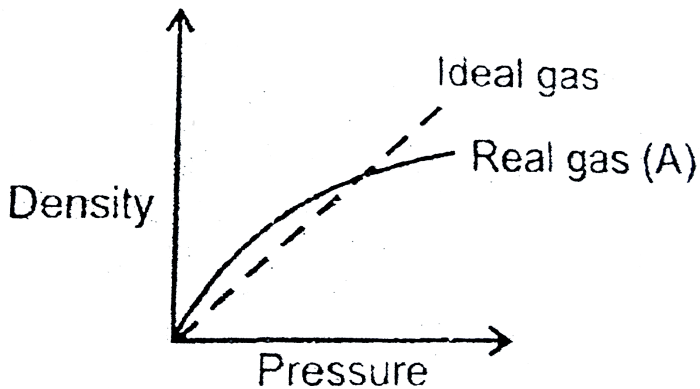Answer the following question based on the information given.

Select the correct option(s) :

A. The element A is under going reduction.

B. The element B is under going reduction.

C. The element B is under going oxidation.

D. The element Y is under going oxidation.

Answer: A::C::D

▶ **Watch Video Solution**

PART - III CHEMISTRY

1. A gas shows following graphs at $25\,^\circ C$

Which is/are correct for the gas?

A. Gas shows only negative deviation throughout the graph

B. Boyle temperature of gas must be more than $20\,^\circ C$.

C. Motar volume of gas is less than that of ideal molar volune at

    $25\,^\circ C$ in low pressure region.

D. In the high pressure region, the gas is less compressible than

    ideal gas at $25\,^\circ C$.

Answer: B::C::D

2. 30mL of $CH_3OH\left(d = 0.8g/cm^3\right)$ is mixed with 60mL of $C_2H_5OH\left(d = 0.92g/cm^2\right)$ at $25\,^\circ C$ to form a solution of density $0.88g/cm^3$. Select the correct option(s) :

A. Molarity and molarity of resulting solution are $6.33M$ and $13.59m$ respectively.

B. The molar friction of solute and molarity are 0.38 and $13.59m$ respectively.

C. Molarity and percentage change in volume are $13.5M$ and zero repectively.

D. Mole fraction of solvent and molality are 0.62 and $13.59m$ respectively.

Answer: B::D

3. For the dissociation

$$A_2B_3 \Leftrightarrow 2AB(g) + \frac{1}{2}B_2(g)$$
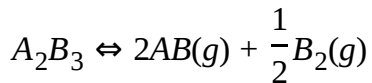
If, $M = $ Molecular mass of $A_2B_3(g)$

$D = $ Vapour density of equilibrium mixture

$P^\circ = $ Initial pressure of $A_2B_2(g)$

then, identify the correct statement(s) :

A. Equilibrium pressure can be expressed as $\dfrac{2P^\circ D}{M}$

B. Equilibrium pressure can be expressed as $\dfrac{2P^\circ M}{2D}$

C. Degree of dissociation of $A_2B_3(g)$ can be expressed as $\dfrac{M - 2D}{3D}$

D. Increase in temperature will increase the magnitude of D

Answer: C

4. For the endothermic reaction

$3A(g) \Leftrightarrow B(g) + C(g)$

select the option(s) by which equilibrium concentration of $A(g)$ can be increased?

    A. Decreasing the temperature

    B. Increasing the volume of the container

    C. Decreasing the volume of the container

    D. Adding $B(g)$ at equilibrium

Answer: A::C::D

▶ **Watch Video Solution**

---

5. Select the correct statement(s) :

    A. For H_2 gas at NTP Molar volume $> 22.4L$

    B. H_2 gas at NTP is less compressible with respect to an ideal gas.

C. The van der Waals gas constant $'a'$ is given by $\dfrac{1}{8}\dfrac{RT_C}{P_C}$

D. The van der Waals gas constant $'a'$ is given by $\dfrac{27}{64}\dfrac{R^2T_C^2}{P_C}$

Answer: A::B::D

6. Consider the following arrangement :
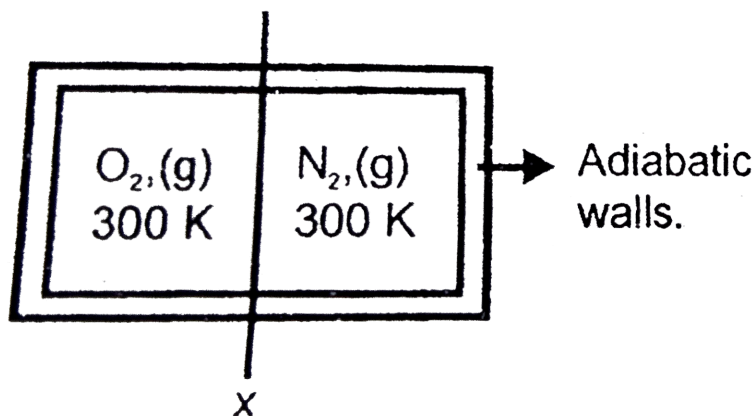
If O_2 and N_2 are assumed to behave ideally, then on removing partition X (smoothly), then select incorrect option(s) for this process :

A. $\Delta S_{says} < 0,\ \Delta S_{surr} < 0$

B. $\Delta S_{univ} > 0$

C. $\Delta U > 0,\ \Delta H > 0$

D. $\Delta G < 0$

Answer: A::C

▶ **Watch Video Solution**

---

7. a $A_{(g)} + bB_{(g)} \rightarrow cC_{(g)} + dD_{(g)}$
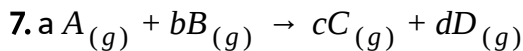
Reaction is taking place at constant Temperature, Pressure & Volume, then correct statement(s) is/are:

A. $a + b = c + d$

B. $M_{avg.}$ may increase or decrease depeding upon limiting reagent.

C. Vapour density of mixture will remain same throughout the course of reaction.

D. Total molar will change with progress of reaction.

Answer: A::C

▶ **Watch Video Solution**

8. A liquid confined inside an adiabatic is suddenly taken from state 1 to state 2 buy a single step process as shown
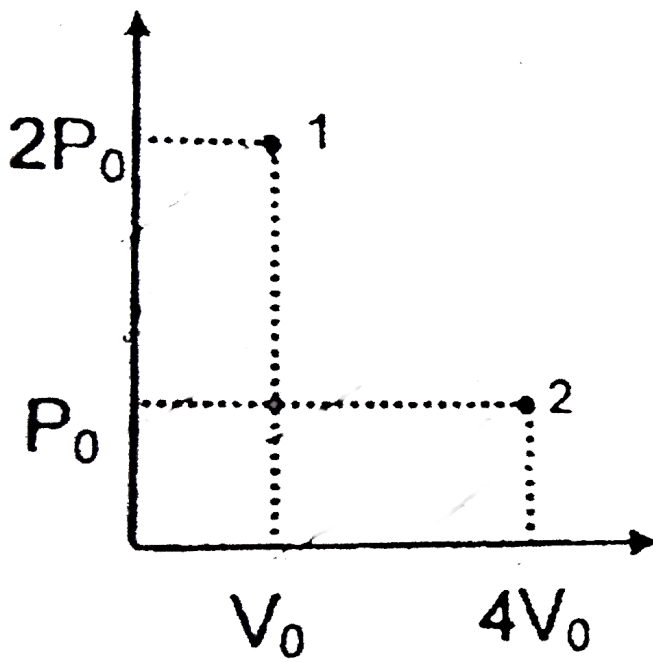
Select correct option(s) :

A. $\Delta U = -3P_0V_0$

B. $\Delta H = -P_0V_0$

C. $W = -3P_0V_0$

D. $q = 0$

Answer: A::B::C::D

> ▶ Watch Video Solution

9. 1 mol of an idel gas is allowed to expand isothermally at $27\,°C$ till its volume is tripped. If the expansion is carried out reversibly then select the correct option(s) : $\left(R = \dfrac{25}{3}\dfrac{J}{molK}, \log 3 = 0.48\right)$

A. $q_{sys} = 2763 J/mol$

B. $\Delta S_{sys.} = 7.21 J/K\,mol$

C. $\Delta S_{universe} = 0$

D. $\Delta S_{surr.} = -9.21 J/K\,mol$

Answer: A::C::D

▶ **Watch Video Solution**

10. Amongs the following select incorrect statement(s) for kinectic energy per mole of an ideal gas.

A. It is directly proportional to its absolute temperature.

B. It is inversely proportional to its absolute temperature.

C. It is independent of temperature.

D. It is zero at $0 \, ^\circ C$.

Answer: B::C::D

▶ **Watch Video Solution**

---

11. which of the following order/s is/are cprrect fpr the properties mentione in the breaket ?

A. $- \overset{\oplus}{NH_3} > \, - NO_2 [- I]$

B. $- \overset{\ominus}{O} > \, - CH_2^{\ominus} [+ I]$

C. $- \overset{O}{\overset{||}{C}} - O - \overset{O}{\overset{||}{C}} - R > \, - \overset{O}{\overset{||}{C}} - OR [- M]$

D. $- \overset{..}{NH_2} > \, - \overset{..}{S} .. H [+ M]$
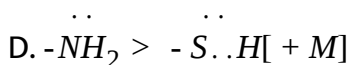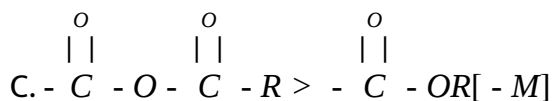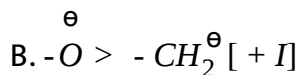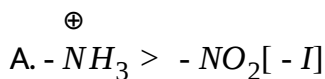
Answer: A::C::D

12. In which of the following one benzene ring is attched to $+m$ and another is attached to $-m$ group ?
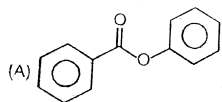
A.
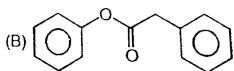
B.
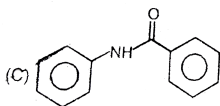
C.

D.
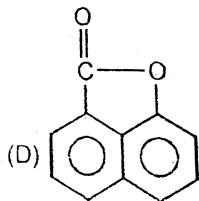
Answer: A::C::D

13. The oimpossible resonating structures of fluorobenzene is/are :

(A)

A.

(B)

B.

(C)

C.

(D)

D.
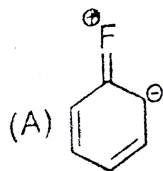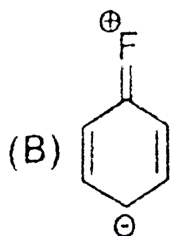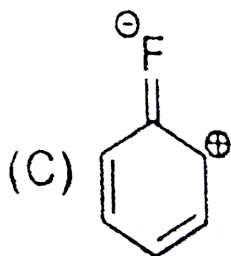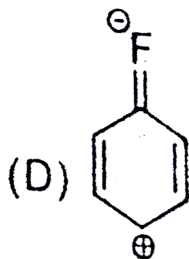
14. Find out correct statement/s about squaric acid diansion:
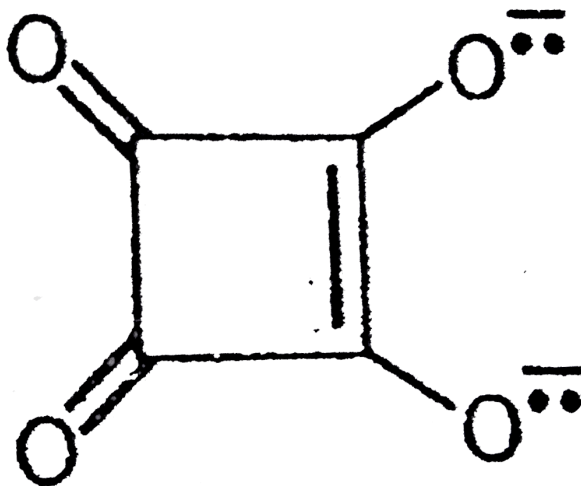
A. It has four equivalent resonating structures.

B. It has all carbon oxygen bond identical.

C. It has all carbon bonds identical.

D. All carbon carbon bond has same bond length as that of carbon oxygen bond.

Answer: A::B::C

15. Which of the following groups exerts $+m$ effect when attached with benzene ring?

A. $- \overset{\oplus}{S}\left(CH_3\right)_2$ group

B. $- \overset{\oplus}{N}\left(CH_3\right)_3$ group

C. $-OCH_3$ group

D. $-NHCH_3$ group
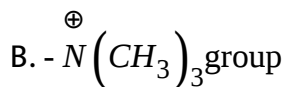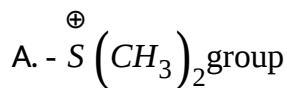
Answer: C::D

16. Among the following reaction, which from salicylic acid.

A.

(A) + $\xrightarrow[\text{(2)}H^{\oplus}]{\text{(1)}CHCl_3+NaOH}$

B.

(B) + $\xrightarrow[\text{(2)}H^{\oplus}]{\text{(1)}CCl_4+NaOH}$

C.

(C) + $\xrightarrow[\text{(2)}H^{\oplus}]{\text{(1)}CO_2+NaOH}$

D.

(D) + $CH_3-\overset{\overset{O}{\|}}{C}-Cl \longrightarrow$
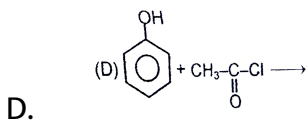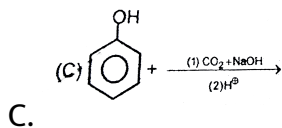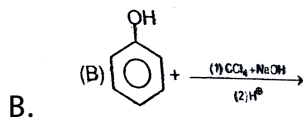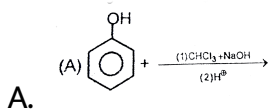
Answer: B::C

▶ Watch Video Solution

17. Which of the following statements is/are correct?

A. Inductive effect causes permanent polarity in the molecular

B. Free radicals have odd electron in p - orbital.

C. Inductive effect is a distance dependent.

D. Mesomeric effect is distance dependent.

Answer: A::B::C

▶ **Watch Video Solution**

---

18. From the compound shown below, choose which is/are aromatic.
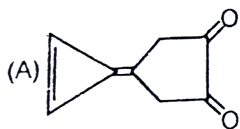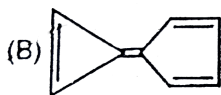
(A)

A.

(B)

B.

(C)

C.

(D)

D.
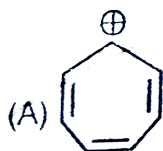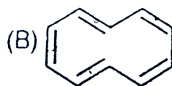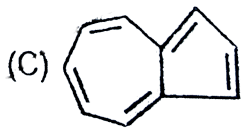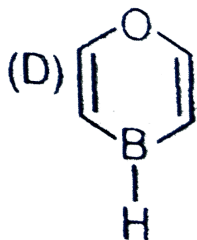
Answer: A::C::D

▶ **Watch Video Solution**

19. Whch of the following has/have non-zero dipole moment?

(A)

A.

(B)

B.
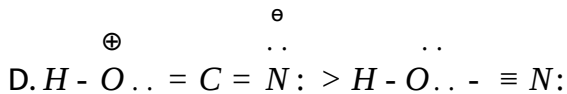
(C)

C.

(D) HO——OH
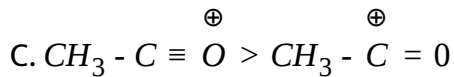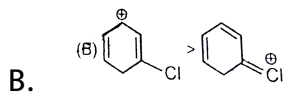
D.
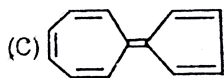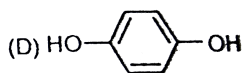
Answer: A::B::C::D

▶ **Watch Video Solution**

---

20. The correct stablity order of following resonating structure is/are

:

(A)

A.

B.

C. $CH_3 - C \equiv \overset{\oplus}{O} > CH_3 - \overset{\oplus}{C} = 0$

D. $H - \overset{\oplus}{O}.. = C = \overset{\ominus}{\underset{..}{N}} : > H - \overset{..}{O}.. - \equiv N:$
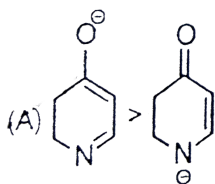
Answer: A::C

PT-03

1. Identify the structure of hydrocarbon (Z) in the given reaction.

$$C_{10}H_{16}(Z) \xrightarrow{O_3} H_2O_2CH_3 - COOH +$$
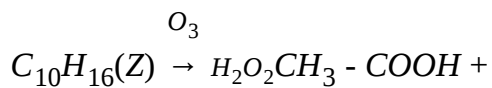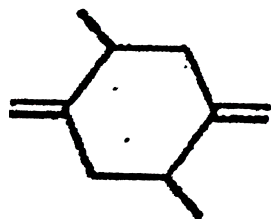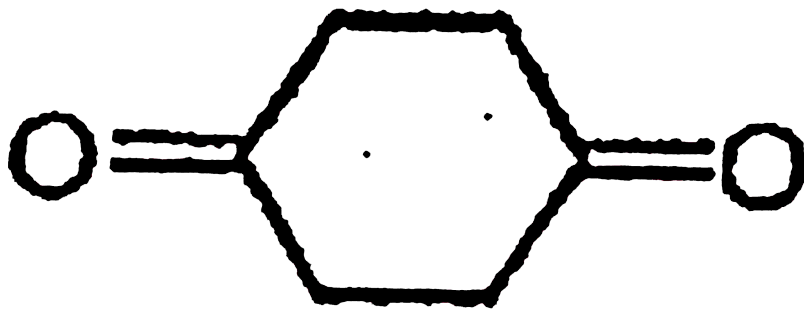
A.

B.

C.

D.

Answer: 2

▶ **Watch Video Solution**