CHEMISTRY

BOOKS - JEE MAINS PREVIOUS YEAR

JEE MAIN 2021

Question

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1. Why α-helix is helical in shape:

    A. H-bonding

    B. Disulphide ink

    C. Covalent bond

    D. Dipole induced dipole

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2. What is the co-ordination no. of b.c.c ?

A. 4

B. 6

C. 8

D. 12

3. An ore of Tin containing $FeCrO_4$ concentrated by

A. Froath flotation

B. Electrostatic method

C. Gravity separation

D. Magnetic separation

4. Which of the following vitamin's deficiency causes sterility in males?

A. Vitamin A

B. Vitamin B

C. Vitamin E

D. Vitamin K

5. Anaerobic respiration causes:

A. Global warming

B. Acid rain

C. Green house effect

D. none of these

6. What are the major components of gun metal:

7. For which of the following ores leaching is done by cyanide:

A. Zn

B. Ag_2S

C. PbS

D. None of these

8. Conversion of cyclobutane to butadiene follows first order kinetics.

How much time will it take for 40% completion (value of K = 3.33×10^{-5}

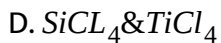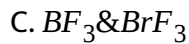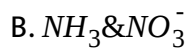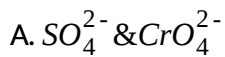**9.** Arrange Mg,Al,P,Si,S in decreasing order of ionization enthalpy

10. Equilibrium constant for a given reaction is 100, at temperature 300k

and 1 atm pressure then value of $\delta G°$ at this temperature and pressure
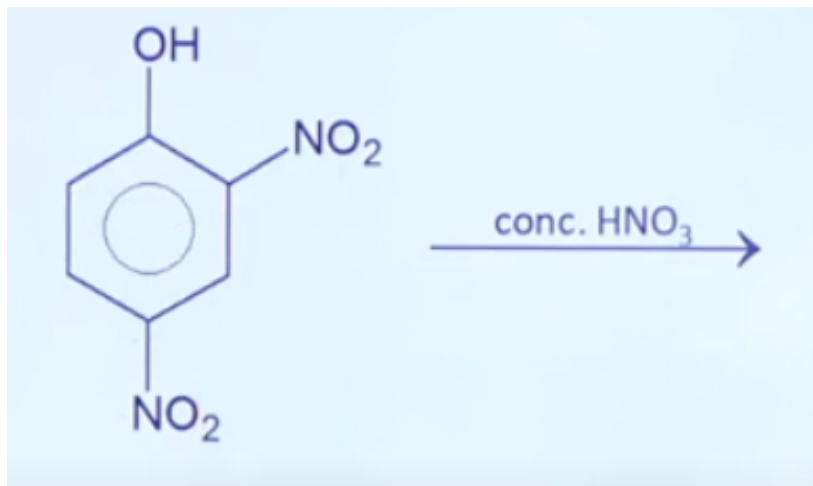
is -xR. Find the value of x.

11. Which of the following pairs are isostructural

A. SO_4^{2-} & CrO_4^{2-}

B. NH_3 & NO_3^-

C. BF_3 & BrF_3

D. $SiCL_4$ & $TiCl_4$

12. What is the product formed in the reaction?

13. What is the slope of freundlich adsorption isotherm ?

14. Observation of Rhumann's purple is a confirmatory test of the presence of

    A. Starch

    B. Cupric ion

    C. Reducing sugar

    D. Protein
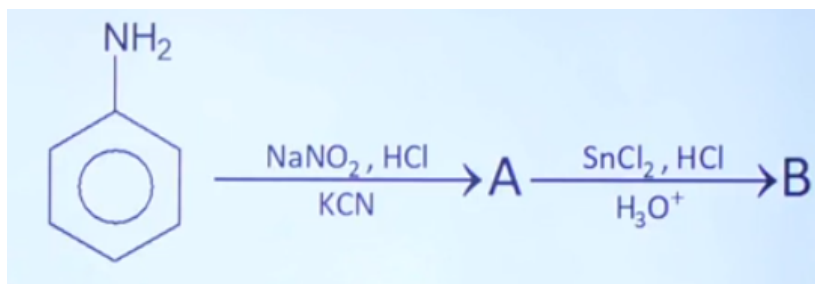
15. 4.5 g of a compound (M.W. = 90) is required to form an aqueous solution of volume 250ml. The molarity of solution is:

16.

What is A and B?

17. Match the column

	Column I	Column II
	Monomer	**Polymer**
(A)	Isoprene	(i) Nylon-6
(B)	Chloroprene	(ii) Natural rubber
(C)	Caprolactum	(iii) Neoprene
(D)	Butadiene-acrylonitrile	(iv) Buna-N

A. A-ii, B-i, C-iii, D-iv
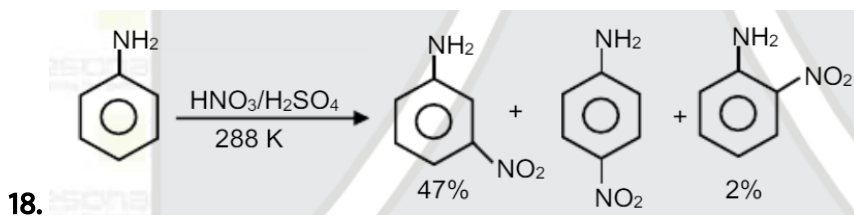
B. A-ii, B-iii, C-i, D-ii

C. A-iii, B-iv, C-i, D-ii

D. A-iv, B-iii, C-ii, D-i

18.

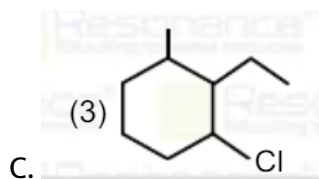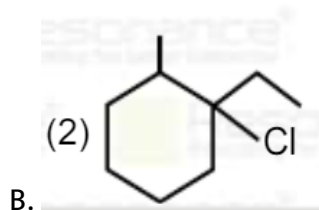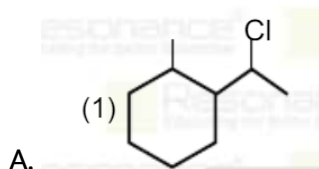NH_2 $\xrightarrow[\text{288 K}]{HNO_3/H_2SO_4}$ [m-nitroaniline 47%] + [p-nitroaniline NO_2] + [o-nitroaniline 2%]
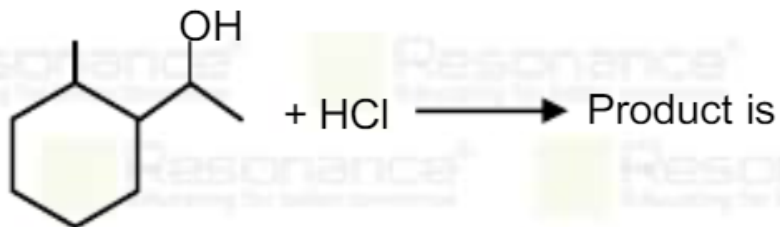
Reason of the product m-nitroaniline is

A. Due to low temperature

B. $-NO_2$ group always attack at meta position

C. $-NH_2$ group is meta directing

D. $-NH_2$ group changes to anilinium ion in acidic medium

19. Complete the following reaction

OH

+ HCl ⟶ Product is

A.

(1)

B.

(2)

C.

(3)

D.

(4)

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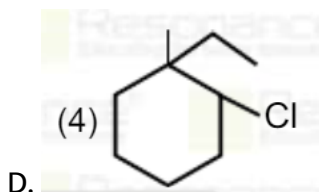
20. $CH_3 - CH_2 - CH_3 \rightarrow$ reagent $CH_3 - CH_2 - CHO$

A. Mo_2O_3

B. Manganese acetate

C. $KMnO_4$

D. Cu

Answer: A

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21. Complete the following reaction

$\xrightarrow[H_2O]{KMnO_4/OH^-} A \xrightarrow[H^+]{CrO_3} B$ Product is ?

(1)

A.

(2)

B.

(3)

C.

(4)

D.
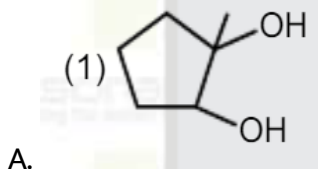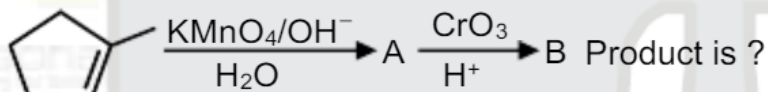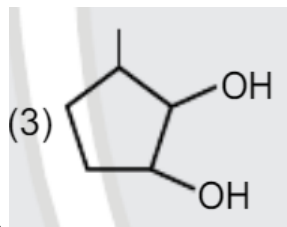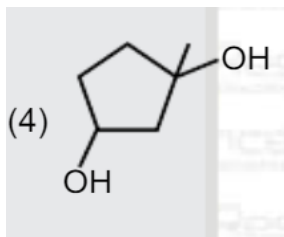
Answer: B

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22. Complete the following reaction

$$CH_3-\overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{C}}-CH=CH_2 \xrightarrow{HI} \text{product is ?}$$

A.

(1) CH$_3$–C(–CH$_3$)(–CH$_3$)–CH$_2$–CH$_2$–I

$$\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{CH_3-C-CH_2-CH_2-I}}$$
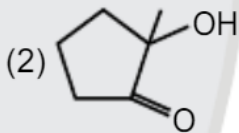
B.

(2)

C.

(3)

D.

(4)
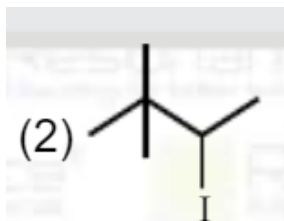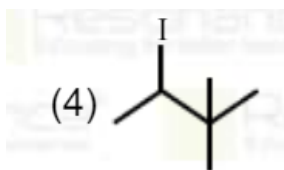
Answer: C

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23. Complete the following reaction

$$CH_3-CH_2-\underset{\underset{X}{|}}{\overset{\overset{X}{|}}{C}}H-CH_2-\underset{\underset{X}{|}}{C}H-CH_3 \xrightarrow{\text{Mg/Ether}} \text{Product is :}$$

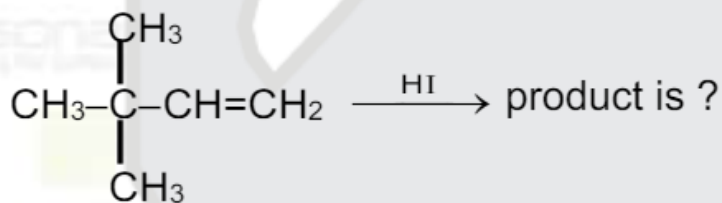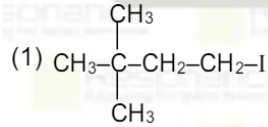A. (1) $CH_3-CH_2-\underset{\underset{MgBr}{|}}{\overset{\overset{MgX}{|}}{C}}H-CH_2-CH-CH_3$

B.

C.

D.

Answer: C

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O + (P) $\xrightarrow[\text{NaOH}]{\text{H}_2\text{SO}_4}$ Pink colour;

24.
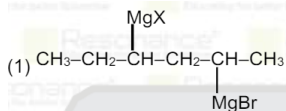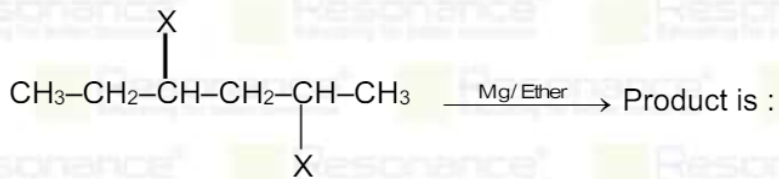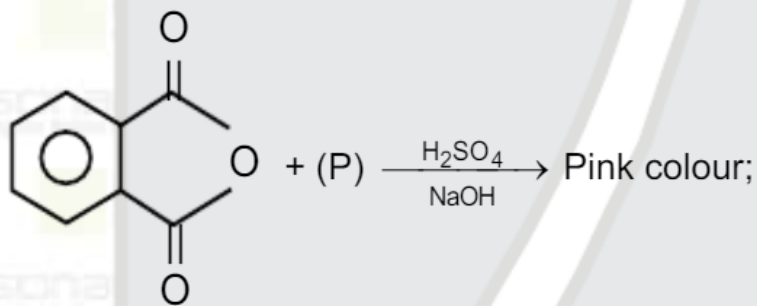
Missing reagent P is:

A.
(1)

B.
(2)

C.
(3)

D.

Answer: B

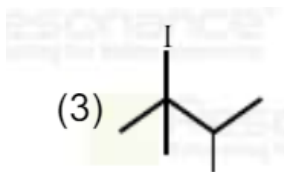**25.** case-I : $I_2 + H_2O_2 \rightarrow O_2 + 2I^- + 2H^+$

case-II: $2H^+ H_2O_2 + 2OCl^- \rightarrow Cl_2 + O_2 + 2H_2O$
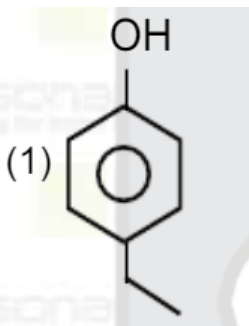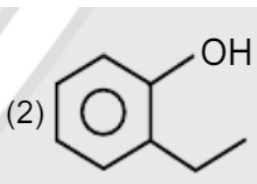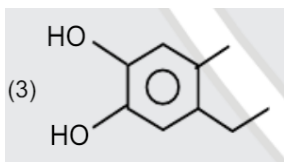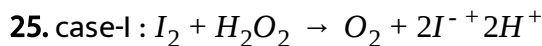
A. In case-I H_2O_2 act as oxidising agent and in case-II H_2O_2 act as reducing agent.

B. In both case H_2O_2 act as reducing agent.

C. In both case H_2O_2 act as oxidising agent.

D. In case-I H_2O_2 act as reducing agent and in case-II H_2O_2 act as oxidising agent.

Answer: B

26. For which of the following metal $M^{2+}(aq) + 2e^- \rightarrow M(s)$ reaction have positive reduction potential value

A. Fe

B. Cu

C. Zn

D. Al

Answer: B

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27. $Impure Al_2O_3 . xH_2O \xrightarrow{NaOH} A \xrightarrow{B(gas)} C$

Then A,B,C are respectively

A. $Na\left[Al(OH)_4\right], CO_2, Al_2O_3$

B. $Al(OH)3, CO_2, Al_2O_3 . XH_2O$

C. $Al(OH)3, SO_2, Al_2O_3 . XH_2O$

D. $Na\left[Al(OH)_4\right], HCl, Al_2O_3$
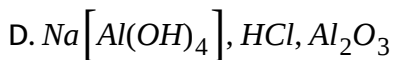
Answer: A

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28. Find the total number of amphoteric compound from following

$BeO, Be(OH)_2, BaO, Sr(OH)2$

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29. $S_8 + aOH^- \rightarrow bS^{2-} + cS_2O_3^{2-} + dH_2O$
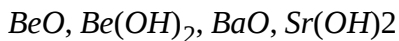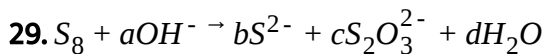
In balanced equation what is the value of a.

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30. For equilibrium reaction at 1900K temperature and 1 atm pressure

$Cl_2(g) \leftrightarrow 2Cl(g)$
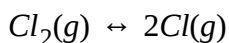
at equilibrium both Cl_2 & Cl have equal number of moles, if the value of K_p is $a \times 10^{-1}$ then value of a is

31. What is the shape of I_3^-

32. Which of the following has highest M.P.

A. MgO

B. LiF

C. NaCl

D. LiCl

33. Match the following

	A		B
a.	Al	p.	Siderite
b.	Zn	q.	Malachite
C.	Fe	r.	calamine
D.	Cu	s.	Bauxite

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34. Which of the following is used in blood clotting

A. $FeCl_3$

B. FeS

C. $Mg(OH)_2$

D. None

35. The tendency to form complex is maximum in

A. Normal element

B. Transition elements

C. Inner-Transition element

D. Element having fully filled d orbitals

36. In contact process impurities of arsenic are removed by

A. Fe_2O_3

B. $Fe(OH)_3$

C. $Al(OH)_3$

D. $Cr(OH)_3$

37. In Buna S,S is for

38. Write the correct order of density for Zn,Fe,Co,Cr,Cu

39. Which can not formed by Gabriel phthalamide synthesis

A.

A. $CH_3 - CH_3 > CH - CH_2 - NH_2$ with CH_3 groups

B.

B. phenyl ring with NH_2

C. C. $CH_3-CH_2-NH_2$

D.

D.
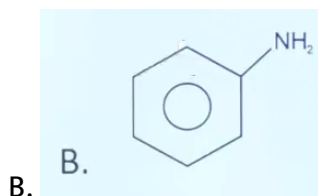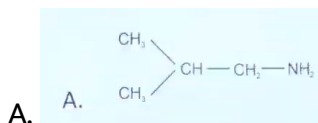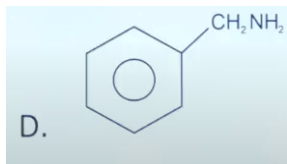
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40. NO_2 forms dimer but ClO_2 does not why?

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41. According to Bohr's model which of the following transition will be having maximum frequency?

A. 3 to 2

B. 5 to 4

C. 4 to 3

D. 2 to 1

42. Choose incorrect statement:

A. RuO_4 is oxidising agent

B. OsO_4 is oxidising agent

C. Cr_2O_3 is amphoteric

D. Red color of ruby is due to Co^(3+)

43. Increasing strength towards nucleophilic attack?

(I)   (II)   (III)   (IV)
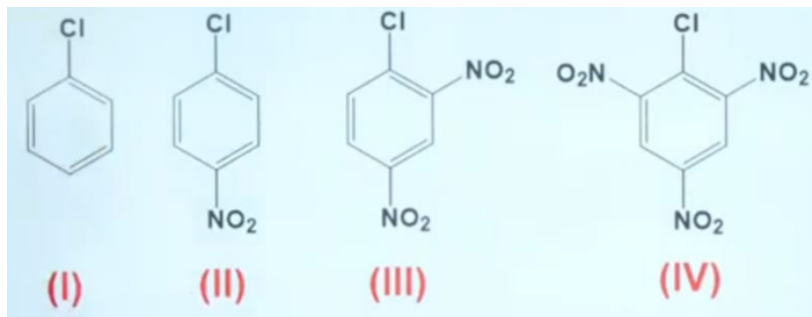
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44. statement 1: Hydrogen is most abundant in universe but not so in Earth's tropoosphere

statement 2: Hydrogen is the lightest element.

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45. Compare the wavelength in flame test for LiCl, NaCl, KCl, RbCl, CsCl.

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46. The suitable reagent for the following conversion :
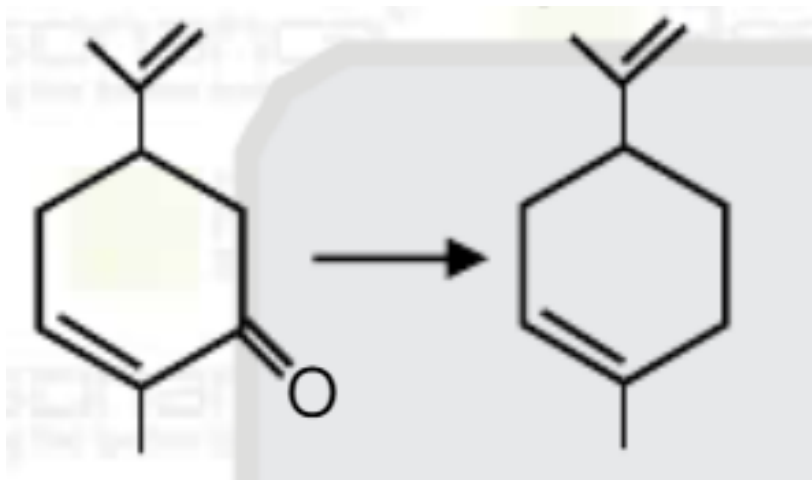
A. $NaBH_4$

B. $NH_2 - NH_2 / C_2H_5O^{-K^+}$

C. Red P + Cl_2

D. $LiAlH_4$

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47. Which of the following is non-aromatic?

A.
(1)

B.
(2)

C.
(3)

D.
(4)
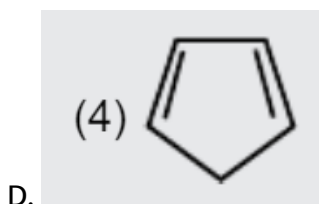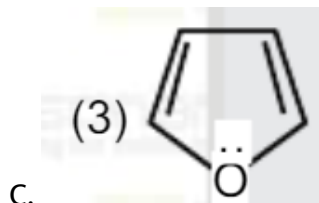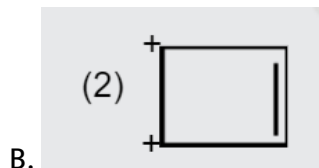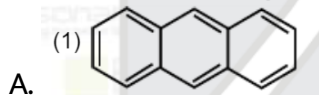
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48. Which of the following product is not possible from the given reaction?

Alkyne overset($H_2SO_4/HgSO_4$) to Product

A. (1)

B. (2) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-H$

C. (3) $CH_3-\overset{O}{\overset{\|}{C}}-CH_2-CH_3$

D. (4) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-CH_2-CH_3$
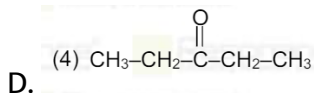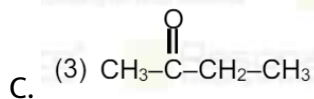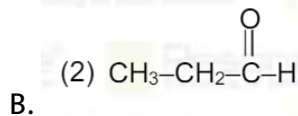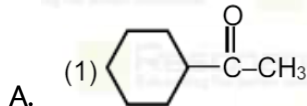
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49. Match the column
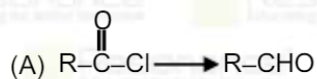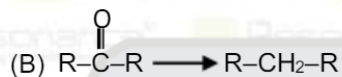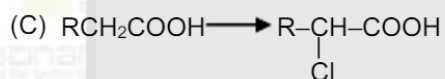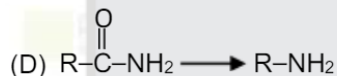
Column 1	Column 2
(A) $R-\overset{O}{\overset{\|}{C}}-Cl \longrightarrow R-CHO$	(1) Red P + Cl_2
(B) $R-\overset{O}{\overset{\|}{C}}-R \longrightarrow R-CH_2-R$	(2) H_2/Pd/BaSO$_4$
(C) $RCH_2COOH \longrightarrow R-\underset{Cl}{\overset{\|}{C}H}-COOH$	(3) Br_2 + KOH
(D) $R-\overset{O}{\overset{\|}{C}}-NH_2 \longrightarrow R-NH_2$	(4) Zn-Hg/HCl

A. A-4,B-1,C-2,D-3

B. A-2,B-1,C-3,D-4

C. A-2,B-4,C-1,D-3

D. A-1,B-2,C-4,D-3

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50. Suitable reagent for the following conversion:
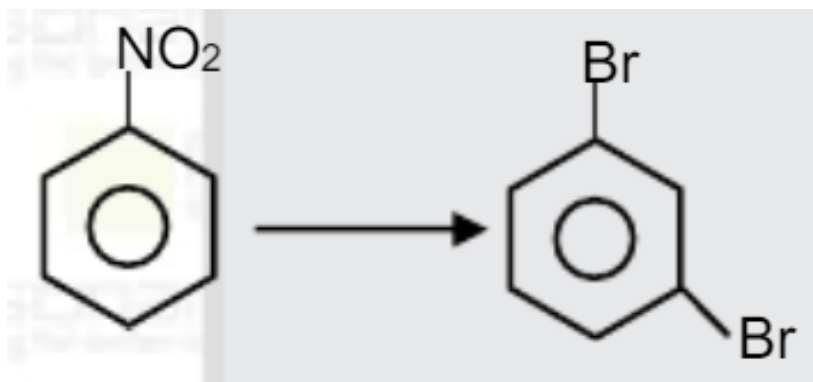
A. $SnCl_2/HCl$, $NaNO_2/HCl$, $CuBr/HBr$, $FeBr_3$

B. $NaNO_2/HCl$, $CuBr/HBr$, $SnCl_2/HC$, $FeBr_3$

C. $FeBr_3$, Sn/HCl, $NaNO_2/HCl$, $CuBr/HBr$

D. $CuBr/HBr$, $SnCl_2/HCl$, $NaNO_2/HCl$, $FeBr_3$

**51.** Statement 1: The parameter "Biochemical oxygen demand" is an important criteria for survival of aquatic life.

statement 2: The optimum "Biochemical oxygen demand" is 6.5

A. statment 1 is true and statement 2 is false

B. statment 1 is true and statement 2 is true

C. statment 1 is false and statement 2 is true

D. statment 1 is false and statement 2 is false

52. What will be magnetic moment

$$\left[FeCl_4\right]^{2-}, \left[Co\left(C_2O_4\right)_3\right]^{3-}, MnO_4^{2-}$$
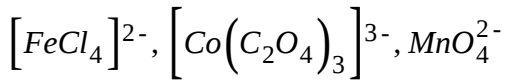
A. 5.92,0,1.73 BM

B. 4.9,0,1.73 BM

C. 1.73,2.83,0 BM

D. 2.83,0,1.73 BM

53. For the following combustion reaction

$$C_xH_y + mO_2 \rightarrow nCO_2 + pH_2O$$
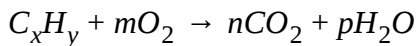
oxygen required 6 times the volume of hydrocarbon and CO_2 produces is 4 times the volume of hydrocarbon. what will be the value of y.

54. 10 gram acetylene at pressure 740MM of Hg pressure & $25\,^{\circ}C$ temperature occupy volume (in L) is:

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55. The solubility of PbI_2 in 0.1M $Pb(NO_3)_2$ Solution is $X \times 10^{-2}$ then value of X is [Given K_{sp} (PbI_2) = 8xx10^(-9)`

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56. How many of the following compounds are paramagnetic in nature α-sulphur,β-sulphur,$S_2(g)$

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57. For reaction $3C_2H_2 \leftrightarrow C_6H_6(l)$

Find the value $\log_{10} Kat25\degree C$

Given $\delta G_f\degree \left(C_2H_2 \right) = 2.4 \times 10^5 J \delta G_f\degree \left(C_6H_6 \right) = 1.4 \times 10^5 J$

58. 10 gram of C_4H_{10} is mixed with 200 gram of C_6H_6 (l) , then calculate freezing point of solution. [Given for

$C_6H_6 K_F = 5.12KK\dfrac{g}{m}o \le \&eez \in gp\oint = 5.5\degree C]$

59. Calculate the ratio of velocity of proton and α - $partic \le$, if they have same De-broglie's wave length.

60. Find change in electrode potential of $E\left(_{MnO_4^-}\right)_{/Mn^{2+}}$, if [H^+

]chan $\geq$ om1M $\rightarrow$ 10^(-4)M[GivenRT/F = 0.059&[MnO_4^-] = [Mn^(2+)'] =

1M]

61. Which of the following does not undergo hydrolysis?

A. BF_3

B. PCl_5

C. SF_6

D. $SiCl_4$
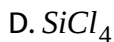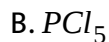
62. Which of the following is the correct statement about diborane?

A. BH_3 is a lewis base.

B. All B-H-B bond angle is equal to 120 °

C. All B-H bonds have same length.

D. Terminal H have less p charater then bridge.

63. Ellingham diagram represents:

A. δH vs T

B. δG vs T

C. δG vs δH

D. none

64. $HC \equiv CH \xrightarrow{RedHotFe} AlCl_3[X] \xrightarrow{CO,HCl/AlCl_3} Y.$
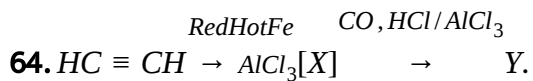
Find the number of sp_2 hybridised C-atoms in Y?

A. 6

B. 4

C. 7

D. 2

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65. Which molecule does not exist?

A. Be_2

B. He_{2+}

C. $He^{2-}{}_2$

D. $O^{2-}{}_2$

66. What is the product formed in the following reaction?

$$H_3C-CH \underset{\underset{CH_2}{\overset{|}{H_2C}}}{\overset{\overset{CH_3}{|}}{}} \quad \underset{CH_2}{\overset{CH_3}{|}} \quad \xrightarrow[MO_2O_3]{773k}$$

A.

A.

B.

B.

C.

D.
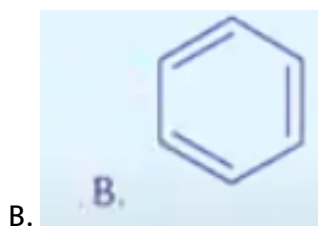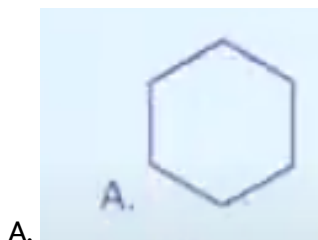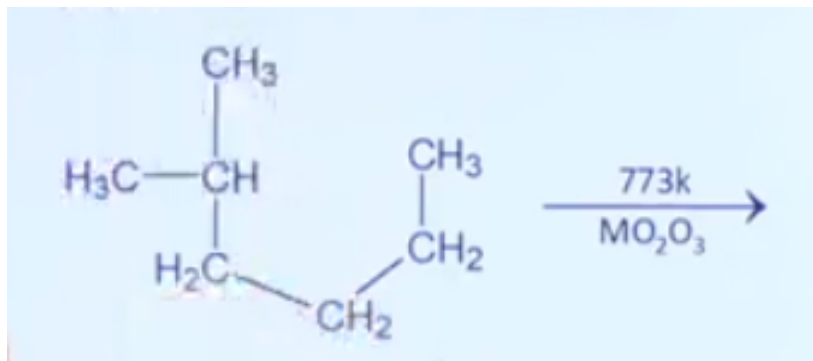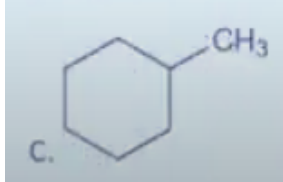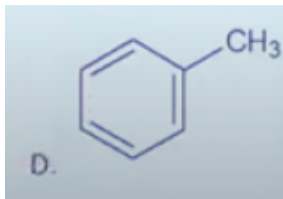
Answer: D

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67. Glycosidic linkage on lactose at which no. of C-atoms

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68. K_{sp} of AgCN is `1.2xx10^(-6) . Find the solubility of AgCN

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69. $\dfrac{x}{m} \propto Kp^{\frac{1}{n}}$. Find the value of n

70. Statement 1: CeO_2 is used for oxidation of aldehyde and ketone

statement 2: Aqueous solution of $Cuso_4$ acts as strong reducing agent.

A. Both statement is true

B. statement 1 true 2 false

C. statement 2 true 1 false

D. Both statement is false

71. $CH_3 - CH_2CN \xrightarrow{\left(SnCl_2 \right)/H_3O^+} \left(PbSO_4 \right)/H_2$?

A. $CH_3 - CH_2 - CH_2OH$

B. $CH_3 - CH_2 - CH_2NH_2$

C. $CH_3 - CH_2 - COOH$

D. $CH_3 - CH_2 - CHO$
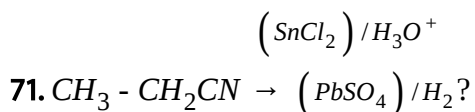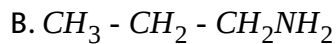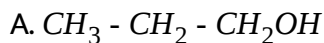
72. Probability density curve for 3s orbital

73. Graph of logK and 1/T was given for which valuue of slope is -10000 K if T is 500K and rate constant is 10^{-5} at which temperature value rate constant will be 10^{-4}

74. Complete the following reaction

$$\text{(structure with } OCH_3 \text{ and } NO_2) \xrightarrow{\text{HCl}} A \xrightarrow[\text{acetone}]{\text{NaI}} ?$$
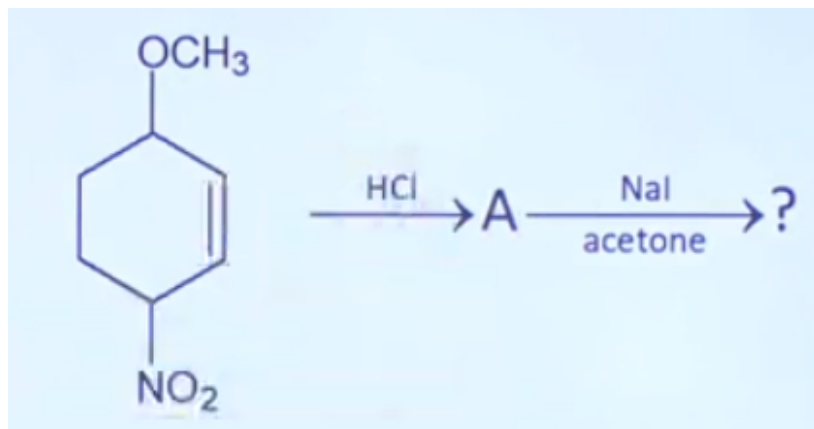
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75. Which will liberate CO_2 with reaction of $NaHCO_3$?

(A) benzene ring with COOH

(B) ring with OH, NO_2 (ortho), NO_2 (para)

(C) ring with OH, NH_2, NH_2
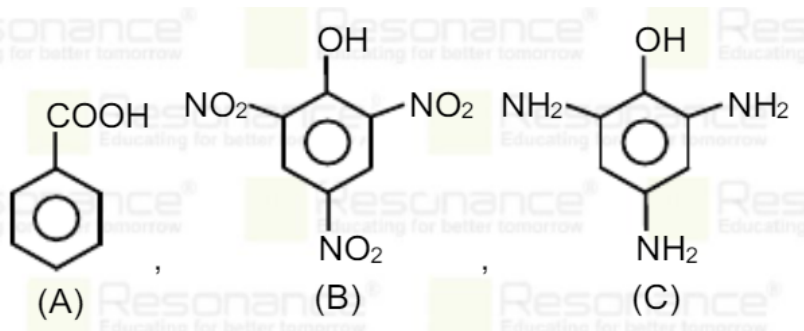
A. B ONLY

B. A ONLY

C. C&D

D. B&C

Answer: D

76. Which of the following is correct?

A. Buna-S is a thermosetting and synthetic polymer

B. Buna-N is a natural polymer

C. Neoprene is used to manufacture buckets

D. Nascent oxygen is used in the formation of Buna-N

77. In which of the following reaction H_2O_2 act as oxidising agent?

A. $KIO_4 + H_2O_2 \rightarrow KIO_3 + H_2O + O_2$

B. $I_2 + H_2O_2 + 2OH^- \rightarrow I^- + 2H_2O + O_2$

C. $2I^- + H_2O_2 + 2H^+ \rightarrow I_2 + 2H_2O$

D. Cl_2 + H_2O_2 to Cl^- + O_2`
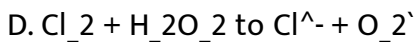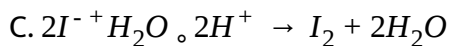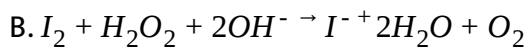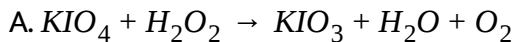
78. Hybridisation of Mn in $\left[Mn(CN)_6\right]^{4-}$ & magnetic nature of $\left[Fe(CN)_6\right]^{3-}$ is respectively

A. Sp^3d^2, diamagnetic

B. Sp^3d^2, paramagnetic

C. d^2Sp^3, diamagnetic

D. d^2Sp^3, paramagnetic

79. Which of the following species have same outer most shell electronic configuration

A. Cr^+, V^{2+}

B. Cu^{2+}, Ni^{2+}

C. Fe^{3+}, Co^{2+}

D. Mn^{2+}, Cr^+
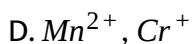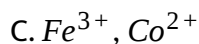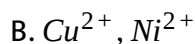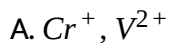
80. statement 1: common components of photochemical smog are oxides of nitrogen & sulphur.

statement 2: Ozone in the stratosphere is a product of UV radiation acting on dioxygen.

A. statement 1 is true, statement 2 is false

B. statement 1 is false, statement 2 is true

C. statement 1,2 both are true

D. statement 1,2 both are false

81. In which of the following reaction p-aminoazobenzene is not formed?

(a) C_6H_5—NO_2 $\xrightarrow{\text{(1) Sn/HCl}}$
(2) HNO_2
(3) Aniline

(b) C_6H_5—NO_2 $\xrightarrow{\text{(1) } HNO_2}$
(2) HCl, Aniline

(c) C_6H_5—NO_2 $\xrightarrow{\text{(1) } NaBH_4}$
(2) HNO_2
(3) Aniline
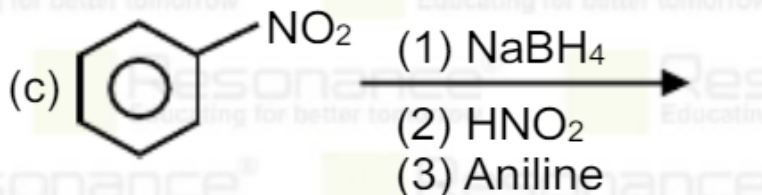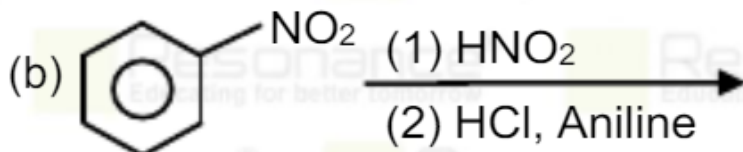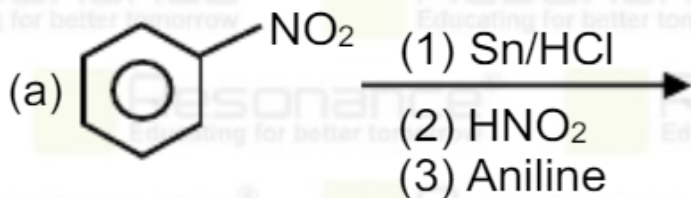
A. only a

B. only b

C. only c

D. a & b

82. Which of the following will not yield acetaldehyde?

A. $CH_3CN + DIBAL - H$

B. $CH_3CH_2OH + Cu, Heat$

C. $CH_3CH_2OH + CrO_3, H_2SO_4$

D. $CH_2 = CH_2 + O_2 \xrightarrow{\text{catalyst}} Pd(II), Cu(II) INWATER$

83. A Tyre is filled with $N_2(g)$ at 35 psi and $27\degree C$ temperature. tyre can exert maximum pressure 40 psi, then find the temperature (in k) at which tyre can burst.

84. 0.154M CrO_4^{2-} can convert 40ml, 0.25M $S_2O_3^{2-}$ to SO_4^{2-} and itself reduces to $Cr(OH)_4^-$ then find volume of CrO_4^{2-} used in this process (in ml).

85. For a reaction graph between $\log K$ vs $\dfrac{1}{T}$ is as with slope = -10,000.
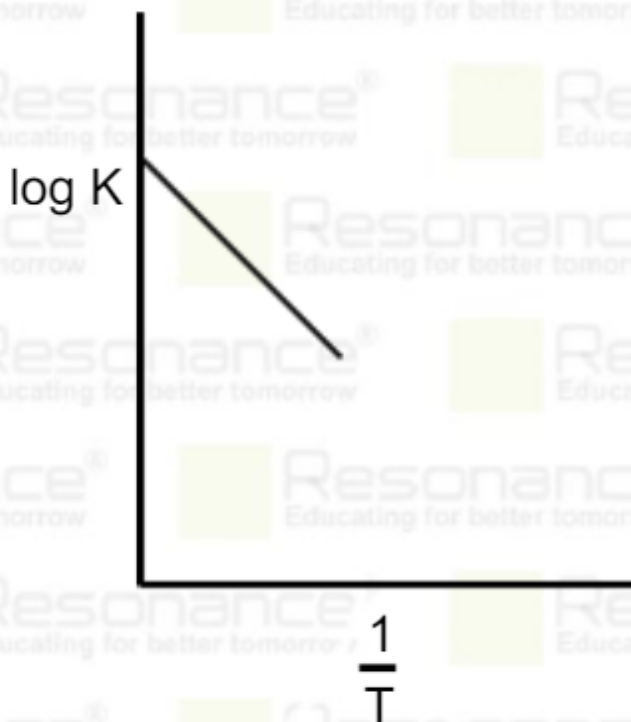
At temperature 500K rate constant $k = 10^{-5}$.

Find the temperature in K at which rate constant = 10^{-4}

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86. Find boiling point (in k) of an 1m aqueous solution of an electrolyte A_2B_3 WHICH IS 60% ionised.

[Given K_b(H_2O) = 0.52 (K Kg)/mole]

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87. Following reaction is take place in BOMB calorimeter at 298 K.

$$NH_4CN(l) + \frac{3}{2}O_2(g) \rightarrow CO_2(g) + N_2(g) + H_2O(l)$$
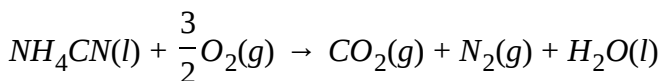
For which $\delta U°\_(reaction)$ = -742.14Kj/mole, then find $\delta H°\_(reaction)$ at 298 K

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88. With the help of given following information find $\delta H°_{f(NaBr)}$

Ionisation enthalpy of Na(g) to Na^+ is 495.8KJ/mole, electron given enthalpy of Br is -325KJ/mole & Lattice enthalpy of NaBr(s) -747KJ/mole.

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89. A and B are separated using chromatography then find retardation factor of A using following information:

Solvent

5 cm

•B

4 cm

•A

2 cm
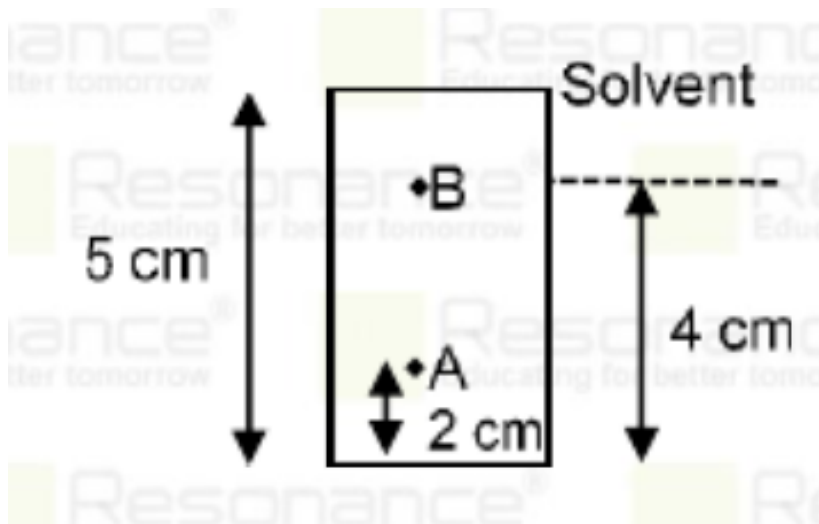
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90. What will be the product form when ethylene glycol react with oxalic acid?

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91. Which molecule does not has same bond length?

A. BF_4^-

B. SF_4

C. NH_3

D. IF_4^-

92. $BaCO_3$, $CaCO_3$, $SrCO_3$, $MgCO_3$ arrange these salts according to their decreasing thermal stability?

93. What are the major components of german silver?

94. Which process is used for indium in extraction of metal?

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95. statement-1 pH of rain water is approx 5.6

statement 2- If Ph of rain water less than 5.6 then it is called acid rain

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96. Solubility product of $Ca(OH)_2$ is `5,5xx10^(-6). calculate solubility?

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97. Correct order of bond dissociation energy of Halogen

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98. What is the IUPAC nomenclature of

$$CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{N} - \overset{\overset{O}{||}}{C} - H$$
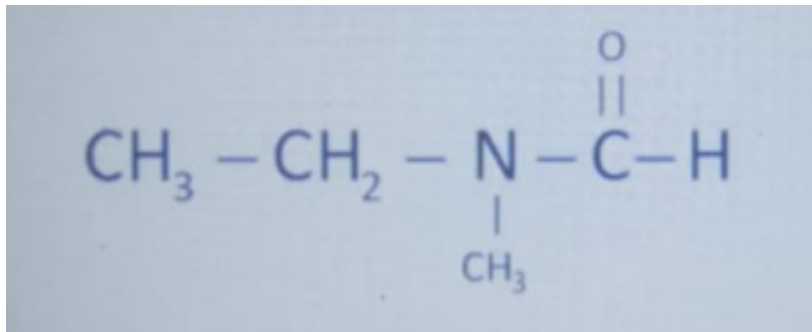
99. An element having Z(divalent)=29 then calculate magnetic moment in aqueous medium

100. For a reaction value of rate constant becomes 5 tomes when temp. is increased from $27°C$ to $52°C$. Find the activation energy?

101. A unit cell of copper lattice of edge length $3.596A°$ of face centred lattice. find density of unit cell in kg/m^3

102. Which of the following is false about hydrophilic sols

A. These canot be coagulated easily

B. These are reversible in nature

C. They have viscosity like H_2O

D. They need electrolytes for stability

103. Which compound is added for detection of halogen before adding $AgNo_3$

104. Statement-1 α sulphur & β sulphur would be interconvertible by applying small heat and cold

statement 2- Most stable form of sulphir is monoclinic

    A. Both statements are true

    B. statement 1 is true but statement 2 is false

    C. statement 1 is false but statement 2 is true

    D. Both statements are false

105. using the following graph for an ideal gas follow $PV^{\frac{1}{2}}$ = constant . find P_1/P_2 ratio. If $V_2 = 2V_1$

P_1, V_1, T_1

P_2, V_2, T_2
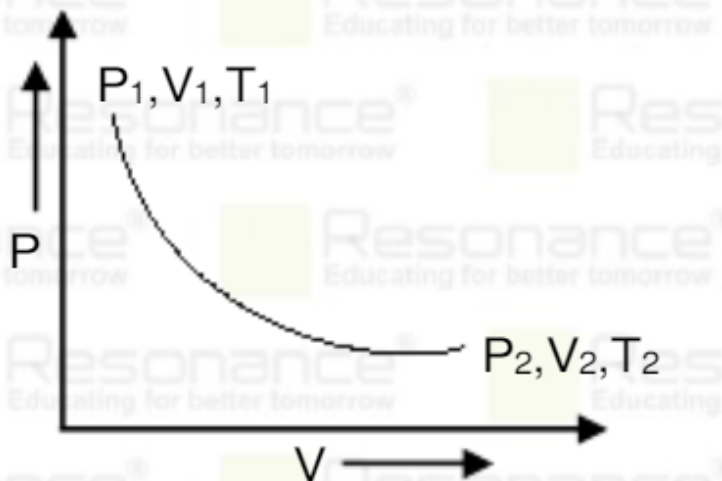
A. $\sqrt{2}$

B. $\dfrac{1}{\sqrt{2}}$

C. 2

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

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106. The correct order of magnetic moment (spin only) of following compound is : (i) $\left[FeF_6\right]^{3-}$

(ii) $\left[Co(CN)_6\right]^{3-}$

(iii) $\left[NiCl_4\right]^{2-}$

(iv) $\left[Cu\left(NH_3\right)_4\right]^{2+}$
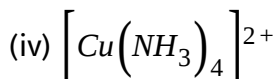
A. (i) < (ii) < (iii) < (iv)

B. (ii) < (iv) < (iii) < (i)

C. (iv) < (iii) < (ii) < (i)

D. (ii) < (iii) < (iv) < (i)

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107. statement 1: dmg is used to detect Ni^{2+}

statement 2 : dmg is bidentate neutral ligand.

A. Both statements are true

B. Both statements are false

C. statement 1 is true but statement 2 is false

D. statement 1 is false but statement 2 is true

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108. Find the order of acidic strength of the following compounds:

(I) phenol (OH on benzene ring)
(II) 4-nitrobenzoic acid (COOH, NO₂)
(III) 4-methylbenzoic acid (COOH, CH₃)
(IV) benzoic acid (COOH)
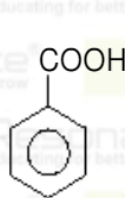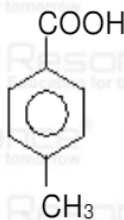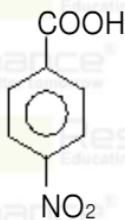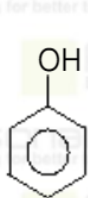
A. $(II) > (IV) > (III) > (I)$

B. $(III) > (I) > (IV) > (II)$

C. $(IV) > (II) > (III) > (I)$

D. $(I) > (III) > (I) > (IV)$

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109. The product of following reaction will be:

A. (1)

B. (2)

C. (3)

D. (4)
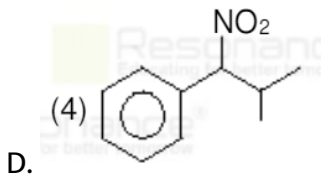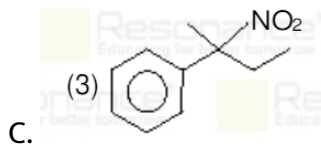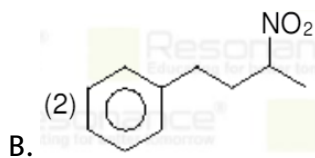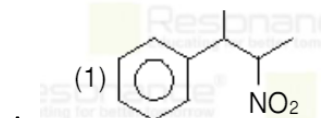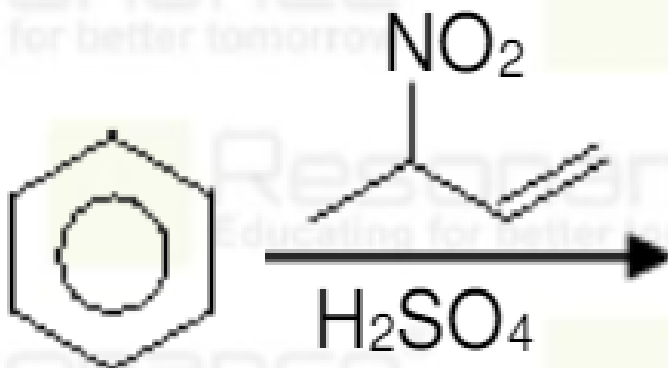
110. In carbylamine test with aniline the product will be:

A.

NC

(1)

B.

CN

(2)

C.

CNO

(3)

(4)

D.
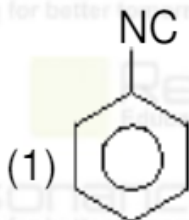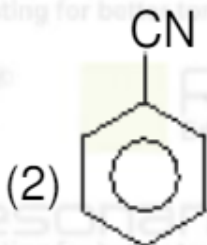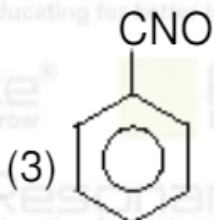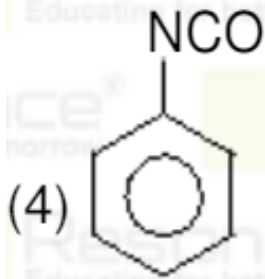
none▶ **Watch Video Solution**

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111. The correct sequence for the following conversion:
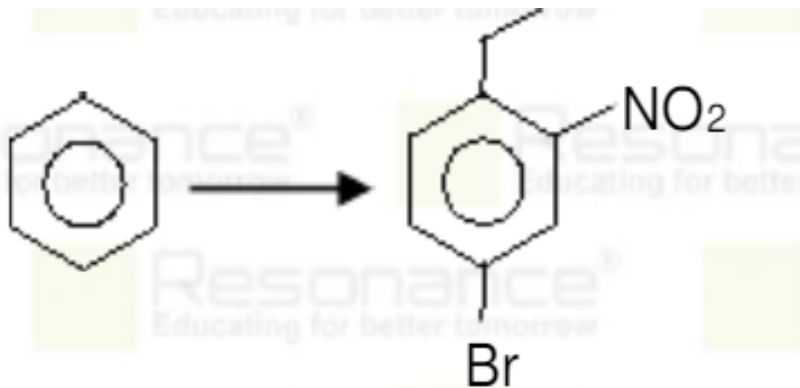
A. HNO_3/H_2SO_4, Br_2/Fe, $C_2H_5Br/FeBr_3$

B. $B\dfrac{r_2}{F}e$, $HN\dfrac{O_3}{H_2}SO_4$, $C_2H_5B\dfrac{r}{F}eBr$

C. $C_2H_5Br/FeBr_3$, Br_2/Fe, HNO_3/H_2SO_4

D. $C_2H_5Br/FeBr_3$, HNO_3/H_2SO_4, $B\dfrac{r_2}{F}e$

112. What is the correct structure of α-isomer of maltose?
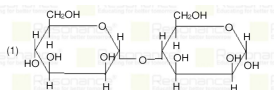
A.
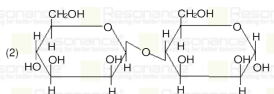
B.
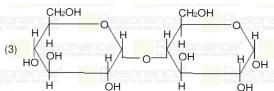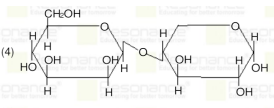
C.

D.

113. The major product of the following reaction is :

$$CH_3-CH_2-CH=CH_2 \xrightarrow[\text{Rh/}\Delta]{\text{H}_2/\text{CO}}$$

A. (1) $CH_3CH_2CH_2CH_2CHO$

B. (2) $CH_3CH_2CHCH_3$
         |
         OH

C. (3) $CH_3CH_2CH_2CHO$

D. (4) $CH_3CH_2\overset{\overset{\displaystyle O}{||}}{C}CH_3$
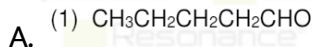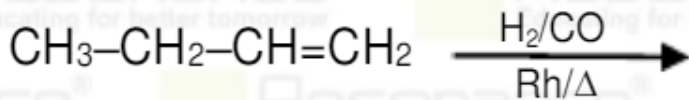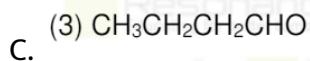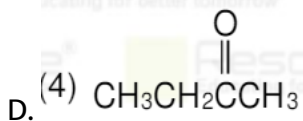
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114. 10ml of oxalic acid is titrated with 3M NaOH till end point. In each experiment colume of NaOH used as

Experiment No.	Volume of NaOH
(i)	1.5 ml
(ii)	1.5 ml
(iii)	1.4 ml
(iv)	1.4 ml
(v)	1.4 ml

Then find molarity of oxalic acid.

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115. 5 mole of an ideal gas is compressed isothermally at 293K by using 5atm external pressure from initial pressure 0.3atm to 0.7atm , find net heat released (in KJ)

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116. Among the following alkali metals how many are used as photoelectrodes?

Li,Na,K,Cs

117. How many of the following contains carboxylic acid group?

Picric acid, salicylic acid, adipic acid, saccharin.

118. Compound A is used as strong oxidising agent,it is amphoteric in nature.t is the part of lead storage batteries.Compound A is

A. PbO_2

B. $PbSO_4$

C. Pb_3O_4

D. PbO
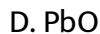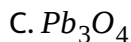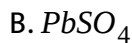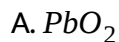
119. Dichromate reacts with base,calculate oxidation number of the product formed

120. Statement-1 O-nitrophenol is steam volatile because of intramolecular hydrogen bonding

Statement-2 It has high melting point because of intramolecular hydrogen bonding.

121. Orbital having 2 radial, 2 angular nodes

A. 5d

B. 4f

C. 3p

D. 4d

122. presence of ozone in troposphere

    A. protect us from UV radiation

    B. protect us from X-rays

    C. protect us from photochemical smog

    D. protect us from green house gas.

123. An amine reacts with benzene sulphonyl chloride to give a precipitate insoluble in alkali. It undergoes ammonolysis possible structure will be:

    A. $CH_3CH_2NH_2$

B. $CH_3CH_2NH - CH_2CH_3$

C. $Ar - NH_2$

D. None

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124. $Phenol + Br_2/CS_2 \rightarrow A$

$Phenol + CHCl_3/NaOH \rightarrow B$

Find A and B

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125. Number of bridging CO ligand $\left[Mn_2(CO)_{10}\right]$
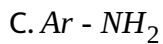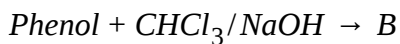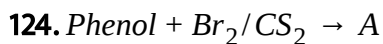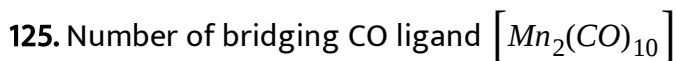
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126. Calculate the minimum temperature required for a reaction to be spontaneous if ΔS = 27J/mol and ΔH = 80KJ/mol

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127. $CH_3 - CH = CHBr \xrightarrow{NaNH_2} Redhotirontube$?

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128. Complete the following reaction
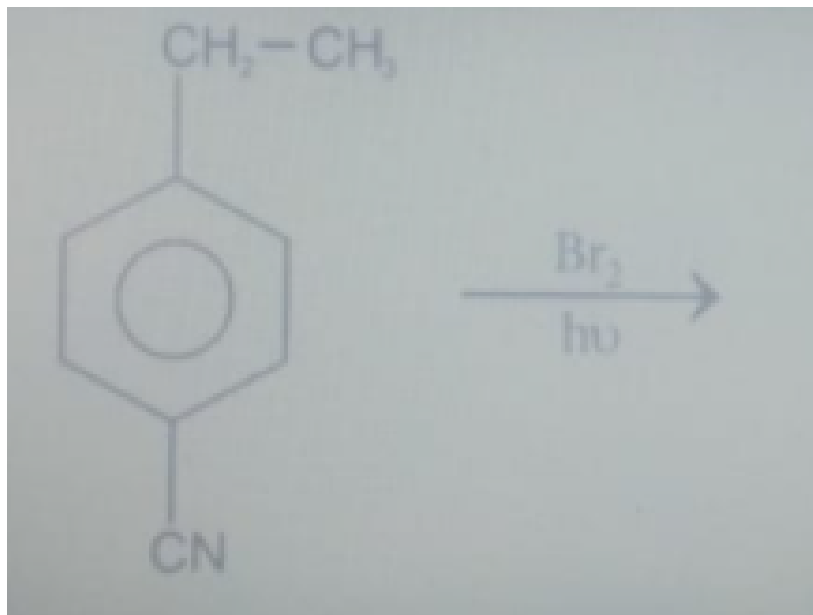
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129. If a reaction $A + B \rightarrow C$ is exothermic to the extent of 30KJ/mol, the forward reaction has an activation energy 70KJ/mol. The activation energy for the reverse reaction is
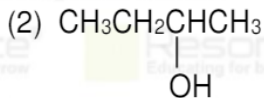
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130. 3.12g of oxygen is adsorbed on 1.2g Pt. What volume of oxygen per gram of adsorbent is adsorbed at 1atm, 300k?

131. How many moles of electron needed in Faraday for reduction of 5 moles of MnO_4^- (in acidic medium)

132. Match the following columns

(i) $1s^2 2s2$	p. 810
(ii) $1s^2 2s^2 2p^4$	q. 899
(iii) $1s^2 2s^2 2p^3$	r. 1300
(iv) $1s^2 2s^2 2p^1$	s. 1490

133. Which of the following is structure of Neoprene?

A.
(1) $\left[CH_2-\underset{\underset{Cl}{|}}{C}=CH-CH_2 \right]_n$

B.
(2) $\left[CH_2-\underset{\underset{CN}{|}}{C}=CH-CH_2 \right]_n$

C.
(3) $\left[CH_2-\underset{\underset{CN}{}}{C}=\underset{\underset{Cl}{|}}{C}-CH_2 \right]_n$

D.
(4) $\left[CH_2-\underset{\underset{CH_3}{|}}{C}=CH-CH_2 \right]_n$
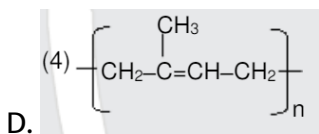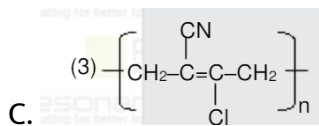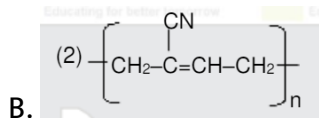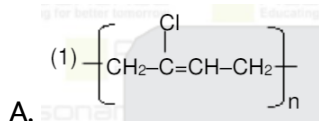
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134. Statement-1 : Dipole-dipole interaction is only non covalent force of interaction for hydrogen bonding.

Statement-2 : F is the most electronegative element and HF has symmetrical hydrogen bonding.

(1) Statement-1 and Statement-2 are true and Statement-2 is correct explanation of Statemnt-1.

(2) Statement-1 and Statement-2 are true but Statement-2 is not correct explanation of Statement-1.

(3) Statement-1 is true and Statement-2 is false.

(4)Statement-1 is false and Statement-2 is false.

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135.
$$A \xrightarrow[\text{373K}]{\text{Hydrolysis}} B$$
$$(C_4H_8Cl_2) \quad (C_4H_8O)$$
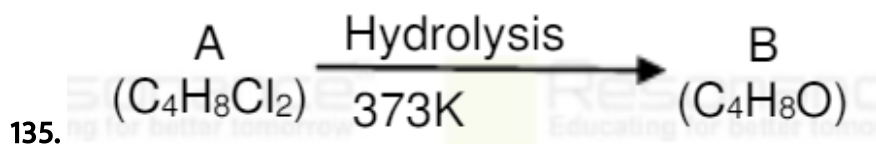
B does not give Tollen's reagent then find out A and B.

A. 1,1-Dichlorobutane, Butanal

B. 2,2-dichlorobutane, 2-butanone

C. 1,1-dichlorobutane, Butanone

D. 2,2-dichlorobutane, Butanal

136. Which vitamin delay blood clotting?

A. Vitamin A

B. Vitamin C

C. Vitamin K

D. Vitamin D

137. Ozone layer protect earth surface from

A. UV radiation

B. X-ray radiation

C. Radio wave

D. Microwave

138. Which of the following Lanthanide does not form MO_2 type oxide.

A. Nd

B. Pr

C. Dy

D. Sm

139. Which of the following statement is false.

(1) Kjeldhal's method is used for estimation of N-element in organic compounds.

(2) Carius method is used for Estimation of N-element.

(3) Carius method is used for estimation of sulphur in organic compounds.

(4)Phosphorous is present in organic compound is oxidized to H_3PO_4 then precipitated by magnesia mixture in form of $Mg_2P_2 - O_7$.

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140. Match the elements which present in column-1 with ore present in column-II

Column-I Element		Column-II Ore	
(a)	Zn	(i)	Cryolite
(b)	Sn	(ii)	Calamine
(c)	B	(iii)	Cassiterite
(d)	F	(iv)	Kernite

A. a-ii,b-iii,c-iv,d-i

B. a-i,b-ii,c-iii,d-iv

C. a-iii,b-ii,c-iv,d-i

D. a-ii,b-iii,c-i,d-iv

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141. A compound on treatment with dil.H_2SO_4 , evolve gas [X]. Gas [X] turns filter paper dipped in acidified $K_2Cr_2O_7$ from orange to green, due to formation of [Y]. select correct option:

A. [X] = SO_2 , [Y] = Cr_2O_3

B. [X] = SO_3 , [Y] = $Cr_2(SO_4)_3$

C. [X] = SO_2 , [Y] = $Cr_2(SO_4)_3$

D. [X] = SO_3 , [Y] = Cr_2O_3

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142. Identify correct statement regarding heavy water

(a)It can be prepared by exhaustive electrolysis of water.

(b) Boiling point of heavy water is more than H_2O.

(c)Viscosity of water is greater than heavy water.

(d)Chemical reaction of heavy water are faster than those of water.

   A. a,b,c,d

   B. a,b

   C. a,d

   D. only b

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143. (i) $NH_3 + CO_2 + A \rightarrow \left(NH_4\right)_2 CO_3$

(ii) $NH_4HCO_3 + B \xrightarrow{30\,°C} NaHCO_3 + NH_4Cl$

(iii) $NaHCO_3 \xrightarrow{150\,^\circ C} C + CO_2 + H_2O$
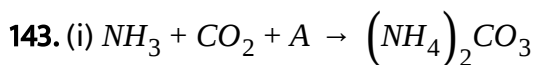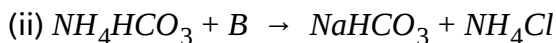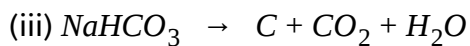
Using above chemical reaction identify the correct set of A,B,C

A. H_2O, $NaCl$, Na_2CO_3

B. H_2O, O_2, Na_2CO_3

C. H_2O, CO_2, $NaHCO_3$

D. $NaOH$, $NaCl$, Na_2CO_3
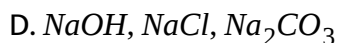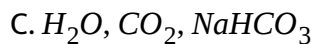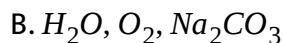
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144. How many significant figures are present in 50002.080×10^{-3} ?

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145. 224ml SO_2 at NTP react with 100ml, 0.1M NaOH and give non volatile product, which is dissolve in 36g of water, then vapour pressure of

solution is $[X] \times 10^{-2}$ then value of X is

[Given $P^\circ - \left(H_2O\right) = 24 mmofHgat25\,^\circ C]$

146. For a real gas following vander waal equation is obtained

$P\left(V_m - b\right) = RT$ and ((deltaZ)/(deltaP))_T = (xb)/(RT)`. Then find value of X

147. 1 mole AB_2(g) is initially present in 25L container at 300K and following equilibrium take place.

$AB_2(g) \leftrightarrow A(g) + 2B(g)$ at equilibrium pressure 1.9atm and K_p of this reaction is $X \times 10^{-1}$, then X is:

148. Find total number of possible stereoisomers of $\left[Co(OX)_2Br\left(NH_3\right)\right]$

149. Identify the correct order of electeon gain enthalpy of O,S,Se,Te.

A. $S > Se > Te > O$

B. $O > S > Se > Te$

C. $Te > Se > S > O$

D. $Se > S > O > Te$

150. What is the correct order of Hybridisation of each carbon atom of following molecule?

$CH_2 = C = CH - CH_3$
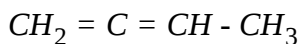
A. sp^2, sp, sp^2, sp^3

B. sp, sp^2, sp^2, sp

C. sp^3, sp, sp^2, sp^2

D. sp^2, sp, sp^3, sp

151. Find average bond energy of S-F in SF_6 (in KJ/mole) using following data

$\Delta H_f^° \left(SF_6(g) \right)$ = -1100Kj/mole, $\Delta H_f^° (S(g))$ = 285Kj/mole, $\Delta H_f^° (F(g))$ = 80Kj/mole

152. Which will emit low energy β^- ?

A. $._1H^2$

B. $._1H^1$

C. $._1H^3$

D. H^+

---

153. $Zn(s)\big|Zn^{2+}(aq)(0.1M)\big|\big|Ag^+(aq)(0.01)\big|Ag(s)$
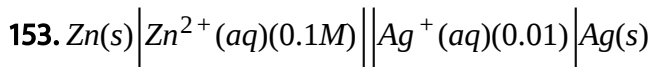
Given $E^\circ_{Zn^{2+}/Zn} = -0.76$, $E^\circ_{Ag^+/Ag} = 0.80V$

Determine E_{cell}, if your answer is $X \times 10^{-2}V$ then determine value of X..

---

154. Determine mass of $NaNO_3$ (g) in 50ml solution in which Na^+ conc is 70 mg/ml.

155. Match the column

	Column-I		Column-II
(a)	NaOH	(i)	Solvay's process
(b)	Na_2CO_3	(ii)	Castner Kellner process
(c)	Ti	(iii)	Van arkel process
(d)	Cl_2	(iv)	Deacon's process

A. a-ii,b-i,c-iii,d-iv

B. a-i,b-ii,c-iii,d-iv

C. a-i,b-ii,c-iv,d-iii

D. a-iv,b-ii,c-iii,d-i

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156. When $FeCl_3$ dissolve in hot water, a colloidal solution is formed, change develop on sol particle is:

A. Positive charge

B. negative charge

C. Some time positive & some time negative charge

D. Neutral

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157. When thiosulphate react with $KMno_4$ in weakly basic medium, then product obtained is A. Find the oxidation state of sulphur in product A.

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158. Match the column

	Column-I		Column-II
(a)	Siderite	(i)	Fe
(b)	Calamine	(ii)	Cu
(c)	Cryolite	(iii)	Al
(d)	Malachite	(iv)	Zn

A. a-ii,b-i,c-iii,d-iv

B. a-i,b-ii,c-iii,d-iv

C. a-i,b-ii,c-iv,d-iii

D. a-i,b-iv,c-iii,d-ii

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159. Identify the correct combination of acidic oxides.

A. Na_2O, BaO

B. CaO, SiO_2

C. B_2O_3, SiO_2

D. B_2O_3,CaO`

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160. Match the column

	Column-I (Molecule)		Column-II (Bond Order)
(a)	Ne₂	(i)	1
(b)	N₂	(ii)	2
(c)	F₂	(iii)	0
(d)	O₂	(iv)	3

A. a-ii,b-i,c-iii,d-iv

B. a-iii,b-iv,c-i,d-ii

C. a-i,b-ii,c-iv,d-iii

D. a-i,b-iv,c-iii,d-ii

161. Which of the following statement is not true about calgon?

A. It do not form ppt with Ca^2+

B. It is also known as Graham's salt

C. Calgon contain metal which is 2nd most adundant in the earth crust

D. Calgon is polymeric and water soluble

162. Statement 1: TlI_3 is isomorphous with CsI_3 & oxidation number of Tl

= +1

Statement -2: Tl has 14f electron.

A. Statement 1 and Statement 2 are true & Statement 2 is correct

explanation of Statement 1

B. Statement 1 and Statement 2 are true & Statement 2 is not correct

explanation of Statement 1

C. Statement 1 is true and Statement 2 is false

D. Statement 1 is false and Statement 2 is true

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163. What is the major product of the given reaction?

OH

$$\xrightarrow{SOCl_2} \text{A (Major product)}$$

OH CH₂OH

(1)

A.

OH CH₂–Cl

CI

(2)

B.

CI CH₂–Cl

OH

(3)

C.

CI CH₂–Cl

CI

(4)

D.
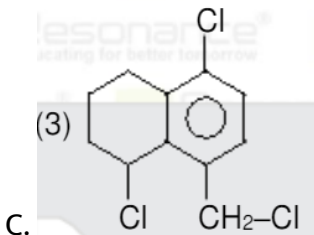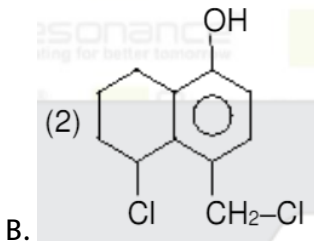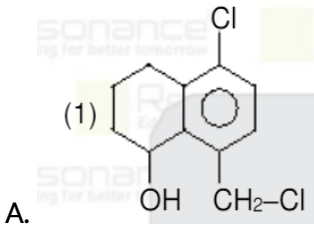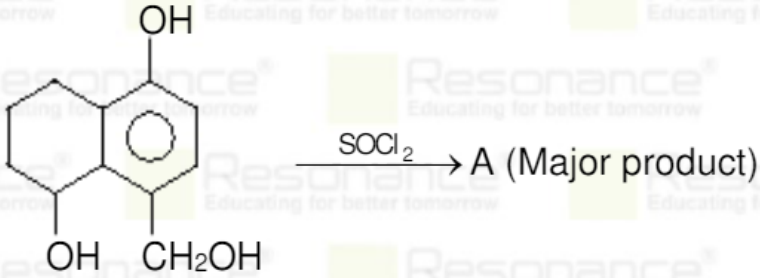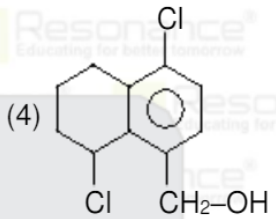
164. 2-4DNP test is used for-

A. Aldehyde

B. Alcohol

C. Aniline

D. Carboxylic acid

165. Complete the following reaction

$$\xrightarrow[\text{(2) } Cr_2O_3, 773 \text{ K}]{\text{(1) } Zn/Hg/HCl}} \text{Product is} -$$

A.

(2)

B.

(3)

C.

(4)

D.
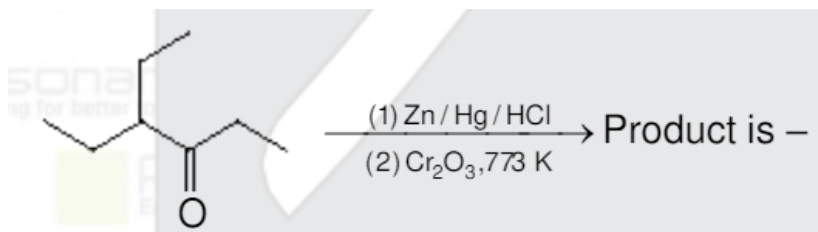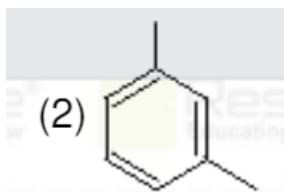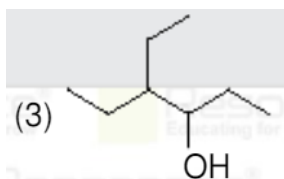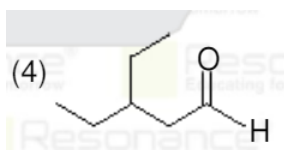
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166. Match the following columns

Column–I Disaccharide	Column–II Monomeric unit
(i) Sucrose	(P) α-D-Glucose + α-D-Glucose
(ii) Maltose	(Q) α-D-Glucose + β-D-Fructose
(iii) Lactose	(R) β-D-Galactose + β-D-Glucose

A. i-Q,ii-P,iii-R

B. i-R,ii-Q,iii-P

C. i-Q,ii-R,iii-P

D. i-P,ii-Q,iii-R

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167. Match the following columns

Column–I	Column–II

(P) Wurtz reaction

(1) $\overset{+}{N_2}Cl^-$ on benzene ring $\xrightarrow{Cu/HCl}$ Cl on benzene ring

(Q) Gattermann reaction

(2) $R-X \xrightarrow[ether]{Na} R-R$

(R) Fittig reaction

(3) $\overset{+}{N_2}Cl^-$ on benzene ring $\xrightarrow{CuCl/HCl}$ Cl on benzene ring

(S) Sandmeyer's reaction

(4) benzene–$X \xrightarrow[ether]{Na}$ biphenyl
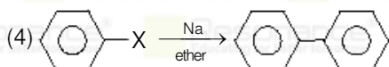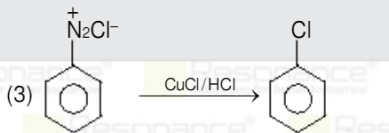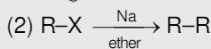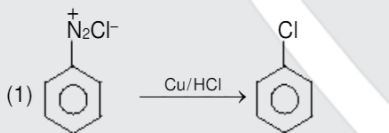
A. P-2,Q-1,R-4,S-3

B. P-3,Q-4,R-1,S-2

C. P-1,Q-4,R-3,S-2

D. P-2,Q-4,R-3,S-1

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168. A- N,N-Dimethyl aniline

B-N-Methyl aniline

C-Benzenamine

D-Phenylmethanamine

Correct order of basic strength is:

A. $D > C > B > A$

B. $D > A > B > C$

C. $A > D > B > C$

D. $A > B > C > D$

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169. Seliwanoff's test and Xanthoprotetic test are respectively used for the identification of:

A. Proteins, Ketose

B. Ketose,Proteins

C. Aldose,Ketose

D. Ketose,Aldose

170. Complete the following reaction

$$\text{ArCHO} \xrightarrow[\substack{(2)CH_3CH_2Br,DMF \\ (3)HI,Heat}]{(1)HCHO,NaOH} \text{Product}$$

(structure with CHO group at top, OCH₃ at bottom of benzene ring)

A.

(1) (structure with CH₂–I group at top, OH at bottom of benzene ring)

(2)

CH_2-OH attached to benzene ring with OH (para)

B.

(3)

CH_2-I attached to benzene ring with OCH_3 (para)

C.

(4)

CH_2-CH_2I attached to benzene ring with OCH_3 (para)

D.
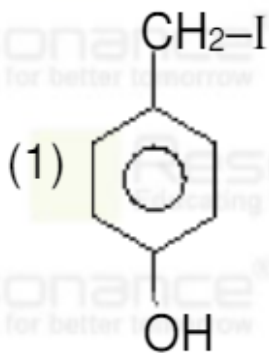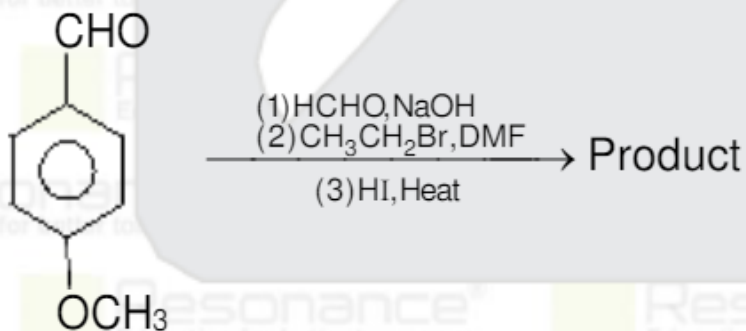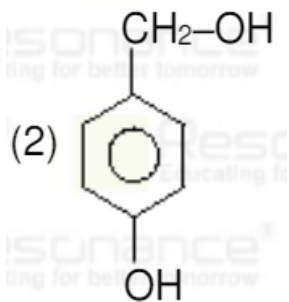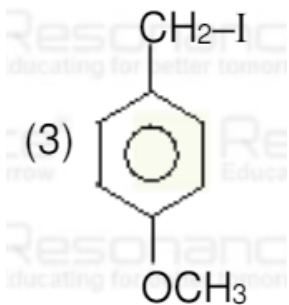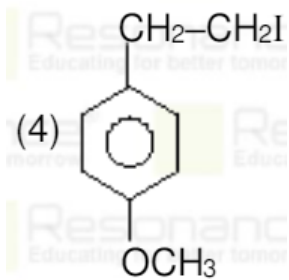
171. Complete the following reaction

$$\xrightarrow[\Delta]{EtO^- / EtOH} \text{Product is :}$$

A. (1)

B. (2)

C. (3)

D. (4)
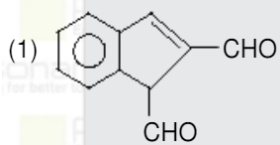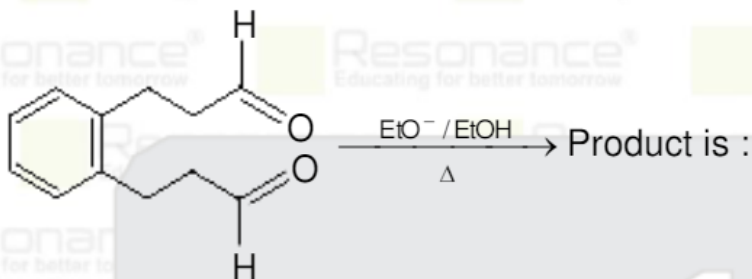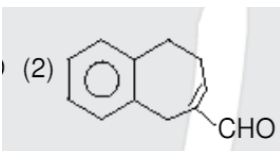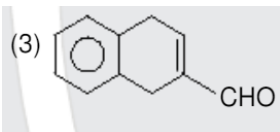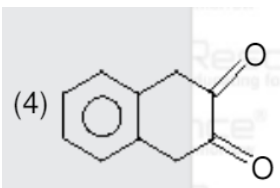
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172. Which of the following give positive test with ceric ammonium nitrate and $CHCl_3 + KOH$ respectively.

    A. Amine & phenol

    B. Phenol & amine

    C. Alcohol & amine

    D. Amine & alcohol

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173. Given a 10g mass particle with velocity 90m/sec. Given uncertainty in velocity is 5% then determine uncertainty in momentum of particle. If your answer is $X \times 10^{-33}$ kgm/sec, then determine value of x

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174. Find pH of 0.1M

Find pH of 0.1 M $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - COONH_4$ solution.

Given $pK_b(NH_3) = 4.75$ & pK_a $\left(CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - COOH \right) = 5.23$

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175. What is the ratio of octahedral voids & number of lattice points in a FCC cyrstal structure?

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176. 12.2g of benzoic acid in 100 g water decreases freezing point upto $-0.93\,^{\circ}C$

K_f = 1.86KKG/mole. if there is 100% polymerisation, the number of molecules of benzoic acid in associated state is

177. Fraction of molecules crossing activation energy barrier $=e^{-X}$

Determine x

$[E_a$ =80.3Kj/mol, T=700K,R=8.314J/moleK]

178. $2MnO_4^{-} + aC_2O_4^{2-} + cH^{+} \rightarrow dCO_2 + eH_2O + fMn^{2+}$.

Find c ?

179. Identify (A and X)

Aniline + $HNO_2 \xrightarrow{0 \rightarrow 5°} A \xrightarrow{X}$ Phenol

180. Total volume of container is V, 16g O_2, 44g CO_2, 28gN_2. Find pressure.

A. 3RT/V

B. 5RT/(2V)

C. 3RT/(2V)

D. NONE

181. Which hydride of group 15 has most reducing power.

A. Bi

B. P

C. Sb

D. As

182. Ozone is responsible for

    A. Global warming

    B. Acid rain

    C. Oxidizing smog

    D. Reducing smog

183. Anti-Histamines are

    A. Antacid & Anti-allergic

    B. Antacid & Analgesic

    C. Anti-depressant & Antacid

D. Anti-pyretic & Analgesic

184. Which of the vitamins are stored in the body

A. Thymine & Ascorbic acid

B. Vit A & Vit D

C. Vit A & Thymine

D. Vit D & Ascorbic acid

185. Sulphur can be remove from ore by

A. Roasting

B. Smelting

C. Calcination

D. none

186. Name of Vitamin B_{12}

A. Cyanocobalamin

B. Niacin

C. Riboflavin

D. Thiamine

187. Heat and Work are

   A. Path function

   B. State function

   C. Intensive property

   D. None of these

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188. What is the order of stability of Hydrides of group 16 elements

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189. 6.5molal solution KOH, d = 1.89 g/cm^3, M =?

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190. For BCC unit cell the edge length is $27A°$. Find the edge length of the same unit cell in FCC arrangement.

191. S_1: Bond angle of H_2O is 104.5 °.

S_2: In H_2O the lone pair- lone pair repulsion overcomes the bond pair-bond pair repulsion

A. Both S_1&S_2 are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both S_1&S_2 are wrong

192. Match the column

Acids	Oxidation States
Hypophosphorous acid	5
Orthophosphoric acid	4
Hypophosphoric acid	3
Orthophosphorus acid	1

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193. Match the column

a. Haber's process	(i) H_2SO_4 synthesis
b. Contact process	(ii) NH_3 synthesis
c. Ostwald's process	(iii) Al_2O_3 synthesis
d. Bayer's process	(iv) HNO_3 synthesis

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194. Which of the following are aromatic?

$$I \qquad\qquad II \qquad\qquad III \qquad\qquad IV$$
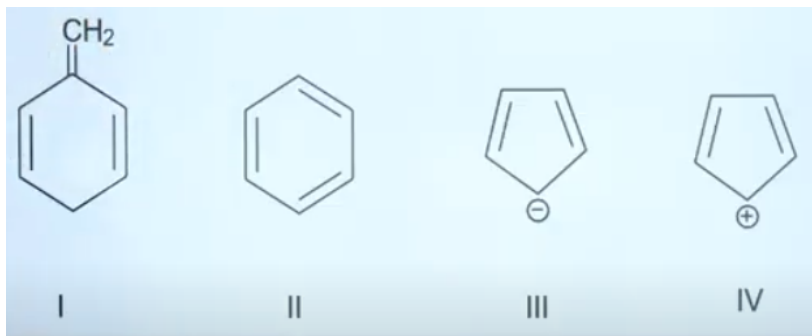
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195. $\lambda_1, \lambda_2, \lambda_3$ are the first 3 lines of balmer series. Find λ_1/λ_3

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196. Aspirin is also known as

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197. S_1: H_2O_2 can act as both oxidising agent and reducing agent in basic medium.

S_2 : In hydrogen econimy energy is transferres in the form of H_2

   A. Both S_1&S_2 are correct

   B. S_1 is correct & S_2 is wrong

   C. S_2 is correct & S_1 is wrong

   D. Both S_1&S_2 are wrong

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198. S_1 : enol form of acetone $<$ 0.1% and enol form of acetylacetone is 15%.

S_2 enol form of acetyl acetone is stabilized by intramolecular H-Bonding which is not possible in acetone enol form.

   A. Both S_1&S_2 are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both S_1&S_2 are wrong

199. $S_1 : Ce^{4+} / Ce^{3+} = 1.74V$

$S_2: Ce^{4+}$ is more stable then Ce^{3+}

A. Both S_1&S_2 are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both S_1&S_2 are wrong

200. S_1: $CaCl_2.6H_2O$ & $MgCl_2.8H_2O$ dehydrate on heating.

S_2 BeO is amphoteric and other oxides are acidic in nature.

A. Both S_1 & S_2 are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both S_1 & S_2 are wrong

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201. Type of pollution during day in presence of O_3

A. Acid rain

B. Global warming

C. Reducing smog

D. Oxidising smog

Answer: D

202. Which of the following is Lindlar's catalyst?

A. Pd/H_2

B. $H_2, Pd/BaSO_4$

C. $H_2/Pd/C$

D. $H_2/Pd/KNO_3$

203. The major products of the given reactions are:

H3PO4/heat ← (cyclohexane ring with Cl and isopropyl-type substituent) → t-BuOk
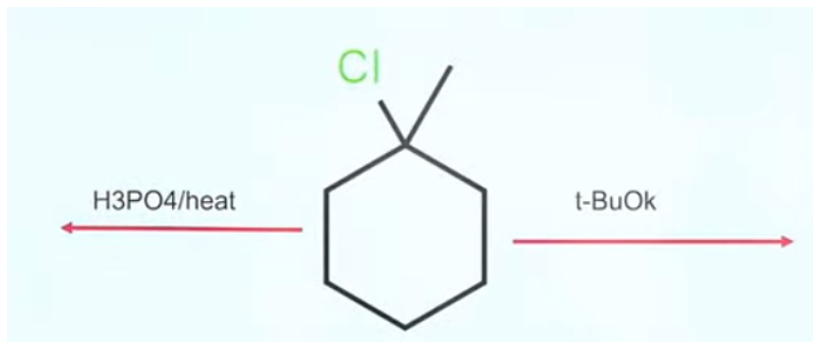
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204. The chromatography does not depend upon

A. Length of column

B. Solubility of compound

C. Physical state

D. Flow rate of the solvent

Answer: A

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205. S_1: Size of Np^{3+} is greater than Bk^{3+}.

S_2: It is due to lanthanide contraction.

A. Both $S_1 \& S_2$ are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both $S_1 \& S_2$ are wrong

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206. Complete the following reaction

Major product is :

$$\xrightarrow[-78°C/H_3O^+]{DIBAL-H} \text{Product is}$$

A.
(1)

B.
(2)

C.
(3)

D.
(4)
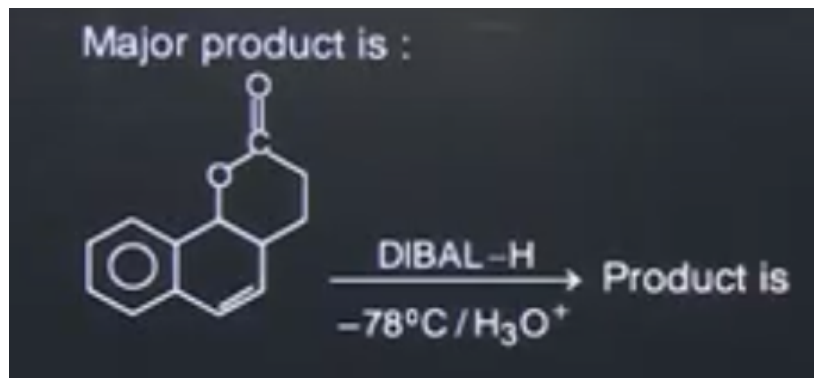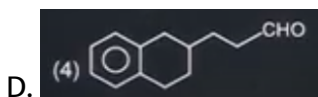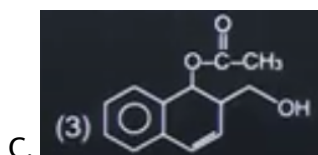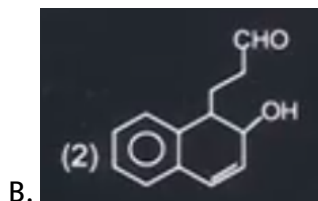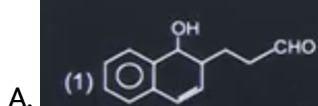
Answer: A

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207. Which of the following will not show Hoffmann bromide reaction?

A.
(1)   (1) Br$_2$ +NaOH/Δ
       (2) NH$_3$

B.
(2)   (1) NH$_3$
       (2) Br$_2$ +NaOH/Δ

C.

D.
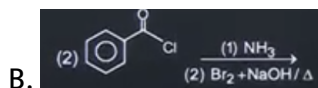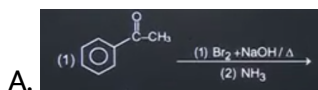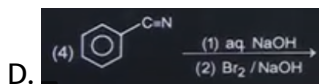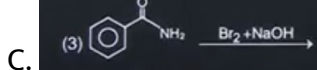
Answer: A

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208. Value of n= 5 & value of m_l = +2 . Find the number of orbitals.

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209. Ammonolysis of alkyl halide include adding NaOH to form amines.

What is role of NaOH?

A. To increase reactivity of alkyl halide

B. to remove acidic impurities

C. to prepare NH_3 for reaction

D. none

Answer: B

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210. The volume of 1M NaOh required for complete neutralisation of 100ml of 1M of H_3PO_3 & 100ml of 2M H_3PO_2

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211. If half life of an radioactive element is 20min. Find the time interval of 33% decay and 67%

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212. Which of the following is used for laminating wood

A. Melamine formaldehyde resin

B. Cis isoprene

C. Urea-formaldehyde

D. Phenol formaldehyde

Answer: C

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213. identify the reagent
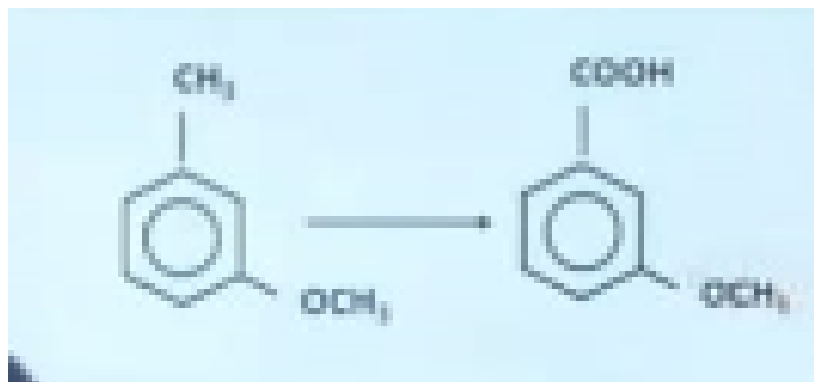
A. $LiAlH_4$

B. $H^+ / KMnO_4$

C. $NaBH_4$

D. None of these

214. Secondary protein is stable by

A. Hydrogen bonding

B. peptide link

C. Glycosidic linkage

D. None of these

Answer: A

215. Which halogen cannot form $FeX_3 \& FeX_2$

A. I

B. Br

C. F

D. Cl

Answer: A

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216. Atomic no. of X,Y &Z are 33,53 &83 respectively.

A. X & Z are non-metal & Y is metal

B. X ia metalloid, Y is non-metal & Z is metal

C. X & Z are metals , Y is non-metal

D. None of these

Answer: B

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217. Which of the following is not reduced by coke

A. ZnO

B. Al_2O_3

C. Fe_2O_3

D. Cu_2O

218. Which of the following is not a greenhouse gas

A. CO_2

B. O_2

C. CH_4

D. Water vapour

Answer: B

219. Complete the following reaction

A.

B.

C.

D.
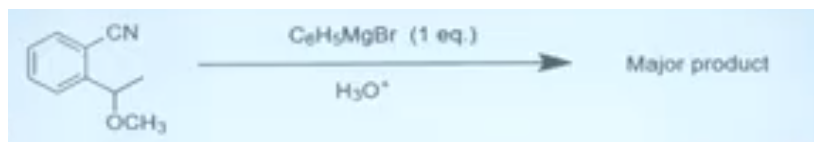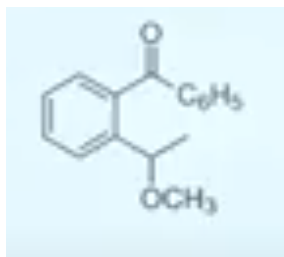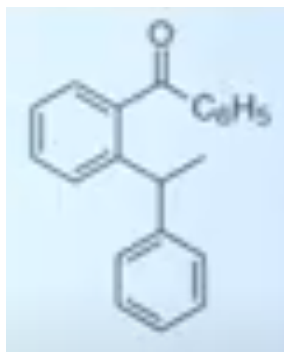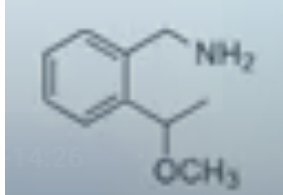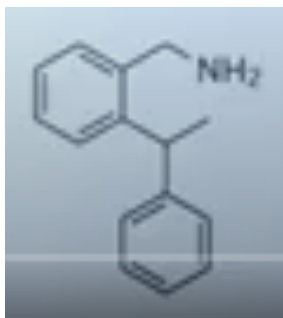
220. The constituents of greenhouse gases:

i - CO_2

ii- H_2O

iii- CH_4

iv O_3

    A. only i

B. i &ii

C. i,ii,iii

D. all of these

221. S_1: Sodium hydride can be used as an oxidizing agent

S_2: Pyridine is base because of lone pair

A. Both S_1&S_2 are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both S_1&S_2 are wrong

222. Half life of A is 54 min & half life of B is 18 min. Find the time when concentration of A = 16B

223. Which of the following is incorrect statement regarding H_2O_2?

A. O-O bond present

B. it is used as both oxidising agent & reducing agent

C. it is used in effluents

D. both hydroxyl groups are present in the same plane

224. Find the number of moles of $PbSO_4$ formed in the reaction

$$Pb(NO_3)_2 + Cr_2(SO_4)_7 \rightarrow PbSO_4$$

$Pb(NO_3)_2 = 35ml, 0.15M$

$Pb(SO_4)_7 = 20ml, 0.12M$
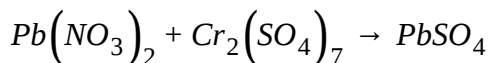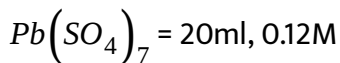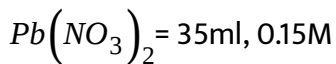
225. A conductivity cell of cell constant $1.3cm^{-1}$ is filled with a electrolytic solution of 0.52M and have resistance $50ohm$ then find molar conductance of solution.

226.   Complete   the   following   reaction

$\xrightarrow[\text{(2) H}_3O^{\oplus}]{\text{(1) PhMgBr (1 eq.)}}$ Product is

A.

(1)

OH
Ph
OCH$_3$

B.

(2)

O
Ph
OCH$_3$

C.

(3)

CN
Ph

D.

(4)

O
O—Ph
OCH$_3$
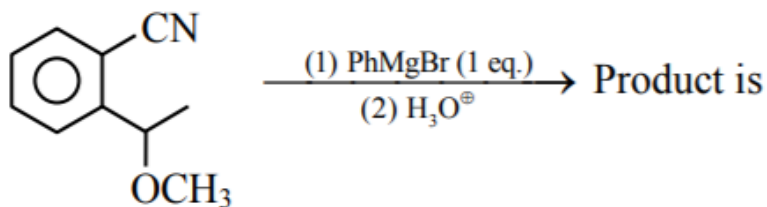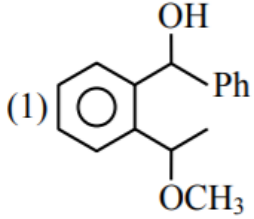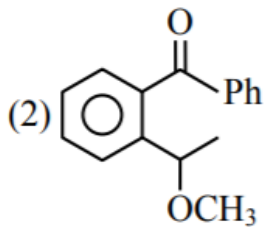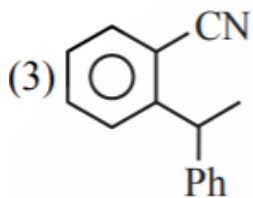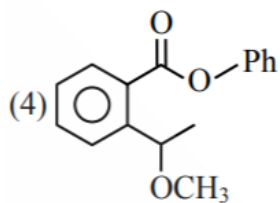
227. Which of the following reagent is used for given conversion?
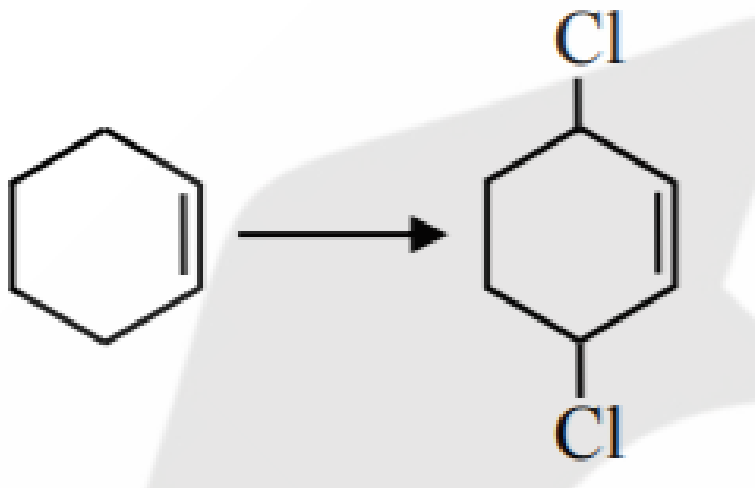
A. Anhydrous $AlCl_3/Cl_2(dark)$

B. HCl + $ZnCl_2$

C. $Cl_2/h\nu$

D. Cl_2/Cl_4

228. Match the column

Match the column

(A) CuO	(I) Halogen
(B) AgNO$_3$	(II) Sulphur
(C) Lassaigne	(III) Carbon
(D) Black ppt with (CH$_3$COO)$_2$Pb	(IV) Nitrogen

A. A-III,B-I,C-IV,D-II

B. A-IV,B-III,C-II,D-I

C. A-III,B-I,C-II,D-IV

D. A-IV,B-I,C-III,D-II

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229. Which of the following is least basic among the following compounds?

A. Et_3N

B. $(ET)_2NH$

C. $\left(CH_3CO\right)_2NH$

D. $CH_3 - CO - NH - Et$
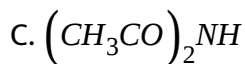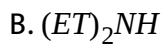
230. Vapour pressure of pure liquid A & B are 21 & 18 mm of Hg respectively. Determine vapour pressure of a solution obeying Raoult's law containing 1 mole of A& 2mole of B

231. Two elements A & B have following ionisation energy data:

	IE_1	IE_2
A	400	4000 (in kJ/mol)
B	700	1400 (in kJ/mol)

A & B are respectively :

A. Na,Mg

B. Mg,Na

C. Na,F

D. Mg,F

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232. Arrange the following compounds (assuming to be high spin) in increasing order of spin magnetic moment:

A. $\left(NH_4\right)_2\left[Ce\left(NO_3\right)_6\right] < Eu\left(NO_3\right)_3 < Gd\left(NO_3\right)_3$

B. $\left(NH_4\right)_2\left[Ce\left(NO_3\right)_6\right] < Gd\left(NO_3\right)_3 < Eu\left(NO_3\right)_3$

C. $Eu\left(NO_3\right)_3 < Gd\left(NO_3\right)_3 < \left(NH_4\right)_2\left[Ce\left(NO_3\right)_6\right]$

D. $Gd\left(NO_3\right)_3 < \left(NH_4\right)_2\left[Ce\left(NO_3\right)_6\right] < Eu\left(NO_3\right)_3$
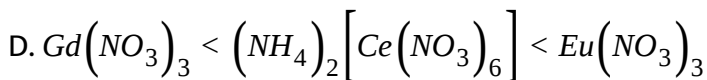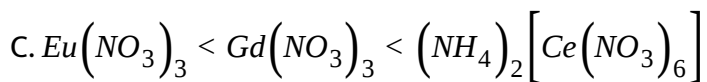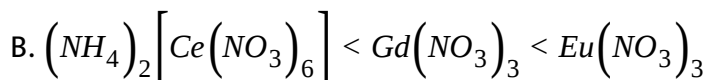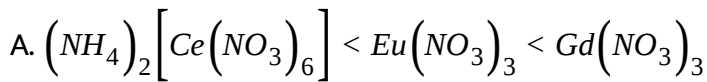
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233. Gallium crystallises in HCP lattice. If the total number of voids in 0.581g of gallium is $X \times 10^{21}$ then determine X.

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234. Which of the following is incorrect?

A. $Al^{3+} > Na^+$ flocculation power

B. Colloids show Nrownian motion

C. Colloids show colligative property

D. Colloidal solution can not pass through ordinary filter paper

235. Incorrect statement regarding C_{60} is:

A. It has 24 6-membered rings & 12 5-membered rings

B. It has 5-membered rings only attached to 6-membered rings

C. It has 6-membered rings attached to both 5 & 6-membered rings

D. Each Carbon is attached to 3 C-atoms

236. Determine pH of 0.558M H_2SO_3 solution given K_{a1} = 1.7x10^{-2} , K_(a2)

= 10^(-8)

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237. Iron react with HCl at $25\,^\circ C$ & 1 bar pressure & give $FeCl_2$ & $H_2(g)$, then find magnitude of work done (in KJ) in this process at 1 bar constant pressure

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238. Number of radial nodes if n = 4 and m = -3

A. 0

B. 1

C. 2

D. 3

239. Which one is aromatic?

A. (a)

B. (b)

C. (c)

D. (d)
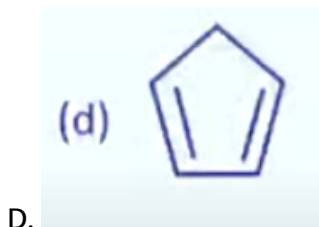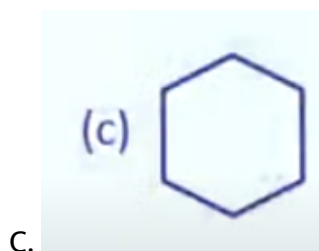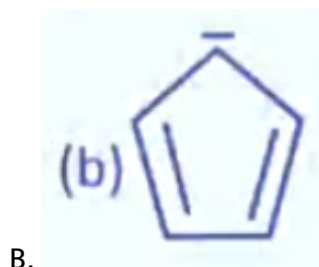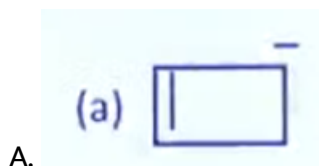
240. Complete the following reaction

CH =CH$_2$

$\xrightarrow[\text{CCl}_4]{\text{HBr}}$

CH$_3$

A.

(a)

Br

CH$_3$

B.

(b)

C$_2$H$_5$

Br

CH$_3$

C.

(c)

Br

CH$_3$

D. (d)
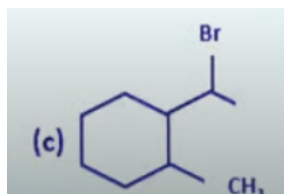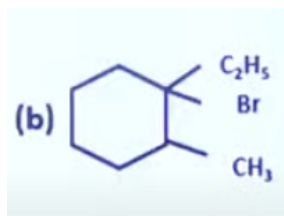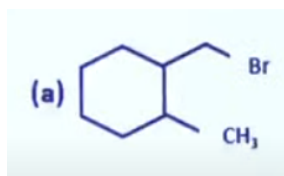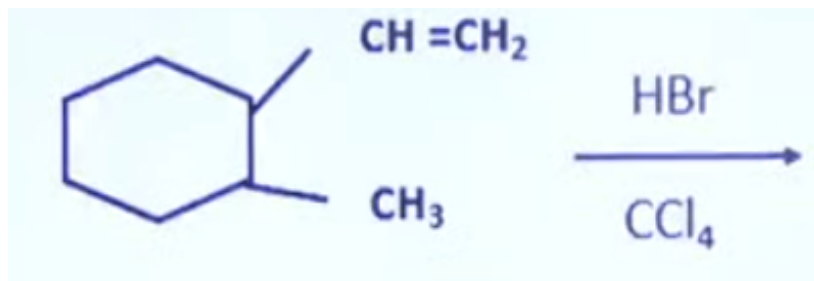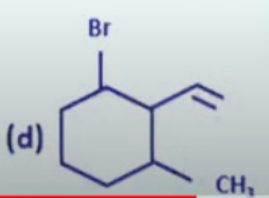
241. Benzene chloride reacts with NaOH give phenoxide ion. What is the temperature and pressure of this reaction.

242.
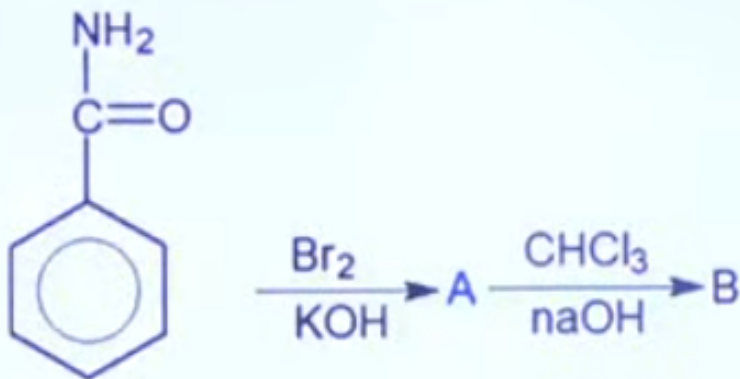
Identify B?

243. Which of the following statement is false for heavy water?

A It is a byproduct in some fertilizer industries.

B it is used in exchange reactions for the study of reaction mechanism

C Ita dielectric constant is higher than H_2O

D It is used as a moderator in nuclear reactor.

A. A,B,C

B. A,B,C,D

C. C ONLY

D. A,B

Answer: C

244.   Complete   the   following   reaction

$$CH_3 - \overset{\overset{O}{\|}}{C} - CH_2 - \overset{\overset{O}{\|}}{C} - OC_2H_5 + \underset{OH}{CH} - \underset{OH}{CH} \xrightarrow{H^+}$$
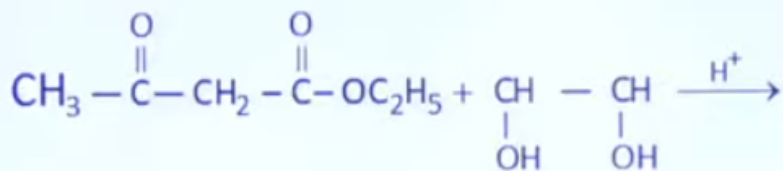
245. A divalent cation having atomic no. 25 . calculate the spin only magnetic moment.

246. Colloidal of gas in solid

   A. Aerosol

   B. Emulsion

   C. Solid Sol

   D. None of the above

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247. For a first order reaction, 32% reaction left after 570sec. Find K in [Kx 10^{-3}]

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248. Order of conductivity of Li^+, Na^+, K^+, Rb^+, Cs^+ in aqueous medium

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249. What is shape of atom having 3 single bond and 2 lone pair

250. Which is the correct order of elecron enthalpy of halogens

A. $F > Cl > Br > I$

B. $Cl > F > Br > I$

C. $Br > F > Cl > I$

D. $Cl > Br > F > I$

251. If an electron is moving in nth orbit of H-atom, then its velocity is-

A. $V \propto \dfrac{1}{n^2}$

B. $V \propto \dfrac{1}{n}$

C. $V \propto n$

D. $V \propto n^2$

252. IUPAC name of mesityl oxide

253. Which of the following is not a Lewis base

A. NF_3

B. PCl_5

C. SF_4

D. ClF_3
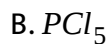
254. Two non-reacting gases CH_4 of mass 6.4g and CO_2 of mass 8.8g is mixed in a vessel of volume 10litre at $27\,^{\circ}C$. the pressure in KPa is?

255. S_1: Potassium permanganate decomposes to give potassium manganate at 500k.

S_2: Both permanganate and manganate are tetrahedral and paramagnetic.

    A. Both S_1&S_2 are correct

    B. S_1 is correct & S_2 is wrong

    C. S_2 is correct & S_1 is wrong

    D. Both S_1&S_2 are wrong

256. $\Delta H_f of Al_2O_3$ = -1290 kj/mol

$\Delta H_f of CaO$ = -675KJ/mol

$3CaO + 2Al \rightarrow Al_2O_3 + 2Ca$
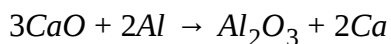
Calculate ΔH_f for this reaction.

257. Composition of reducing smog:

A. SO_2, Smoke,Fog

B. $CH_2 = CH - CHO$, Smoke,fog

C. N_2O_3,Smoke,fog

D. O_3,smoke,fog

258. HA is a weak acid . No. of moles = 0.001, K_a = 2x10^{-6}, HCl is added with molarity 0.01 and the solution is made 1 litre. calculate degree of dissociation of HA

259. Find mole fraction of solute in aqueous solution with the molality 100 mol/Kg.

260. Which energy level of C^{5+} ion will have the same energy as that of ground state of hydrogen atom?

261. Structure of tyrosine

262. A polyatomic gas has 24 vibrational degree of freedom then find the value of C_p/C_v

263. When white phosphorous react with NaOH a gas is produced which is pass through $AgNO_3$ solution.Then how many mole of $AgNO_3$ react with per mole of gas?

264. In Ellingham diagram, at the point of intersection and when slope of graph suddenly increases

A. $\Delta G = 0$ & melting point of metal

B. $\Delta G < 0$ & boiling point of metal

C. $\Delta G = 0$ & boiling point of metal

D. Boiling point & melting point of metal

265. Which of the following is correct?

A. Competitaitve inhibitors binds active site

B. Competitaitve inhibitors binds allosteric site

C. Competitaitve inhibitors change the shape of active site

D. Competitaitve inhibitors bind with enzyme

266. Which of the following reaction is ammonolysis reaction?

A. (1) $R-C\equiv N \xrightarrow{[H]} R-CH_2-NH_2$

B. (2) $R-CH_2-Cl \xrightarrow{\overset{..}{N}H_3} R-CH_2-NH_2$

C. (3) $R-\underset{\underset{O}{\|}}{C}-Cl \xrightarrow{NH_3} R-\underset{\underset{O}{\|}}{C}-NH_2$
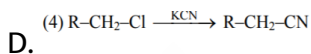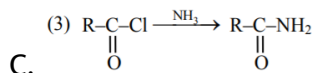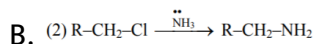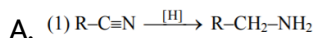
D. (4) $R-CH_2-Cl \xrightarrow{KCN} R-CH_2-CN$

267. S_1: R_f Can be measured in the form of metre/centimetre..

S_2: R_f of a compound is same for all solvents

A. Both $S_1 \& S_2$ are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both $S_1 \& S_2$ are wrong

268. Which of the following statement is wrong about Eutrophication.

A. Dense plant growth

B. excess use of fertilizer

C. excess use of detergent

D. deficiency of nutrients

269. Which of the following pair is different from others

A. Li,Na

B. Li,Mg

C. Be,Al

D. B,Si

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270. Which of the following is Linear

A. NO_2

B. OCl_2

C. O_3

D. N_3^-

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271. IUPAC name of
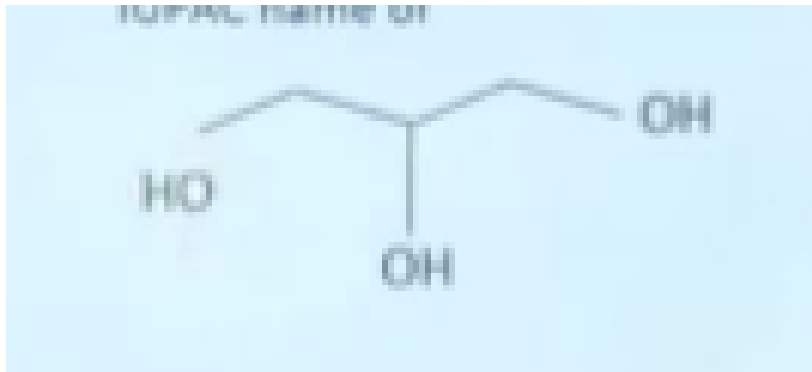
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272. No. of C-C sigma bond in mesityl oxide

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273. Which enzyme is involved in the conversion of glucose to ethanol and sucrose to glucose and fructose

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274. Magnetic moment of Fe (ground state)

275. Match the following

(a)	Haematite	(P)	$CuCO_3.Cu(OH)_2$
(b)	Malachite	(Q)	Al_2O_3
(c)	Magnetite	(R)	Fe_2O_3
(d)	Bauxite	(S)	Fe_3O_4

276. What is the product in solvay's proces

A. $CaCl_2$

B. $NaHCO_3$

C. Na_2CO_3
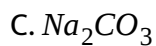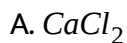
D. NH_4Cl

277. Which of the following is showing decrease in entropy?

A Freezing of water at $0\,°C$

B Freezing of water at $-10\,°C$

C $N_2 + 3H_2 \rightarrow 2NH_3$

D Adsorption of CO on Charcoal

E NaCl in H_2O

278. For the given reaction

$N_2O_4(g) \leftrightarrow 2NO_2(g)$
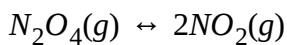
$K_p = 600.1$

$K_c = 20$

R= 0.083 Lbar/molK

Find the Temperature

279. Fructose is

A. Pyranose

B. Aldohexose

C. Ketohexose

D. Heptanose

280. S_1: 2-methylbutane on oxidation with $KMnO_4$ gives 2-methylbutan-2-ol

S_2: n-alkanes on oxidation with $KMnO_4$ gives alcohol

A. Both S_1&S_2 are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both S_1&S_2 are wrong

281. Which can give N_2 with KJehldal's method?

(A)

N_2Cl

A.

(B)

NH$_2$

B.

(C) (D

CH$_2$–NH$_2$

C.

D.
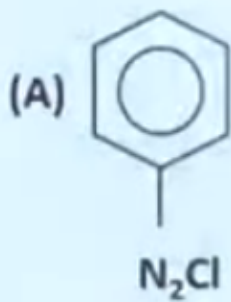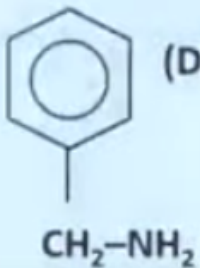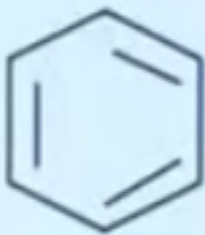
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282. Number of Cl atoms in 20mL Cl_2 at STP = λx 10^{21} . Find λ

283. Which of the following oxides of N are neutral

A. $NO \& N_2O$

B. $N_2O_3 \& NO$

C. $NO_2 \& N_2O_3$

D. $NO_2 \& N_2O_3$
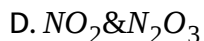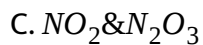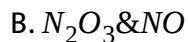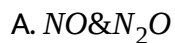
284. If colloid is negatively charged then, the one which coagulates most effectively is:

A. Na

B. Ba^{2+}

C. PO_4^{3-}

D. SO_4^{2-}
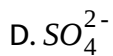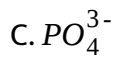
285. In 1g of KBr, 10^{-5} mole percent $SrBr_2$ is doped. Find number of cationic vacancies

286. The common oxidation states of element with z = 24 is

A. 1 to 6

B. 2 to 6

C. 3 to 6

D. 1 to 5

287. In the reaction of aniline with HNO_3 Meta product is formed as 46%

because

    A. Anilinium ion is formed

    B. NH_2 is meta directing

    C. Low temperature

    D. NO_2 is meta directing

288. What are the common oxidation states of Cr?

289. Which line in Hydrogen Spectrum falls under visible region?

290. Find the molecule in which hydrolysis does not take place

A. SF_6

B. BF_3

C. XeF_4

D. XeF_6
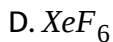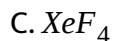
291. Primary, secondary & tertiary amines can be distinguished by which test?

A. KOH, $CHCl_3$
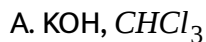
B. para toluene sulfonyl chloride

C. Benze sulphonic acid

D. Tollens test

292. $\left[Fe(CN)_6\right]^{3-}$ & $\left[Cr(CN)_6\right]^{3-}$. Find hybridisation & magnetic character

A. d^2sp^3 & paramagnetic

B. d^2sp^3 & dimagnetic

C. sp^3d^2 & dimagnetic

D. sp^3d^2 & paramagnetic

293. Ambident Nucleophiles are

1. AgCN,KCN

2. $AgNO_2$, KNO_2

3. KI,AgI

4. RCOONa, RCOOK

    A. 1 & 2

    B. 3 only

    C. 1,2,3&4

    D. 2 only

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294. Match the following
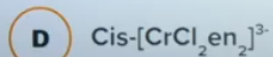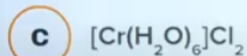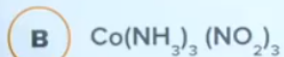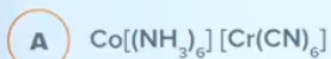
A	$Co[(NH_3)_6][Cr(CN)_6]$	i	Linkage
B	$Co(NH_3)_3(NO_2)_3$	ii	Coordination
C	$[Cr(H_2O)_6]Cl_2$	iii	Optical
D	Cis-$[CrCl_2en_2]^{3-}$	iv	hydrate

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295. Complete the following reaction

$$\xrightarrow[\text{HT / HP}]{Mo_2O_3}$$

A.

B.

B.

CH$_3$

C.

D.

D.
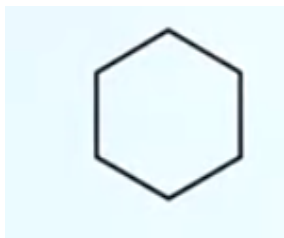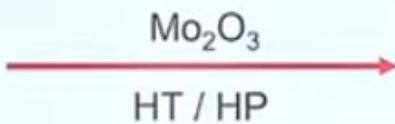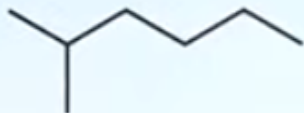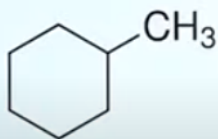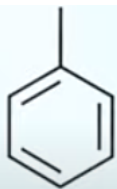
296. Correct statement about A & B is :

$+ \ HBr \longrightarrow$ (A) Br$^-$ + (B) Br$^-$

(A)   (B)
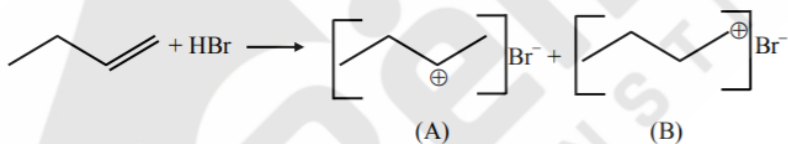
A. A is more stable and formed with faster rate

B. B is more stable and formed with faster rate

C. A is Less stable and formed with slow rate

D. B is less stable and formed with faster rate

297. Match the column

(A) Artificial sweetner	(i) Sodium benzoate
(B) Antiseptic	(ii) Bithional
(C) Preservative	(iii) Sodium stearate
(D) Glyceryl ester of stearic acid	(iv) Sucralose

298. Match the following

A	Troposphere	**i**	Above 80km
B	Stratosphere	**ii**	80km
C	Mesosphere	**iii**	50 km
D	Thermosphere	**iv**	10km

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299. For which of the following orbials, (Given l = 0), the number of radial nodes is equal to 2

A. 2p

B. 3s

C. 2s

D. 3p

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300. Which of the following on hydrolysis gives reducing sugar

A. Sucrose

B. Glucose

C. Fructose

D. galactose

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301. A in HCP & M occupies $\dfrac{2}{3}$ tetrahedral voids. Find formula of the compound

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302. CH_3 - CH_3 + O_2 → CO_2 + H_2O
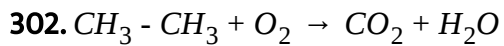
Given that moles of ethane is 0.1 & the number of molecules of water

$X \times 10^{-22}$. Find X

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303. Complete the following reaction

Alkaline KMnO₄

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304. Match the following

A	CaO	i	Cement
B	$CaCO_3$	ii	Antacid
C	$CaSO_4 \cdot \frac{1}{2} H_2O$	iii	Plaster of paris
D	$CaOCl_2$	iv	Bleach

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305. Complete the following reaction

$$\underset{\text{Major product}}{\overset{CN}{\bigcirc}} \xrightarrow[H^+]{H_2O} A \xrightarrow[H^+]{H_2O} \overset{COOH}{\bigcirc}$$

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306. An electron of hydrogen is replaced by a particle of mass 247 times and having same charge. Find the energy to ionise it.

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307. HA (2 molal) has freezing point of $-3.885\,^\circ C$. Find the dgree of dissociation if $K_f = 1.85$

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308. Complete the following reaction

NH₂ reaction:

$$\text{NH}_2 \xrightarrow[\text{low temperature}]{\text{NaNO}_2,\ \text{HCl}} A \longrightarrow B$$

A.

B.

C.

D.
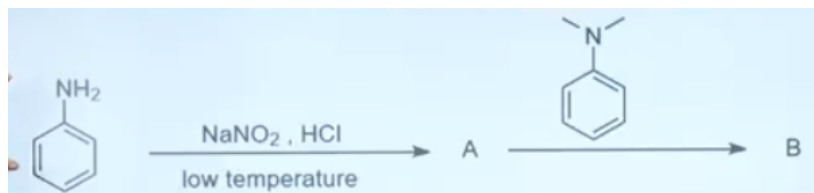
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309. Total number of unpaired electrons present in complex

$$K_3\left[Cr\left(C_2O_4\right)_3\right]$$

A. 1

B. 2

C. 3

D. 4
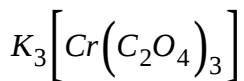
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310. Match the following

(a)	Tranquilizer	(p)	Veranol
(b)	Antacid	(q)	Cinetidile
(c)	Antifertility drug	(r)	Novestrol
(d)	Artificial sweeter	(s)	Aletame

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311. Point out the correct structure of trans $\left[NiBr_2(PPh_3)_2\right]$ & meridional $\left[Co(NH_3)_3(NO_2)_3\right]$

312. Compound with molecular formula C_3H_6O can show

A. position and metamerism

B. metamerism

C. functional group isomersim

D. position isomerism

313. The ionic radius Na^+ ion $1.02A°$ then ionic radius in $A°$ of $Mg^{2+} \& Al^{3+}$ respectively.

A. 0.72, 0.53

B. 0.53, 0.72

C. 1.02, 0.72

D. 0.72, 1.02

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314. To lowering the melting point which compound is used in extraction of aluminium?

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315. Match the following columns

Column – I	Column – II
(A) Contact process	(P) ZSM-5
(B) Deacon's process	(Q) V_2O_5
(C) Hydrogenation of vegetable oil	(R) $CuCl_2$
(D) Cracking of hydrocarbon	(S) Particle Ni

A. A-Q,B-R,C-S,D-P

B. A-Q,B-R,C-P,D-S

C. A-Q,B-S,C-R,D-P

D. A-R,B-Q,C-S,D-P

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316. Assertion: $Mg\left(HCO_3\right)_2$ on heating produces $MgCO_3$

Reason: $Mg(OH)_2$ has greater solubility than $MgCO_3$

A. Assertion is correct but reason is wrong

B. Both assertion & reason are correct and reason is correct explanation of assertion

C. Both assertion & reason are correct and reason is not correct explanation of assertion

D. Assertion is wrong but reason is correct

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317. Calculate ΔG° of reaction

$$2Fe^{3+} + 2I^- \rightarrow 2Fe^{2+} + I_2$$
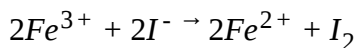
Given: $E^\circ_{Fe^{3+}/Fe^{2+}} = 0.77V, E^\circ_{I_2/I^-} = 0.53V$

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318. Determine $\Delta_r H$ of the reaction

$$C_2H_6 \rightarrow C_2H_4 + H_2$$
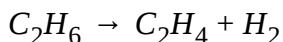
given :	Bond energy (in KJ/mol)
C – C :	340
C = C :	602
C – H :	411
H –H :	432

319. Phosphoric acid react with PCl_3 to give A. How many ionisable hydrogen are there in A?

A. 2

B. 0

C. 1

D. 3

320. Match the following:

Column – I	Column - II
(A) Anticancer Drug	(I) Ru
(B) Chlorophyll	(II) Co
(C) Vitamin B_{12}	(III) Mg
(D) Grubbs reagent	(IV) Pt

A. A-IV,B-III,C-II,D-I

B. A-I,B-II,C-III,D-IV

C. A-III,B-IV,C-II,D-I

D. A-I,B-III,C-II,D-IV

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321. Find overall order of given reaction using following experimental data

$2NO + Cl_2 \rightarrow 2NOCl$
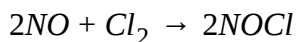
Exp.	[NO]	[Cl$_2$]	Initial rate
1.	0.1	0.1	0.18
2.	0.1	0.2	0.35
3.	0.2	0.2	1.4

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322. pH of buffer solution of CH_3COOH & CH_3COONa is 5.74. Concentration of CH_3COOH = 1M. Find concentration of CH_3COONa in solution.

Given pK_a of CH_3COOH = 4.74

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323. Match the following:

Column (I)	Column (II)
(A) Alc. KOH	(I) Electrode formation
(B) Pd/BaSO$_4$	(II) Lindlar
(C) BHC	(III) β-Elimination
(D) Polyacetylene	(IV) Addition

324. Moles of Methylbromide required to form 23g Trimethylbenzyl ammonium bromide is $nx10^{-1}$. Calculate n
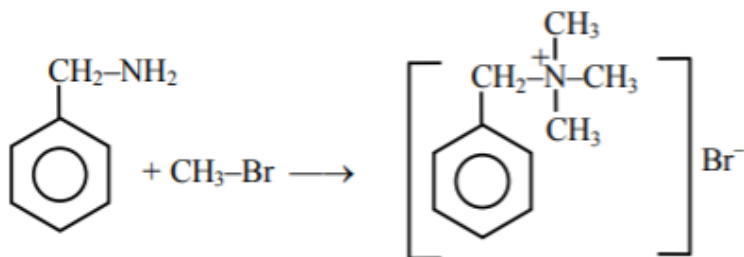
325. Which of the following statements is/are true for methane?

Statement-1: Methane causes both photochemical smog & global warming.

Statement-2: Methane is found in paddy fields.

Statement-3: It is a stronger global warming gas than CO_2.

Statement-4: Methane is a part of reducing smog.

A. S1,S2,S3

B. S2,S3

C. S1,S2,S4

D. S1,S2

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326. $C_8H_8O + CH_3CH_2MgBr \rightarrow (A) \xrightarrow{Lucas reagent} (B) Instant turbidity.$

Identify product B.

A. (1)

B. 2)

(3)

C.

(4)

D.
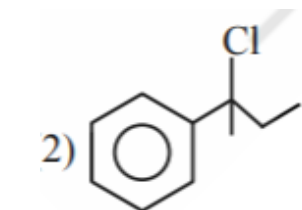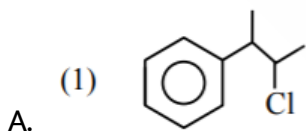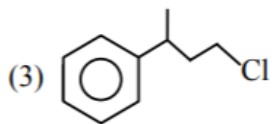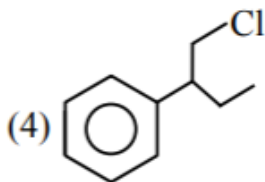
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327. Which is paramagnetic

A. Mn_3O_4

B. MgO

C. Na_2O

D. SiO_2
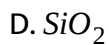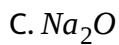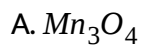
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328. Ratio of V_{rms} to $V_{average}$ of O:

A. $\sqrt{\dfrac{3\pi}{8}}$

B. $\sqrt{\dfrac{3}{2}}$

C. $\sqrt{\dfrac{8\pi}{3}}$

D. $\sqrt{\dfrac{2\pi}{8}}$

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329. The solubility of $CaSO_4$ is 8×10^{-4} in $0.01MH_2SO_4$. The k_{sp} of $CaSo_4$ is $a \times 10^{-6}$. find value of a

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330. Complete the following reaction

$$2 \quad \overset{O}{\bigcirc} \quad \xrightarrow{\text{dil NaOH}} \quad X \quad \xrightarrow{H^+, \text{ Heat}} \quad Y$$

331. The charge on the colloidal sols of CdS & TiO_2 are:

A. positive & negative

B. negative & positive

C. positive & positive

D. Negative & negative

332. 10ml of Na_2CO_3 war titrated against 0.2M HCl. The following were the titre values obtained (ml) 4.8,4.9,5.0,5.0,5.0. Molarity of Na_2CO_3 ?

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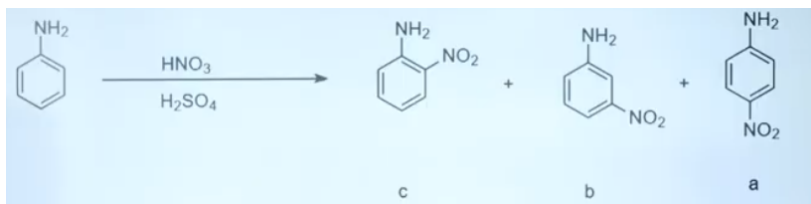
333.

Percent yield of a,b,c are in the order ?

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334. Arrange the following in the decreasing oxidation states of NO, N_2O, NO_2, NO_3^-

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335. S_1: C_2H_5OH & $AgCN$ can form nucleophile

S_2: $AgCN$ & KCN can form nitrile nucleophile in all reaction conditions

A. Both S_1&S_2 are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both S_1&S_2 are wrong

336. S_1: Bohr's model could explain the stabiliy and line spectrum of Li^+

S_2: Bohr could not explain the splitting of spectral lines in magnetic field.

A. Both S_1&S_2 are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both S_1&S_2 are wrong

337. A molecule A dimerises in 2 molal solution. The boiling point is 100.52 $^\circ$ C. (K_b of water = 0.52, T_b of water = 100 $^\circ C$). Find the percentage association.

338. Match the following

A	Antifertility drug	i	Meprobamate
B	Tranquilizer	ii	Norethindrone
C	Antibiotic	iii	Salvarsan
D	Artificial sweeteners	iv	Alitame

339. Partial hydrolysis of A gives XeO_2F_2 . Find lone pair of A

340. Deficiency of Vitamin K causes

A. Increase in blood clotting time

B. Decrease in blood clotting time

C. Doesn't effect blood clotting

D. Cheloiosis

341. Half life of a first order reaction is 60s. Reaction is completed by 99.9%. Calculate the time taken for this reaction.

342. In $CuSO_4$, how many water molecules bonded to complex and outside of complex

A. 4,1

B. 5,2

C. 6,1

D. 5,0

343. The hybridisation of a,b,& c are respectively.
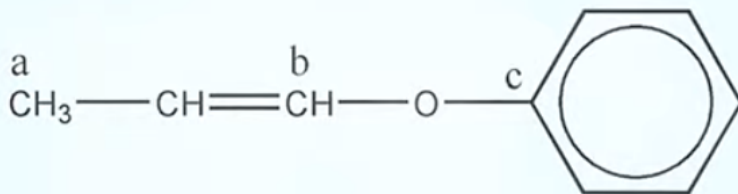
344. Match the following

1.	Copper	A.	Zone refining
2.	Nickil	B.	Electrolytic refining
3.	Silicon	C.	Vapour phase refining
4.	Aluminium	D.	Hall's process

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345. Two elements x & y have more ionisation energy than Mg. z have less

ionisation energy than Mg. x,y,z respectively

A. Li,Ar,Na

B. Ar,Cl,Na

C. Ar,Na,Cl

D. Li,Cl,Na

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346. An organic compound B reacts with Benzene sulphonic chloride to give a compound which is soluble in alkali metal hydroxide. What is B?

A. $\left(C_2H_5\right)_2NH$

B. $C_2H_5NH_2$

C. $\left(C_2H_5\right)_3N$
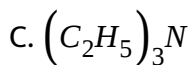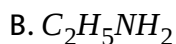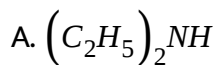
D. All of these

347. S_1: Non-biodegradable waste are excreted by thermal power palnts

S_2: Biodegradable detergents causes eutrophication.

A. Both S_1 & S_2 are correct

B. S_1 is correct & S_2 is wrong

C. S_2 is correct & S_1 is wrong

D. Both S_1 & S_2 are wrong

348. $2A \rightarrow A_2$
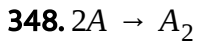
$T = 400K$

$K_{eq} = x \times 10^{-4}$

$\Delta G° = 25.2KJ/mol$

$R = 8.3$ J/k-mol

Determine x?

349. The molar conductivity of $BaSO_4$ at infinite dilution is:

Given   ⋮

$\lambda_m° \left(BaCl_2\right) = 278 ohm^{-1}mol^{-1}cm^2$, $\lambda_m° \left(H_2SO_4\right) = 860 ohm^{-1}mol^{-1}cm^2$, $\lambda_m° (HCl$

350. An ideal gas is taken in a container which is divided into 2 parts by a partition. Entropy of the parts is $S_1 \& S_2$. What will be entropy if partition is removed?

A. $S_1 + S_2$

B. $S_1 - S_2$

C. $S_1 \times S_2$

D. $\dfrac{S_1}{S_2}$

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351. H_2O_2 in basic medium shows which of the following reaction

A $Mn^{2+} \rightarrow Mn^{4+}$

B $I_2 \rightarrow I^-$

$PbS \rightarrow PbSO_4$
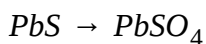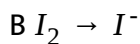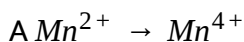
A. A & B

B. A only

C. B & C

D. B only

352. Match the column

Column-I	Column-II
(A) Be	(P) Used in treatment of cancer
(B) Mg	(Q) Used in reduction of metals
(C) Ca	(R) Used for making windows of x-ray tubes
(D) Ra	(S) Used in signal & explosive

A. A-R,B-S,C-Q,D-P

B. A-P,B-S,C-Q,D-R

C. A-P,B-Q,C-R,D-S

D. A-R,B-Q,C-S,D-P

353. Percentage yield of product obtained in the following reaction is:

$$\underset{\substack{\text{COOH} \\ \\ 6.1 \text{ gm}}}{\bigodot} \quad \xrightarrow{\text{Br}_2/\text{FeBr}_3} \quad \underset{\substack{\text{COOH} \\ \\ 8.04 \text{ gm}}}{\bigodot}\text{Br}$$
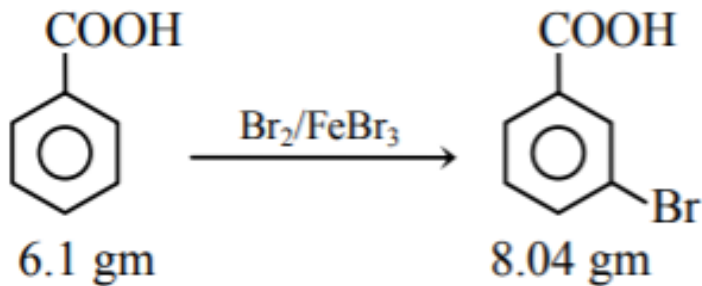
354. In the reaction of benzamide with hypobromite CO group is obtained in the form of:

A. CO

B. CO_2

C. CO_3^{2-}

D. HCO_3^{-}

355. What product are obtained when 1-Methoxy napthalene reacts with hydroiodic acid?

A. (1) + CH_3OH

B. (2) + CH_3OH

C. (3) + CH_3I

D. (4) + CH_3I
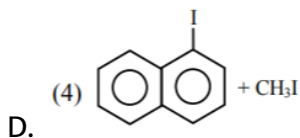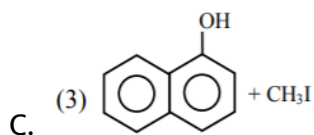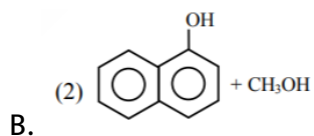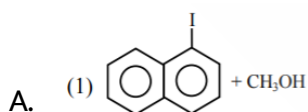
356. Benzene has vapour pressure of 70 torr and methyl benzene has 20 torr. If we have an equimolar mixture of both then find mole fraction of benzene in vapour phase?

357. If $P_4O_{10} + HNO_3$ are mixed in 1:4 ratio, then nature of nitrogen oxide obtained will be:

A. Acidic

B. Basic

C. Amphoteric

D. Neutral

358. Which of the following does not disproportionate?

A. BrO^-

B. BrO_2^-

C. BrO_3^-

D. BrO_4^-

359. Which of the following is most easily economically refined by fractional distillation?

A. Zn

B. Ni

C. Cu

D. Fe

360. Products A & B for the following reactions are as follows:
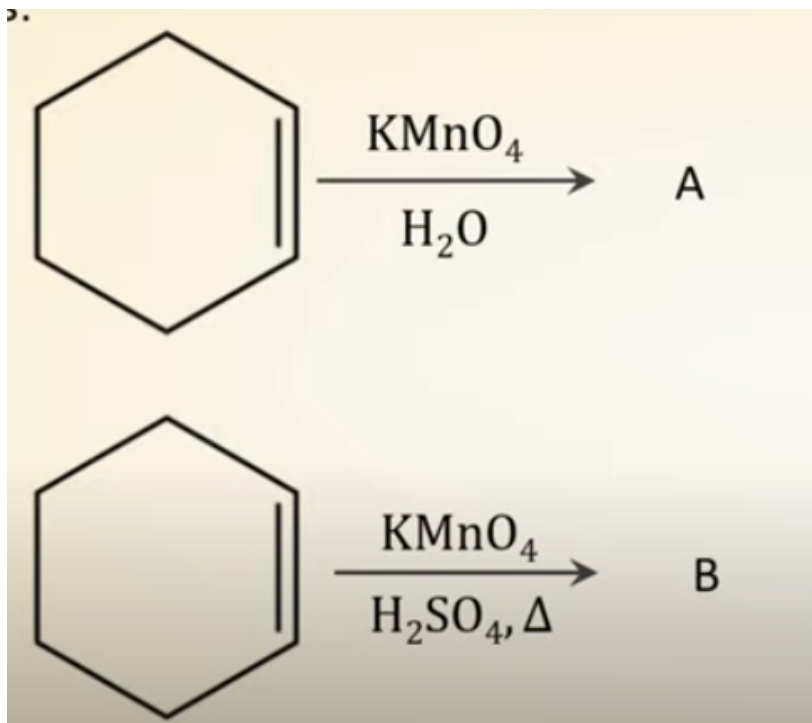
361. Number of lone pair present on central atom I_3^-

A. 2

B. 3

C. 4

D. 5

362. Which of the following will form superoxide?

A. K

B. Na

C. Mg

D. Ca

Answer: A

363. Determine Azimuthal quantum number of last electron of Ga^+ ion

A. 1

B. 0

C. 2

D. 3

364. The wave number of the spectral line in the emission spectrum of hydrogen will be equal to $\frac{8}{9}$ times the Rydberg's constant if the electron jumps from ....:-

A. $3 \rightarrow 1$

B. $5 \rightarrow 3$

C. $4 \rightarrow 1$

D. 5 → 2

Answer: A

365. S-block element having formula of oxide MO_2, which is yellow and paramagnetic is

A. Na

B. K

C. Ca

D. Mg

Answer: B

366. When 250ml of 0.5M NaOH is added to 1M 500ml HCl. How much is the final concentration of HCl that remains?

A. 0.1M

B. 0.5M

C. 50M

D. 5M

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367. Different properties are seen in which pair

A. $B(OH)_3, Al(OH)_3$

B. $Be(OH)_2, Al(OH)_3$

C. $NaOH, Ca(OH)_2$

D. None of these

368. Hybridisation of Xenon in $XeOF_4$

A. sp^3

B. sp^3d

C. sp^3d^2

D. sp^3d^3

Answer: B

369. Green chemistry used in day to day life

A. Cleaning cloth with water

B. Using liquid H_2O_2 in drying clothes

C. Using tetrachloroethane in laundries

D. Using chlorine in bleaching paper

Answer: B

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370. 10000kJ energy is needed per day and heat of combustion 2700kj/mol, then find the grams of glucose needed?

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371. The difference in energy between the 2nd & 3rd orbit of He^+ ion will be

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372. Intensity of color for $\left[Co(CN)_6\right]^{3-}$, $\left[Co(H_2O)_6\right]^{2+}$, $\left[Co(Cl)_4\right]^{2-}$

373. Orlon has which monomeric unit from the following

A. Acrylonitrile

B. Caprolactum

C. Hexamethylene diamine

D. Tetrafluoro ethene

374. How many equivalents of CH_3MgBr are required to convert ethylethanoate to 2-methyl propan-2-ol?

375. Statement I: Glass corners turns smooth when heated below melting point

Statement II: Viscosity of glass is decreases with temperarue

    A. statment 1 is true and statement 2 is false

    B. statment 1 is true and statement 2 is true

    C. statment 1 is false and statement 2 is true

    D. statment 1 is false and statement 2 is false

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376. Ninhydrin test for proteins result in the structure

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377. Which of the following is incorrect?

A. Amylose is branched

B. Glycogen is also called animal strach

C. Starch is made up of α-glucose

D. β-glycosidic linkage for cellulose

378. Statement I: In gas phase, the angle of H_2O_2 is 90.2 ° and in solid phase it is 112 °

Statement II: It is due to intermolecular forces

A. statment 1 is true and statement 2 is false

B. statment 1 is true and statement 2 is true

C. statment 1 is false and statement 2 is true

D. statment 1 is false and statement 2 is false

379. In which of the following, resonance is not possible?

A.

B.

C.

D.
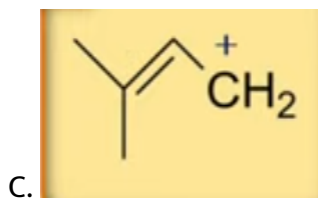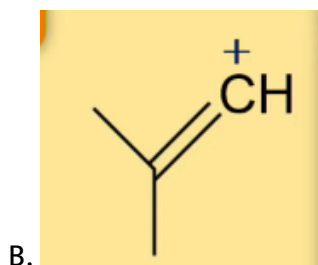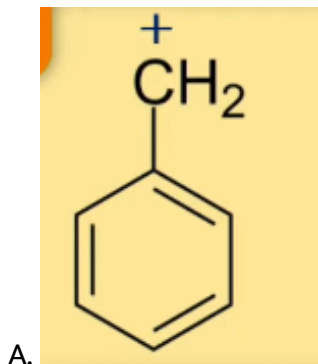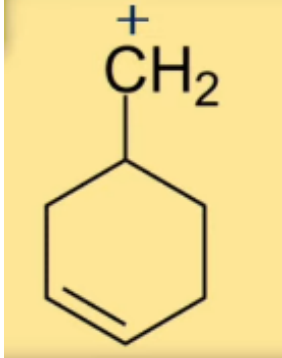
380. Four moles of a diatomic gas is heated from $0\,^\circ C$ to $50\,^\circ C$, find the heat supplies to the gas if work done by it is zero.

A. 780R

B. 500R

C. 100R

D. 650R

381. Identify the correct increasing order of 1st ionisation energy of following

Al,Mg,Si,S,P

382. Determine the product formed when 3-Bromo-2,2-dimethylbutane reacts with ethanol

A. 2,3-dimethylbut-2-ene

B. 3,3-dimethylbut-1-ene

C. 3-ethoxy-2,2-dimethylbutane

D. 2-ethoxy-2,3-dimethylbutane

383. Which of the following have positive electrode potential for reaction

$M^{2+}(aq) + 2e^- \rightarrow M$

A. Co

B. Ni

C. Cu
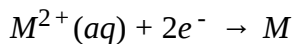
D. Zn

384. 4.5g mass of a substance (molar mass = 90g/mol) is dissolved in 250ml solution, the molarity of solution is

385. What is magnetic moment of complex $\left[Co(CN)_6\right]^{4-}$:

386. Which gas retard the rate of photosynthesis?

A. CO

B. NO_2

C. CO_2

D. CFC

387. Rate of hydrolysis : ester, acid chloride, acid anhydride

388. The hybridisation of NO_2^-, NO_2^+ and NH_4^+ are respectively:

389. Difference in number of unpaired electron in $\left[Ni(H_2O)\right]_6 Cl_2$ and $\left[Ni(CN)_6\right]^{2-}$

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390. In nitration , HNO_3 and H_2SO_4 act as:

A. Both acid

B. Both base

C. HNO_3 : Acid & H_2SO_4: Base

D. HNO_3 : Base & H_2SO_4: Acid

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391. Find A and B
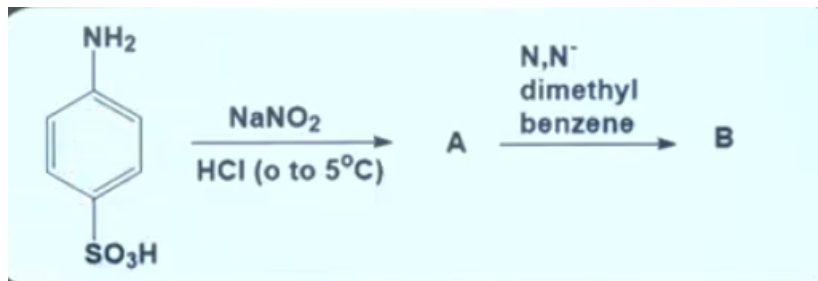
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392. Choose correct structure of Paracetamol

A.

A.

B.

B.

C.

C.
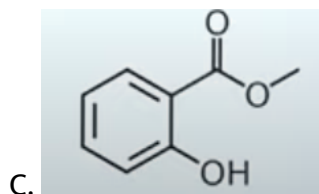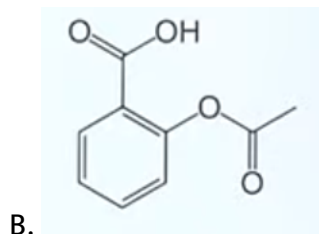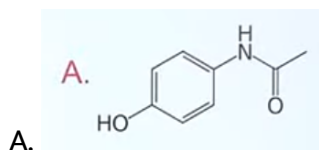
D. None

393. Cu^{2+} on reaction with potassium iodide gives

A. CuI_3

B. $Cu\left(I_3\right)_2$

C. Cu_2I_2

D. CuI

394. Bakelite is formed by Copolymerisation of formaldehyde and

A. Phenol

B. Navolac

C. Dacron

D. Ethene

395. Which of the following do not have magnetic moment of 1.73BM

A. CuI

B. $\left[Cu\left(NH_3 \right)_4 \right] Cl_2$

C. O_2^-

D. O_2^+

396. If equimolar mixture of NaOH and Na_2CO_3 weight 4g then weight of NaOH is:

397. Complete the following reaction

Find A and B
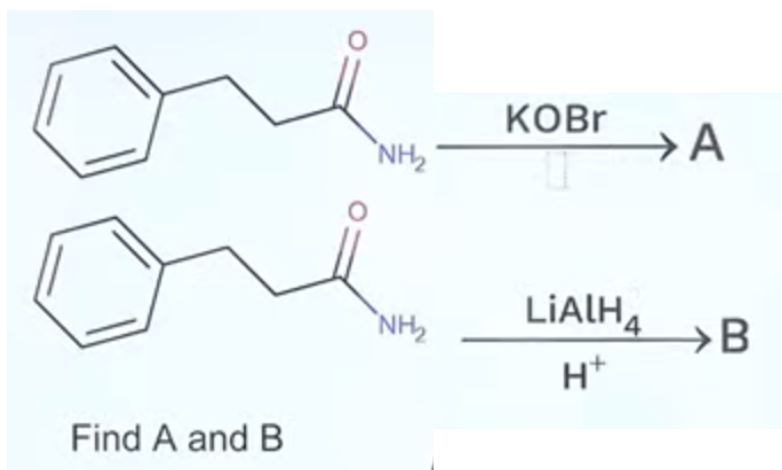
398. Complete the following reaction

A. $ZnCO_3 \xrightarrow{\Delta} ZnO + CO_2$

B. $ZnS \xrightarrow{\Delta} ZnO + SO_2$
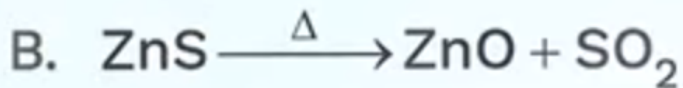
A. A= Roasting, B= Calcination

B. A= Calcination, B= Roasting

C. A= B= Roasting

D. A= B= Calcination

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399. Identify the diagonally next element in the p-block of the element having configuration for $4s^2 4p^1$

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400. Which of the following statements about enzymes is not correct

A. Enzymes are non specific

B. Enzymes are temperature and pH specific

C. almost all Enzymes are proteins

D. Enzymes act as catalyst

401. $PCl_5 \rightarrow PCl_3 + Cl_2$
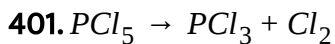
the above 1st order reaction has initial moles as 50 and final moles as 10 in 120seconds. Find the rate constant.

402. Radioactive substance becomes 1/16th of original in 80 minutes. find half life

403. In FCC , 50% tetrahedral void is filled. Find the effective number of atoms in cell if made using the same atoms

404. Which of the following is used in carious method

A. H_2SO_4

B. HNO_3

C. $AgNO_3$

D. $CaCO_3$
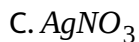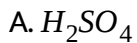
405. What is the correct relation between degree of freedom and γ?

A. 1+2/F

B. 1+ F/2

C. F/2

D. 2/F

406. In a octahedral complex of Fe^{2+} in high spin state what is the magnetic moment

A. 4.89BM

B. 1.73 BM

C. 0 BM

D. 3.87 BM

407. An ideal gas change state from A to state B. Find work done by gas

(in   KJ   )   using   following   P-V   diagram
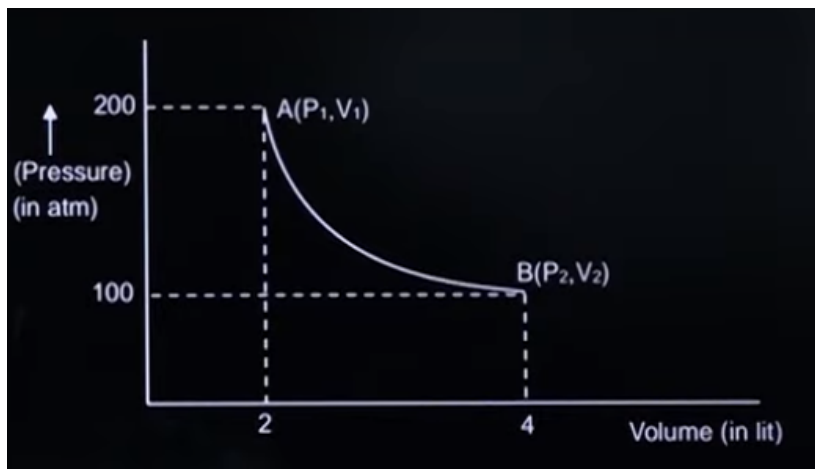
408. An ideal solution is prepared by mixing of A (P_A° = 90 Torr) and B (P_B°

= 15 Torr) in which mole fraction of A in liquid phase is 0.6. Then mole

fraction of B in vapour phase is $[X] \times 10^{-1}$. Then value of X is

409. What is the major use of dihdrogen

A. In formation of HNO_3

B. In synthesis of ammonia

C. In fuel cell for generating electrical energy

D. To reduce heavy metal oxides to metal

410. Complete the following reaction

Product (P) is :

A.
(1)

B.
(2)

C.
(3)

D.
(4)
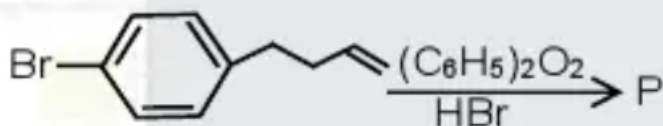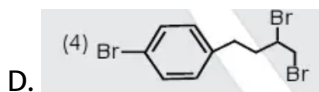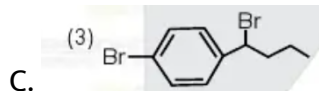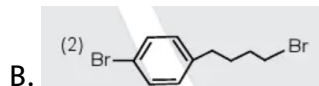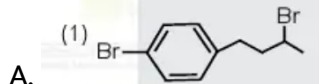
411. Which of the following compounds are metamers?

A.
(1)

B. (2) CH_3-CH_2-OH & $CH_3-O-CH_2-CH_3$

C. (3) $CH_3-CH_2-CH_2-CH_3$ & $CH_3-\overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}}-CH_3$

D.
(4)
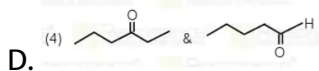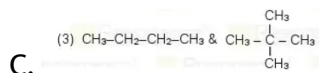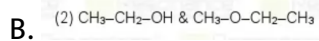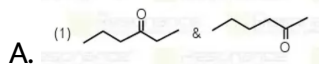
412. For a reaction $\Delta G°$ = -51.4 KJ/mol and $\Delta H°$ = 49.4 KJ/mol at 300K, then value of $\Delta S°$ in J/K is

413. Number of acyclic structural isomers of pentene are:

414. Match the following

(a)

1. Chloroprene

2. Isoprene

(b)

3. Caprolactum

(c)

4. Acrylonitrile

(d)
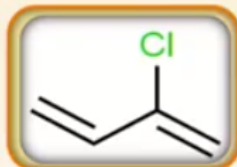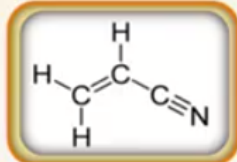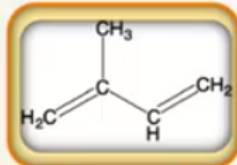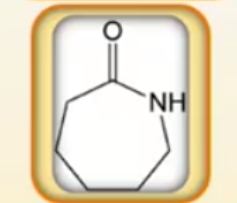
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415. Benzene diazonium chloride reacts with H_3PO_2 to give:

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416. More dissolved oxygen is found in?

A. Boiling water

B. Water at $4°C$

C. Water at $80°C$

D. Polluted water

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417. If concentration of glucose in blood is $0.72 gL^{-1}$. The molarity of glucose is:

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418. Methylation of 10g of benzene gives 9.2g of toulene, the % yield is:

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419. Isotope of hydrogen which emits low energy β- particle with $t_{0.5}$ value greater than 12 years is:

A. Tritium & Deuterium

B. Deuterium

C. Tritium

D. Protium

420. Which statement is not true for Dl Mendeleev?

A. Author of principle of chemistry

B. Invented accurate barometer

C. He proposed periodic table when structure of atoms were unknown

D. Element with atomic number 101 is named after him

421. Which of the following is the strongest reducing agent in group 15?

A. AsH_3

B. SbH_3

C. BiH_3

D. PH_3
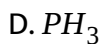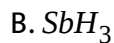
422. Which of the following 0.05 m solution has lowest freezing point?

A. K_2SO_4
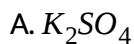
B. KI

C. $C_6H_{12}O_6$

D. $Al_2(SO_4)_3$

423. Which of the following statements is true?

A. Diborane is obtained by $NaBH_4 + I_2$

B. It is planar molecule

C. It is Sp^2 hybridised

D. Contains one 3c-2e bond

424. When $AgNO_3$ is added in KI, Which sol is formed

A. KI/NO_3^-

B. AgI/Ag^+

C. KI/Ag^+
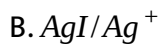
D. None of these

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425. The number of electrons in p orbital of vanadium

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426. Thiamine and pyridoxine are found in which vitamin?

A. B1 and B6

B. B6 and B1

C. B1 and E

D. E and B1

427. Find the number of unpaired electron in $\left[Co\left(NH_3\right)_6\right]Cl_2$ and $\left[Co\left(NH_3\right)_6\right]Cl_3$
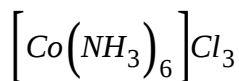
428. A compound C_6H_6O gives violet color with $FeCl_3$ and reacts with $CHCl_3/KOH$ to give B

429. For $N_2O_4 \rightarrow 2NO_2$, $K_p = 47.6$. Find K_c at 298K

430. Match with correct hybridisation

1. SF_4	(a) sp^3d^2
2. IF_5	(b) sp^3d
3. NO_2^+	(c) sp^3
4. NH_4^+	(d) sp
	(e) sp^3d^3

431. Which of following is paramagnetic and shows color

A. Zn^{2+}

B. Sc^{3+}

C. Mn^{7+}
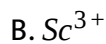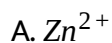
D. None of these

432. Which compound does not give friedel-crafts reaction?

A. Benzene

B. Aniline

C. Toulene

D. Ethyl benzene

433. Calculate the total number of isomers of square planar complex

$$\left[MFCl(SCN)\left(NO_2\right)\right]$$

434. Compare C-C sigma bond length of the given structure
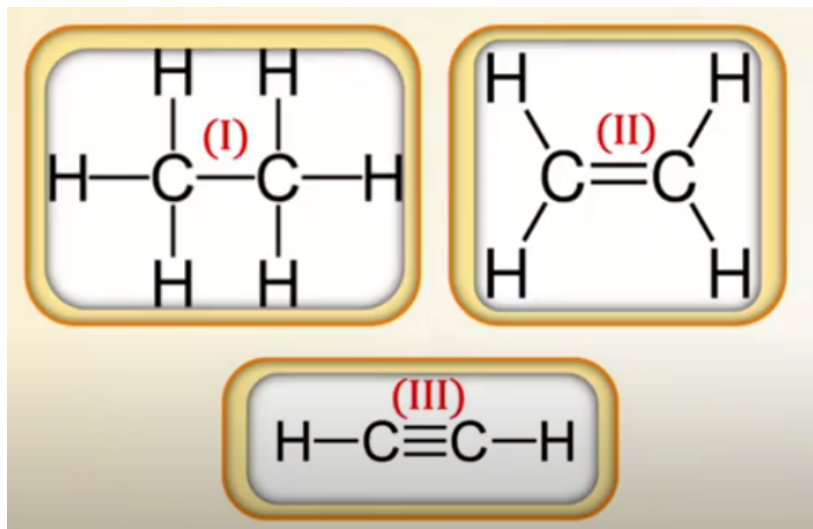
A. $I > II > III$

B. $II > III > I$

C. $III > II > I$

D. $II > I > III$

Answer: A

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435. Which of the following does not show stereoisomerism

A. (1)

B. (2)

C. (3)

D. (4)
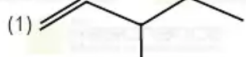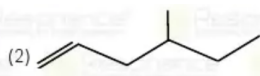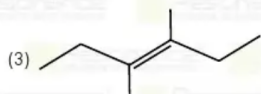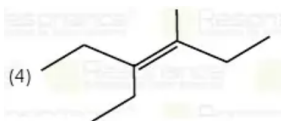
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436. Which of the following reaction is not possible

A.

(1)

B.

(2)

C.

(3)

D.

(4)
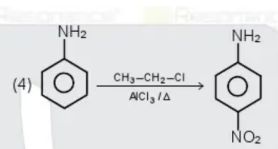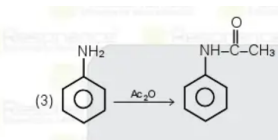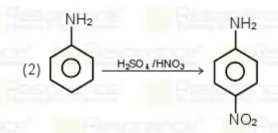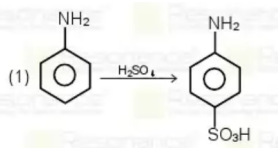
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437. Which of the following does not show resonance

A.

(1)

B. (2)

C. (3)

D. (4)

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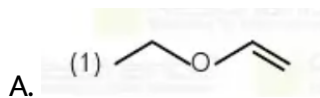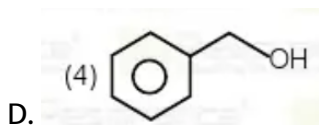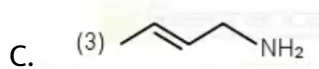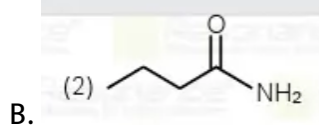
438. Consider sulphide ion as a soft base. Which of the following ion will form sulphide

A. Pb^{2+}, Ag^+

B. Ag^+, Mg^{2+}

C. Al^{3+}, Ag^+

D. Al^{3+}, Mg^{2+}
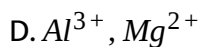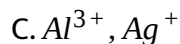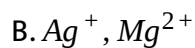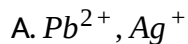
439. How much heat is releases in (KJ) from 10g graphite. [Given $\Delta H_{combustion}$(graphite) = -2.48KJ/mol]

440. Find the sum of magnetic moment of following ion Co^+, Zn^{2+}, V^{5+}

441. Match column-I with Column-II

Column-I	Column-II
(a) Li	(i) soluble in organinc compound
(b) Na	(ii) outer electronic configuration is $6s^2$
(c) Ca	(iii) oxalate is not soluble in aqueous solution
(d) Ba	(iv) form strong monobasic compound

A. a-i,b-iv,c-iii,d-ii

B. a-i,b-ii,c-iii,d-iv

C. a-iii,b-iv,c-i,d-ii

D. a-i,b-iv,c-iii,d-ii

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442. Using the following cell reaction find E_{cell}

(i) $Cu(s) \rightarrow Cu^{2+}(0.5M) + 2e^- \quad E° = -0.34V$

(ii) $Ag^+(0.45M) + e^- \rightarrow Ag \quad E° = 0.80V$

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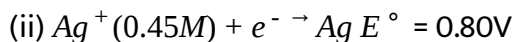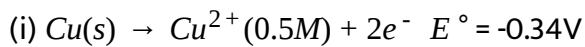
443. In a reaction where

$A + B \rightarrow 2C$
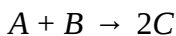
All of them start from 1M concentration and K_c value is 100. Find [A] at equilibrium

444. The concentration of Fe^{2+} (10ml) required to oxidize 15ml of 0.1M $K_2Cr_2O_7$ solution is:

445. In the combustion of butane, 72g of water is given out, how much butane is taken

446. Arrange the following ions in the increasing order of atomic size.

Na^+, Mg^{2+}, Al^{3+}

447. Which of the following leached out from the extraction of Al from bauxite

A. Fe_2O_3

B. SiO_2

C. TiO_2

D. SnO_2
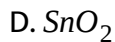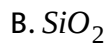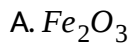
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448. Arrange in increasing order of oxidation number

V_2O_5, CrO_3, MnO_2, Fe_2O_3
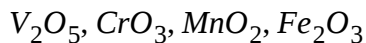
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449. Which of the following does not exist?

A. SiF_6^{2-}

B. $GeCl_6^{2-}$

C. $Sn(OH)_6^{2-}$

D. $SiCl_6^{2-}$
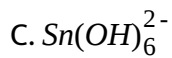
450. Which is water soluble protein

A. Albumin

B. Collagen

C. Myosin

D. Fibrin

451. Which of the following complexes show attraction or repulsion on external magnetic field

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

B. $Ni(CO)_4$

C. $\left[Ni(CN)_4\right]^{2-}$

D. $\left[Fe\left(H_2O\right)_6\right]^{3+}$
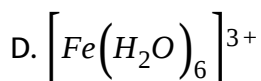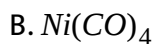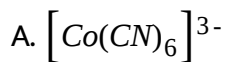
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452. Number of sigma bonds in pent-3-en-1-yne

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453. Which of the following is not used in dry cleaning?

A. H_2O_2

B. CCl_4

C. CO_2

D. C_2Cl_4
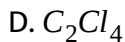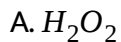
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454. Arrange correct order of De broglie wavelength of electron,proton and alpha particle all having the same kinetic energy

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455. Which reagent is used for poly bromination of phenol

A. $Br_2/FeBr_3$

B. CS_2/Br_2
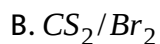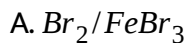
C. $CHCl_3/Br_2$

D. Bromine water

456. Major product

(i) CH_3CH_2MgBr
(ii) H_2O, HCl
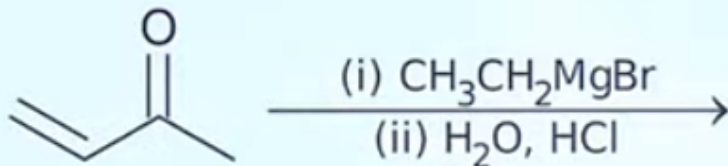
457. About sodium stearate $\left(C_{17}H_{35}COO^-Na^+\right)$

Which among following is true:

A. Form non spherical micelle with $C_{17}H_{35}COO$ - towards the centre

B. Form non spherical micelle with $C_{17}H_{35}COO$ - pointing outside

C. Form spherical micelle with $C_{17}H_{35}$- towards the centre

D. Form spherical micelle with $C_{17}H_{35}$- pointing outside

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458. Complete the following reaction

(i) $CH_3CHO/NaOH$

(ii) $I_2/NaOH$

(iii) H^+, H_2O
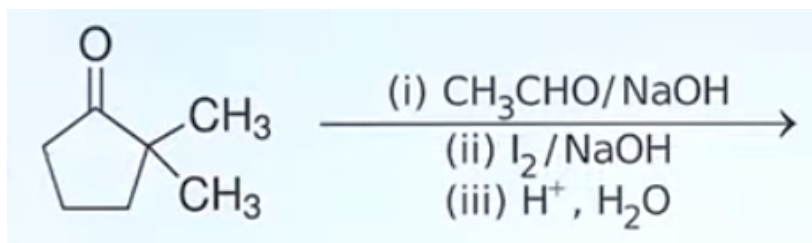
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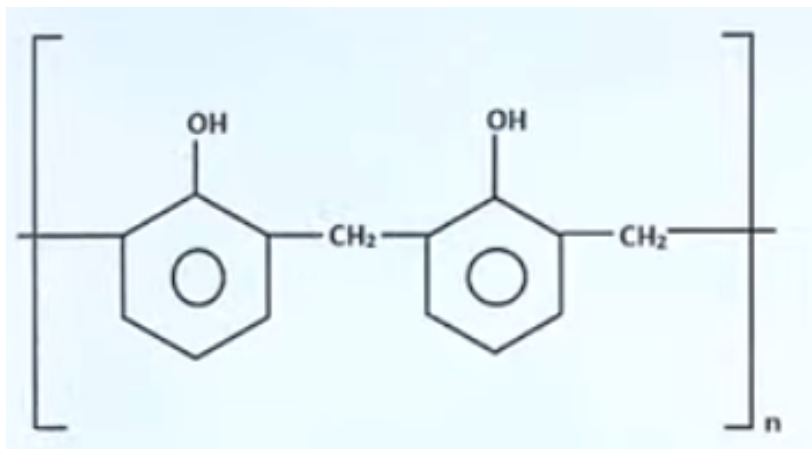
459. is

repeating unit of

A. Buna-S

B. Navolac

C. Neoprene

D. Acrylonitrile

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460. An octahedral complex $CrCl_3 \cdot \left(NH_3\right)_3 \cdot 3H_2O$ react with $AgNO_3$ to give 3 moles of AgCl as precipitate. How many secondary valency of a

Chromium are satisfied by chloride ion

461. Select the correct option for the given graphs
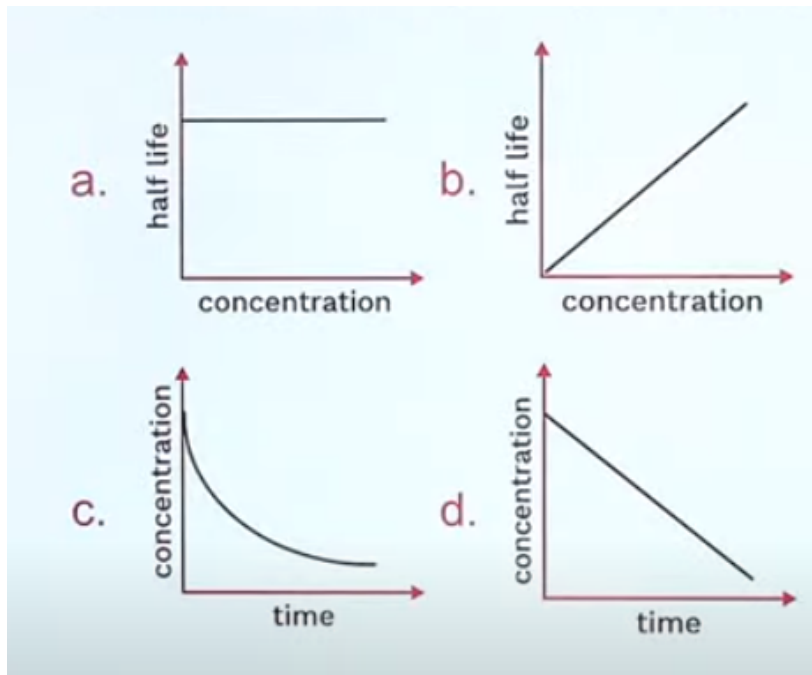
A. a,c = 1st order & b,d = zero order

B. b,d = 1st order & a,c = zero order

C. All are 1st order

D. All are Zero order

462. Which of the following react with $NaHCO_3$ and evolved CO_2 gas

A.

(1)

B.

(2)

C.

(3)

D.

(4)
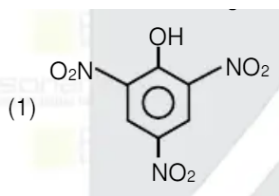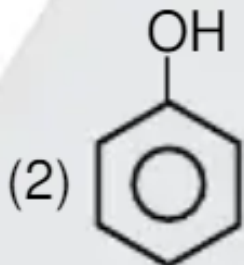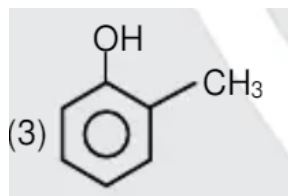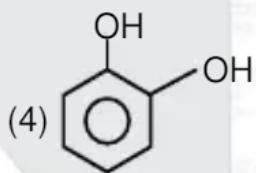
463. Assertion: Primary aromatic amine can't be prepared by gabrial-pthalamaide method

Reason: aryl halide can't be undergo nucleophilic substitution reaction

A. Assertion is true, reason is true and reason is correct explanation for assertion

B. Assertion is true, reason is true and reason is not correct explanation for assertion

C. Assertion is true and reason is false

D. Assertion is false and reason is true

464. CH_3MgBr react with which of the following to give methane gas

A. H_2S

B. H_2O

C. NH_3

D. All of these

465. Which of the following statement is correct:

A. H-H bond strength is equal to D-D bond strength

B. H-H bond strength is half of D-D bond strength

C. H-H bond strength is double to D-D bond strength

D. H-H bond strength is less than D-D bond strength

466. For a process ΔH_{fusion} = 2.4KCal/mol and $\Delta H_{vaporisation}$ = 98.6Kcal/mol. then $\Delta H_{sublimation}$

467. Henry's law constant for CO_2 in water is 0.835x2x10³bar.How many millimoles of CO_2 would dissolve in 0.9L water? Assume CO_2 gas exerts a partial pressure of 0.853bar

468. Assertion: The alkali earth metal hydroxide does not dissolve in Alkaline solution

Reason: On going down the group, solubility of Alkali metal decreases

A. Assertion is true, reason is true and reason is correct explanation for assertion

B. Assertion is true, reason is true and reason is not correct explanation for assertion

C. Assertion is true and reason is false

D. Assertion is false and reason is true

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469. Find the magnitude of change in internal energy when system does 150J work and absorbs 200J heat

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470. The correct structure of cytosine is

A.

B.

C.

D.

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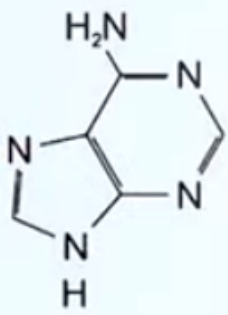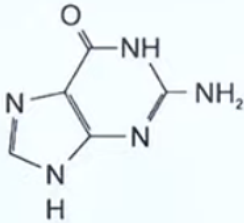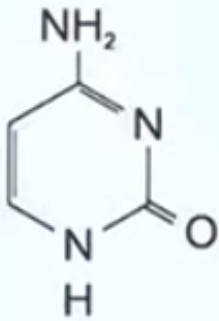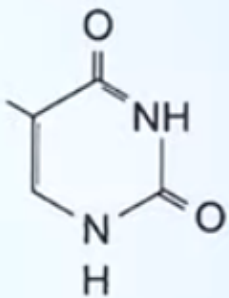
471. The total no of stereoisomers when Cis but-2-ene reacts with Br_2/CCl_4

---

472. The interstitial hydride is formed by

A. Cr

B. Fe

C. Mn

D. Co

473. Assertion: CFC's are dissociated to Cl radical by radiation of visible region

Reason: O_3 reacts with nitric oxide to form N_2 & O_2

A. Assertion is true, reason is true and reason is correct explanation for assertion

B. Assertion is true, reason is true and reason is not correct explanation for assertion

C. Assertion is true and reason is false

D. Both Assertion and reason is false

474. Arrange the following in increasing density order

I Benzene

II 1,3-Dichlorobenzene

III Chlorobenzene

IV 1-Bromo-3-Chlorobenzene

    A. $I > II > III > IV$

    B. $I > III > II > IV$

    C. $IV > II > III > I$

    D. $IV > III > I > II$

475. The number of electrons present in f orbital of Ho^{3+} ion

476. $Ba(OH)_2$ of concentration of 0.005 molar is completely ionised in water. Find H_3O^+ Nion concentration in solution.

477. Which is more acidic?

A.

B.

2.

C.

D.
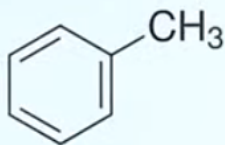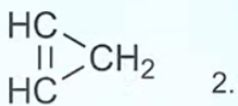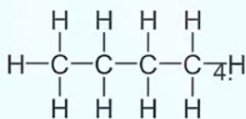
478. Find spin only moment of Ti^{3+}, V^{2+} and Sc^{3+}

479. Bond order of $O_2, O_2^{2-}, O_2^{-}, O_2^{+}$

480. Maleic anhydride can be prepared by

A. Heating trans but-2-en-1,4-dioic acid

B. treating trans but-2-en-1,4-dioic acid with alcohol and acid

C. treating cis but-2-en-1,4-dioic acid with alcohol and acid

D. Heating cis but-2-en-1,4-dioic acid

481. In Kjeldahl's method0.8g of organic compoundis used. the percentage of nitrogen came out to be 46%. The _____ml of 1M H_2SO_4 used to neutalize ammonia

A. 30

B. 13

C. 20

D. 17

482. Complete the following reaction
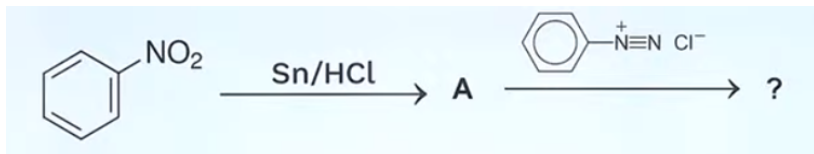
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483. $A \rightarrow B$

In this reaction concentration of B changes by 0.2 in 30Minutes. Find the average rate of the reaction in moles per litre hour

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484. Match the following columns

Match the following:

Column I	Column II
a.Pumice stone	1. Liquid in gas
b.Hair cream	2. Gas in solid
c.Clouds	3. Liquid in solid
d.Cheese	4. Liquid in liquid

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485. Match the following columns

Column I	Column II
Froth floatation method	Sulphide ore
Reverberatory furnace	Pig iron
Blast furnace	Ag
Leaching	Blister Copper

486. Which reaction oxidation state gets changed by 5

A. $C_2O_4^{2-} \rightarrow CO_2$

B. $MnO_4^- \rightarrow Mn^{2+}$

C. $Cr_2O_7^{2-} \rightarrow Cr^{3+}$

D. $CrO_4^{2-} \rightarrow Cr^{3+}$
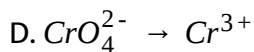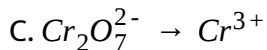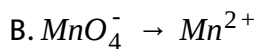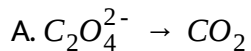
487. The benzonitrile is treated with grignard reagents followed by hydrolysis to give a compound A, which gives yellow coloration when treated with a reagent. This test is

A. Ninhydrin

B. Iodoform test

C. Schiff's test

D. Tollen's test

488. Complete the following reaction

$$\xrightarrow[\text{(2)}H_2O]{\text{(1) NaNO}_2 + \text{HCl}} \text{Product (P) is :}$$

A.

(1)

B.

(2)

CH$_3$ N$_2^+$Cl$^-$

C.

(3)

OH

D.

(4)

OH
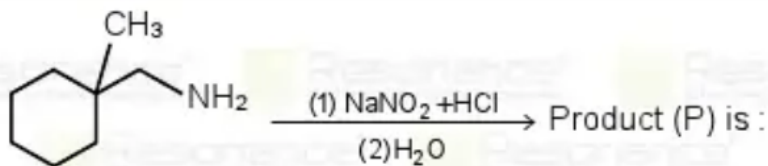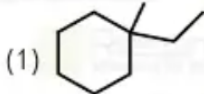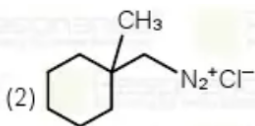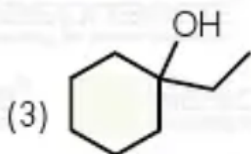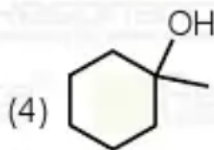
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489. Match the following columns

Column - I	Column - II
a) Li	(i) I$^-$ is least soluble
b) Na	(ii) Bicarbonate is used in fire extinguisher
c) K	(iii) Carbonate easily decomposed on heating
d) Cs	(iv) Has vital role in biological system

490. 3g of X dissolve in 100g of CCl_4 which increases the bioling point by 0.6. Find molar mass of X .Given K_b of CCl_4 = 5KKg/mol

491. The covalent radii of $F^- = 1.33A°$, $O^{2-} = 1.40A°$ and for N = $0.74A°$. Then which of the following is correct

A. Ionic radius of N^{3-} is in between $F^- \& O^{2-}$ but greater than N

B. Ionic radius of N^{3-} is greater than both $F^- \& O^{2-}$ but greater than N

C. Ionic radius of N^{3-} is less than $F^- \& O^{2-}$ and less than N

D. Ionic radius of N^{3-} is less $F^- \& O^{2-}$ but greater than N

492. An e^- moving with a velocity of $2 \times 10^6 m/s$. If the speed can be measured with an accuracy of 0.02%. Calculaate the uncertainty in its position is 1.45×10^{-x}. The value of x:

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493. Which among the following compounds is most stable:

A. $\left[Cr(en)_2 \left(NH_3 \right)_2 \right] Cl_3$

B. $\left[Cr(en)_3 \right] Cl_3$

C. $\left[Cr(en) \left(NH_3 \right)_4 \right] Cl_3$

D. $\left[Cr \left(NH_3 \right)_6 \right] Cl_3$
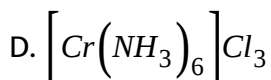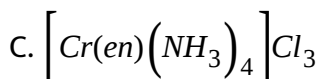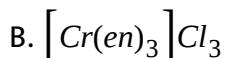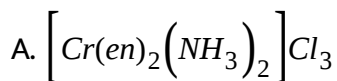
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494. Biodegradable polyamide is formed by

A. Glycine + isoprene

B. `Glycine + Aminocaproic acid

C. Alanine + chloroprene

D. Acrylonitrile + Aminocaproic acid

495. In which of the following compounds one π bond is present and maximum canonical structures possible

A. SO_3

B. CO_3^{2-}

C. O_2

D. SO_2

496. What is the oxidation state of P in:

$H_4P_2O_7, H_4P_2O_6, H_4P_2O_5$
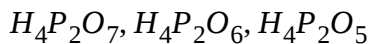
497. Difference between bond order of CO and NO^+ is $\dfrac{x}{2}$. Find x

498. Hybridisation of $\left[MnCl_6\right]^{3-}$

499. Assertion: Aniline is less basic than acetamide

Reason: Lone pair of N is involved in resonance

A. Assertion is true, reason is true and reason is correct explanation

for assertion

B. Assertion is true, reason is true and reason is not correct

explanation for assertion

C. Assertion is true and reason is false

D. Assertion is false and reason is true

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500. Acoording to x/m = $Kp^{1/n}$, when pressure increases 2 times than

concentration becomes 64 times. Find value of n

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501. Assertion: General halides of Li are covalent

Reason: Lithium has highest polarising power

    A. Assertion is true, reason is true and reason is correct explanation

       for assertion

    B. Assertion is true, reason is true and reason is not correct

       explanation for assertion

    C. Assertion is true and reason is false

    D. Assertion is false and reason is true

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502. Assertion: Rutherford's gold foil experiment didn't explain hydrogen

spectrum

Reason: Bohr's model contradicted Heisenberg's uncertainty principle

A. Assertion is true, reason is true and reason is correct explanation for assertion

B. Assertion is true, reason is true and reason is not correct explanation for assertion

C. Assertion is true and reason is false

D. Assertion is false and reason is true

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503. Staggered and eclipsed form of ethane are

A. Rotamer

B. Enantiomer

C. Mirror images

D. Polymers

504. Classify them into basic and acidic hydroxides:

$NaOH, Mg(OH)_2, Al(OH)_3, Be(OH)_2, B(OH)_3$

505. Find the unit of rate constant for nth order

506. What is the Stability order of carbocation

$, CH_2 = CH^+, CH_3CH_2^+, CH\equiv C^+$

507. $PCl_5 \rightarrow PCl_3 + Cl_2$ K_c = 1.844
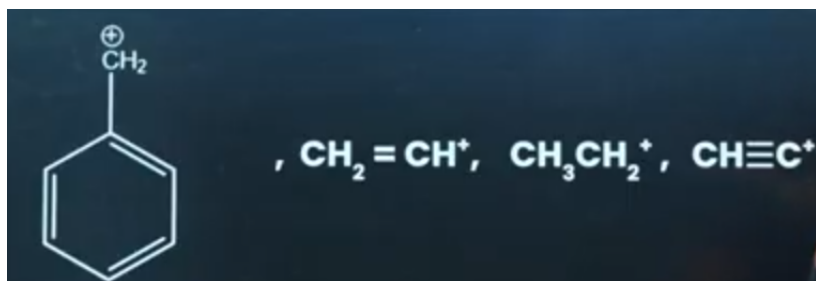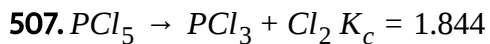
If 3 moles of PCl_5 are taken in 1L vessel. Find equilibrium concentration of PCl_5

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508. Complete the following reaction

Find B
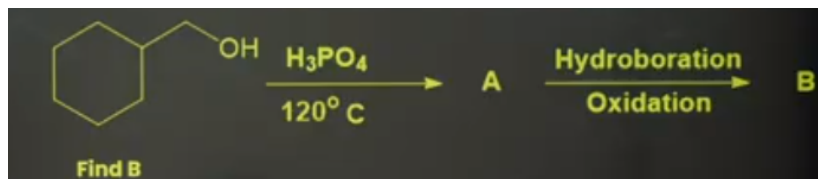
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509. Which gives orange color with 2,4 DNP?

A.

B.

C.

D.
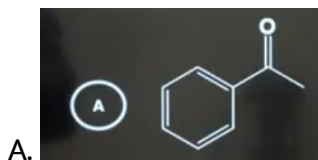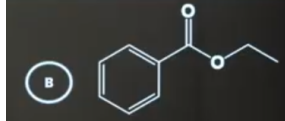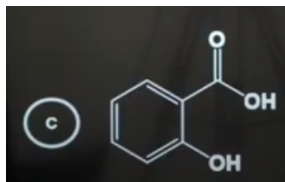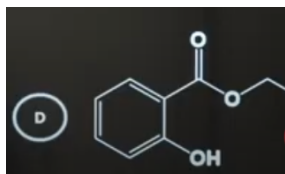
510. Which of the following is complementary base of the strucutre in
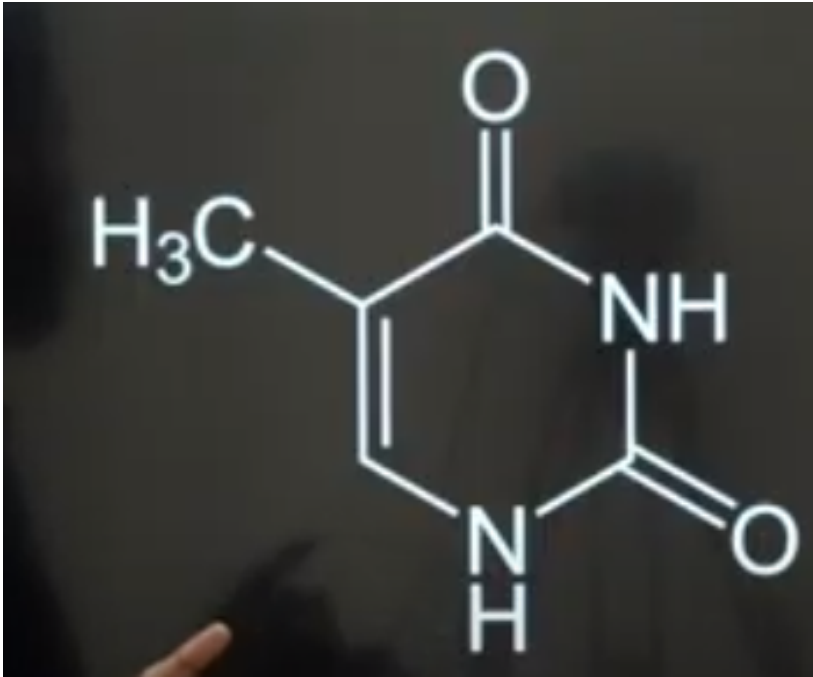
DNA

A. uracil

B. cytosine

C. Adenine

D. Guanine

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511. In crystal system ,$\alpha = \beta = 90°$, $\gamma = 120°$ and a=1.5,b=1.5,c=3. Find the crystal?

A. Monoclinic

B. Orthorhombic

C. Triclinic

D. Hexagonal

512. How to differentiate between monosaccharides and disaccharides

A. Iodine test

B. Selvinoff test

C. Barfoed test

D. Tollen's test

513. The bond angle of C-N-C in $N(Et)_3$

514. If number of geometrical isomers of $\left[Co(NH_3)_3(NO_2)_3\right]$ is A and that of $\left[Cr(C_2O_4)_3\right]$ is B then find A+B?

515. Which of the following is incorrect about Ellingham diagram?

A. Graph gives idea about change of phase

B. Graph gives idea about rate of reaction

C. Graph gives idea about free energy

D. It gives idea about Reduction of oxides

516. $CH_4 + I_2 \leftrightarrow CH_3I + HI$
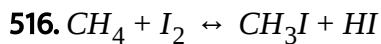
Which reagent can stop backward reaction?

A. Dilute HNO_3

B. Conc HIO_3

C. HClO

D. NH_3 (aq)

517. Which of the following has magnetic properties?

A. Mn_3O_4

B. MgO

C. SiO_2

D. Na_2O
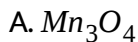
518. A weak acid HA of concentration 0.001 mile/litre have conductance 2x $10^{-5}Scm^{-1}$ and molar conductivity at infinite dilution is 190 Scm^2mole^{-1} then value of K_a of weak acids id [X] x 10^{-6}, then value of x in nearest integer is:

519. Number of Geometrical isomers of complex's

$\left[Ni(CO)_4\right], \left[PtCl_2\left(NH_3\right)_2\right], \left[RuCl_3\left(NH_3\right)_3\right]$ are respectively:

A. 0,2,2

B. 2,2,2

C. 0,1,2

D. 0,0,2

520. The value of $(\Delta H - \Delta U)$ for vaporisation of water at $100\,^{\circ}C$ is 'x' x $10^2 J/\text{mole}$, assume water vapour to be an ideal gas [Take R = 8.31 $J/\text{mole}.\,K$]

521. Density of aqueous solution of NaOH is $1.2g/cm^3$, then find its molality [Given density of water = $1g/cm^3$

522. The main product of electrolysis of conc.H_2SO_4 is

A. SO_3

B. $HO_3SO - OSO_3H$

C. $HO_2SO - OSO_2H$

D. O_2

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523. Match the column

	Column-I		Column-II
(i)	Furacine	(a)	Antiseptic
(ii)	Dimetane	(b)	Synthetic antihistamine
(iii)	Arsphenamine	(c)	Tranquilizer
(iv)	Valium	(d)	Antibiotic

A. i-b,ii-a,iii-c,iv-d

B. i-a,ii-b,iii-d,iv-c

C. i-a,ii-d,iii-c,iv-b

D. i-c,ii-d,iii-a,iv-b

524. What is formula of mustard gas-

A. (1)

B. (2)

C. (3)

D. (4)
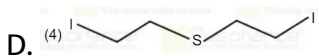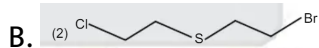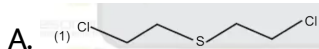
525. Which of the following given statements on Eutrophication are not correct?

    A. Eutrophication decrease oxygen level in water

    B. les than 6ppm oxygen fishes can't survive

    C. Eutrophication involve an aerobic respiration

    D. Eutrophication increase oxygen level in water

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526. $2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$
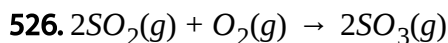
$$\left(P_{SO_2}\right)_{intial} = 250, \left(P_{O_2}\right)_{intial} = 750, \left(P_{SO_3}\right)_{intial} = 0$$

Find P_{total} after completion of reaction is:

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527. 10ml of 0.05M of $KMnO_4$ is titrated with 10ml oxalic acid. Find its strength

528. $A(s) \leftrightarrow M(s) + \dfrac{1}{2}O_2(g)$
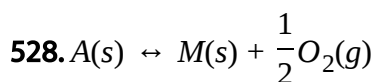
K_p of the reaction is 4. Find the partial pressure of O_2 at equilibrium

529. 1mol of A takes 100 mins to give 0.2mol of B in reaction

$A \leftrightarrow 2B$
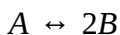
Find the half life of reaction

530. Number of neutrons and electrons present in radioactive isotope of hydrogen is

531. The number of Cl=O bonds in chlorous, chloric acid and perchloric acid

532. Find the total number of electrons in bonding molecular orbital of O_2^{2-}

533. Assertion: $\left[Mn(CN)_6\right]^{3-}$, $\left[Fe(CN)_6\right]^{3-}$ and $\left[Co(CN)_6\right]^{3-}$ have d^2sp^3 hybridisation

Reason: $[MnCl_6]^{3-}$ and $[FeCl_6]^{3-}$ are paramagnetic with unpaired electrons 4 and 5 respectively

A. Assertion is true, reason is true and reason is correct explanation for assertion

B. Assertion is true, reason is true and reason is not correct explanation for assertion

C. Assertion is true and reason is false

D. Assertion is false and reason is true

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534. $R - C \equiv N \xrightarrow[2.H_2O]{1.DIBAL}$

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535. D-Galactose and D-Glucose are formed by the hydrolysis of the following

    A. Maltose

    B. Lactose

    C. Sucrose

    D. Amylose

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536. The 1st ionisation order energy of Mg,S,P & Al is given by

    A. $Mg > Al > P > S$

    B. $Al > S > P > Mg$

    C. $Mg > Al > S > P$

    D. $Al > Mg > S > P$

Answer: D

---

537. Why silica is added to the sulphide of copper

A. To reduce temperature

B. To convert Cu to Copper silicate

C. To convert CuO to Copper silicate

D. To remove impurities of iron oxide

---

538. How many cations will get precipitated when $Al^{3+}, Cu^{2+}, Ni^{2+}, Co^{2+}, Fe^{3+}, Ba^{2+}, Zn^{2+}$. When conc. HCl is added 1st and after that H_2S

A. 1

B. 2

C. 3

D. 4

Answer: A

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539. Dihedral angle in 1,1,1-trichloroethane in staggered conformation (in degrees) is

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540. The correct of the reagent used for the conversion

A. $Fe/HCl \rightarrow AlCl_3/Cl_2 \rightarrow NaNO_2/HCl \rightarrow H_3O^+$

B. $AlCl_3/Cl_2 \rightarrow Fe/HCl \rightarrow NaNO_2/HCl \rightarrow H_3O^+$

C. $NaNO_2/HCl \rightarrow Fe/HCl \rightarrow AlCl_3/Cl_2 \rightarrow H_3O^+$

D. $NaNO_2/HCl \rightarrow AlCl_3/Cl_2 \rightarrow H_3O^+ \rightarrow Fe/HCl$
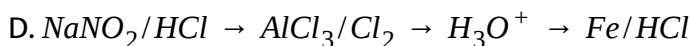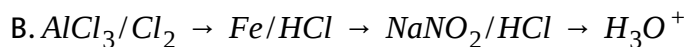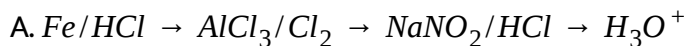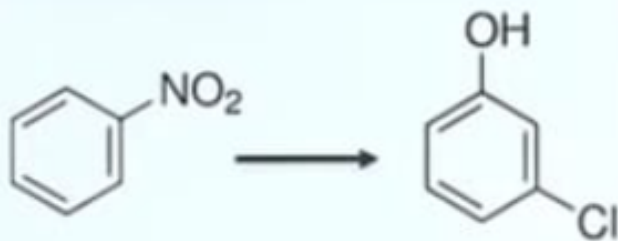
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541. Assertion: Penicillin is bactericidal

Reason: The   strucutre   of   Penicillin   is
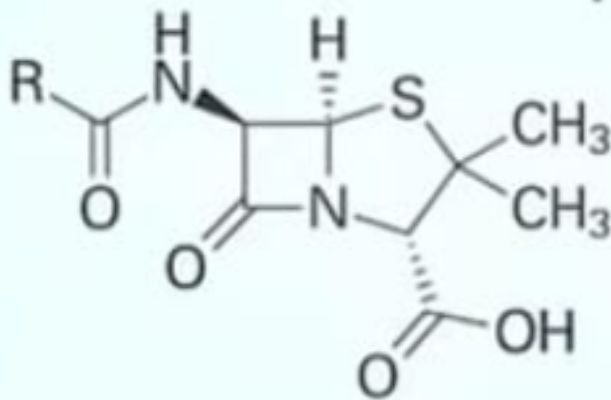
A. Assertion is true, reason is true and reason is correct explanation for assertion

B. Assertion is true, reason is true and reason is not correct explanation for assertion

C. Assertion is true and reason is false

D. Assertion is false and reason is true

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542. Complete the following reaction
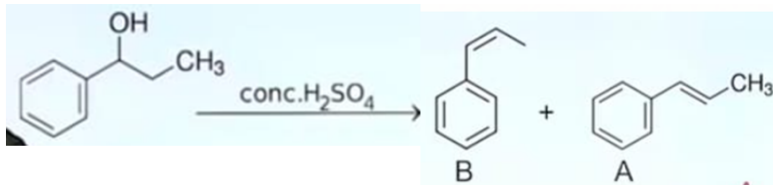
A. A is major product

B. B is major product

C. Both are formed equally

D. None of these

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543. If Thomson model is considered to be true then in Rutherford model

A. All α particle reflects at $180°$

B. They deflect at wide range of angle

C. All will pass through foil without deflection

D. They will pass but with reduced speed

544. Complete the following reaction

List-I	List-II
(a) Li	(i) used in devising photoelectric cell
(b) Na	(ii) used to make electrochemical cell
(c) K	(iii) used as coolant in nuclear reactor
(d) Cs	(iv) used in absorption of CO_2

Identify the correct match

A. a-ii,b-iii,c-iv,d-i

B. a-i,b-iii,c-iv,d-ii

C. a-i,b-ii,c-iii,d-iv

D. a-ii,b-iv,c-iii,d-i

545. Identify the incorrect statement from the following

A. Crystalline solids are isotropic

B. Amorphous solids are also called pseudo solids

C. Amorphouse do not have definite enthalpy of fusion

D. Crystlline solids are long range order

546. Which of the following product is ;not possible?

Product (P)

A.

(1)

B.

(2)

C.

(3)

D.

(4) + CH₃Br
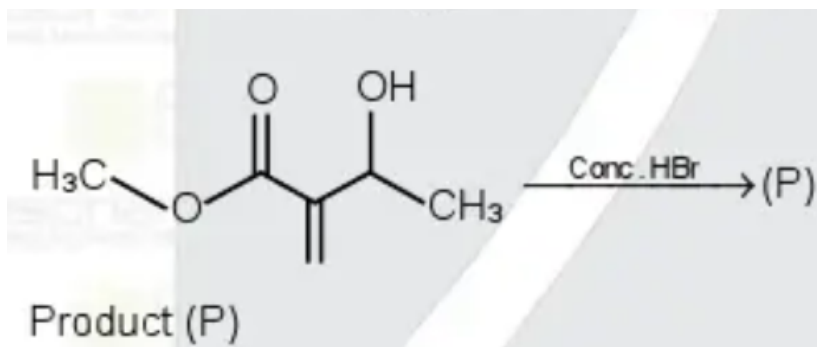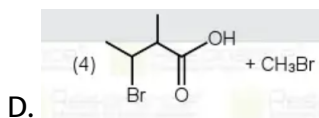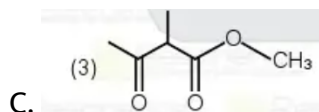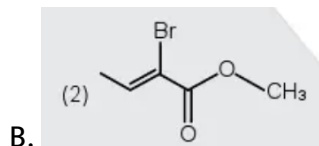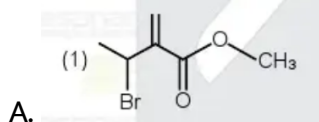
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547. In following sequence of reactio final product will be

A.

(1) with NH_2 group

B.

(2) benzene ring with NH_2

C.

(3) benzene ring with NH_2

D.

(4) benzene ring with $NH-Br$
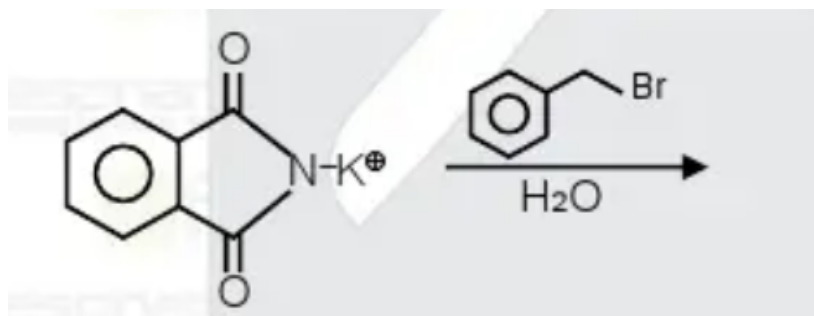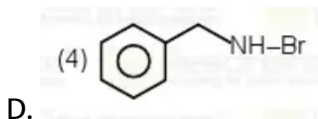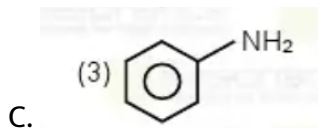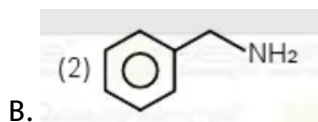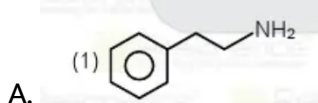
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548. Statement-I: Hyper conjugation is a permanent effect.

Statement-II: In $CH_3 - CH_2^+$ sp_{C-H}^2 overlapwith the adjacent vacant p-orbital.

A. Both Statement-I & Statement-II are correct.

B. Statement-I is correct and Statement-II is incorrect.

C. Statement-I is incorrect and Statement-II is correct.

D. Both Statement-I & Statement-II are incorrect.

549. Match the following columns

List - I (Metal)	List - II (Colour during flame test)
a) Li	(i) Golden yellow
b) Na	(ii) Crimson red
c) Ca	(iii) Apple green
d) Ba	(iv) Brick Red

Identify the correct matching from List – I with List - II :

A. a-ii,b-i,c,-iv,d-iii

B. a-i,b-ii,c-iii,d-iv

C. a-ii,b-i,c-iii,d-iv

D. a-i,b-ii,c-iv,d-iii

550. 1 mole of complex $CoCl_3.6NH_3$ on reaction with $AgNO_3$ gives 3 moles of AgCl precipitate. The secondary valency of complex is-

551. An electrolyte AB is 50% dimerise and rest is ionise in a solvent , then vant't hoff factor for this acid is

A. 1

B. 1.25

C. 2

D. 1.5

552. Assertion : SO_2 is highly adsorbed on charcoal than H_2

Reason : SO_2 has high critical temperature than H_2.

A. Assertion is true, reason is true and reason is correct explanation for assertion

B. Assertion is true, reason is true and reason is not correct explanation for assertion

C. Assertion is true and reason is false

D. Assertion is false and reason is true

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553. Ratio of water molecules of Potash alum to Mohr's salt is ?

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554. An inter halogen compound AB_3 has T shaped structure, how many lone pairs are present on 'A'

A. 1

B. 2

C. 3

D. 4

Answer: C

555. Statement 1: Frenkel defect showa interstitial as well as vacancy effect

Statement 2: In Frenkel defect, solids show color because of F-centre.

A. Statement 1 is true, Statement 2 is true, Statement 2 is the correct explanation of statement 1.

B. Statement 1 is true, Statement 2 is false

C. Statement 1 is flase, Statement 2 is true

D. Statement 1 is false, Statement 2 is false

Answer: D

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556. Reaction of phenol with Br_2 and H_2O gives A and reaction of phenol with Br_2 and CS_2 at less than gives $5\,^\circ C$ gives B. Find the product A and B

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557. By which of the following process deionized water can be obtained

A. Calgon's process

B. synthetic Resin's method

C. clark's method

D. permutit

Answer: b

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558. How many electrons are present in 4f orbitals of Gd^{2+}

A. 9

B. 8

C. 7

D. 6

Answer: C

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559. Statement 1: Ellingham diagram is used to check which metal to be reduced by which compound

Statement 2: In Ellingham diagram as we move from left to right ΔS increase

    A. Statement 1 is true, Statement 2 is true, Statement 2 is the correct

       explanation of statement 1.

    B. Statement 1 is true, Statement 2 is false

    C. Statement 1 is flase, Statement 2 is true

    D. Statement 1 is false, Statement 2 is false

Answer: C

560. On heating Novalac with formaldehyde which of the following polymers will form

A. urea formaldehyde

B. Melamine

C. Bakelite

D. styrene

Answer: C

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561. What is tue for adsorption of gas on solid surface

A. $\Delta H > 0, \Delta S > 0$

B. $\Delta H > 0, \Delta S < 0$

C. $\Delta H < 0, \Delta S > 0$

D. $\Delta H < 0, \Delta S < 0$

Answer: D

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562. The reaction of acetophenone with Br_2 and KOH forms products A and B. find A and B are

563. Which of the following will dissolve in water and give color?

A. $CuCl_2$

B. Cu_2Cl_2

C. AgBr

D. $ZnCl_2$
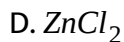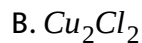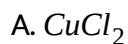
Answer: B

564. Statement 1: In Bohr's model, velocity of electron increases with decrease in positive charge of nucleus as electrons are not held tightly.

Statement 2: Velocity decreases with an increase in principal quantum number

    A. Statement 1 is true, Statement 2 is true, Statement 2 is the correct

       explanation of statement 1.

    B. Statement 1 is true, Statement 2 is false

    C. Statement 1 is flase, Statement 2 is true

    D. Statement 1 is false, Statement 2 is false

Answer: C

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565. Statement 1: Methyl orange is suitable indicator for titration of strong acid and weak base

Statement 2: Phenolphthalein is not suitable indicator for titration of acetic acid and NaOH

A. Statement 1 is true, Statement 2 is true, Statement 2 is the correct explanation of statement 1.

B. Statement 1 is true, Statement 2 is false

C. Statement 1 is flase, Statement 2 is true

D. Statement 1 is false, Statement 2 is false

566. The number of properties on which reduction potential depends is

1) Electron gain enthalpy

2) Sublimation enthalpy

3)Ionisation enthalpy

4)Hydration enthalpy

567. Formula of Hydroxyapatite

A. $\left(CaPO_4\right)_6 \cdot CaF_2$

B. $3\left[Ca\left(PO_4\right)_2\right] \cdot Ca(OH)_2$

C. $3\left[Ca_3\left(PO_4\right)_2\right] \cdot CaF_2$

D. $Ca_3\left(PO_4\right)_2 \cdot Ca(OH)_2$
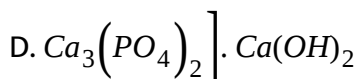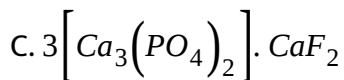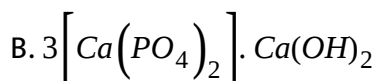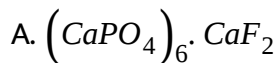
Answer: B

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568. Which is incorrect?

A. F_2 is better oxidising agent than Cl_2

B. Cl_2 is more reactive than ClF

C. F_2 is more reactive than ClF

D. On hydrolysis ClF gives $HOCl$ and HF

Answer: b

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569. Which of the following is the correct sequential method to convert benzene to 3-nitrobenzoic acid

A. alkaline$KMnO_4$, $concH_2SO_4/HNO_3$, $CH_3Cl + FeCl_3$

B. $CH_3Cl + FeCl_3$, alkaline$KMnO_4$, $concH_2SO_4/HNO_3$

C. alkaline$KMnO_4$, $CH_3Cl + FeCl_3$, $concH_2SO_4/HNO_3$

D. $concH_2SO_4/HNO_3$, $CH_3Cl + FeCl_3$, alkaline $KMnO_4$

Answer: b

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570. Which of the following reactions gives yellow precipitate for the following sequence

1.$NaOH$

2.dil HNO_3

3. $AgNO_3$

A.

B.

C.

D.
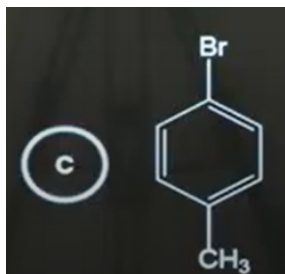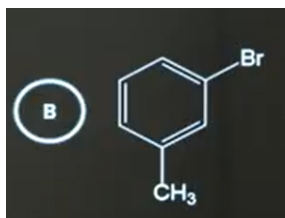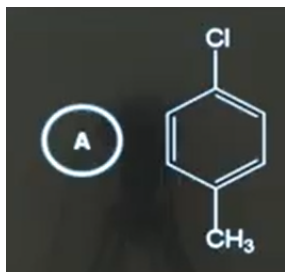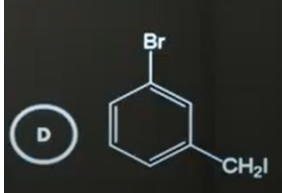
Answer: D

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571. Match the following columns

Predict the major product for the following reaction.
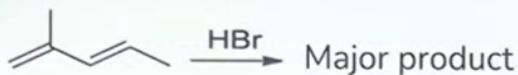
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572. Calculate the molarity of 3.3molal solution of KCl whose density is

$1.28g/ml$

A. 3.7M

B. 3.4M

C. 5.0M

D. 2.5M

---

573. Choose the ion whose aqueous solution is voilet colored

A. $\left[Fe(CN)_6\right]^{4-}$

B. $\left[Fe(CN)_5NOS\right]^{4-}$

C. $Fe(SCN)_3$

D. $\left[Fe(CN)_6\right]^{3-}$
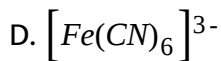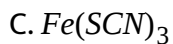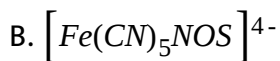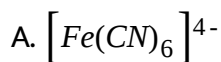
574. Correct sequence of U_{rms} of O_2, Co_2, N_2 at contant temperature will be:

A. $N_2 > O_2 > CO_2$

B. $O_2 > N_2 > CO_2$

C. $CO_2 > O_2 > N_2$

D. $CO_2 = O_2 = N_2$
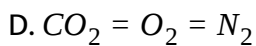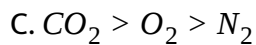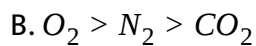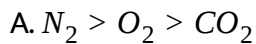
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575. Complete the following reaction

$$\xrightarrow[\text{(2) } CH_3OH/H^+]{\text{(1) } SOCl_2} \text{Product (P)}$$

A.

B.

(2) OCH₃

C.

(3) OH

D.

(4) CH₃
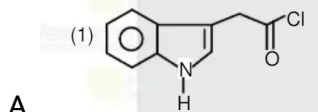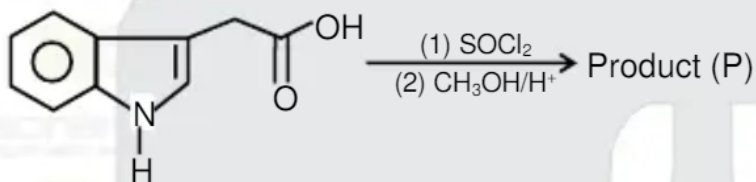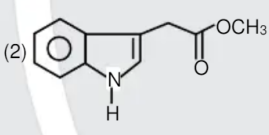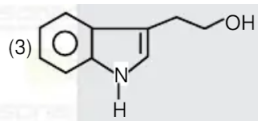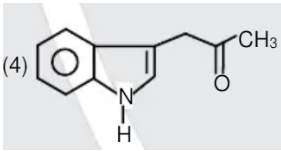
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576. Complete the following reaction

$$\text{Isobutane} + Br_2 \xrightarrow[\ 125\ ^\circ C\ ]{h\nu} \text{product}$$

Product is

A.

(1)

Br

(2) Br

B.

(3) Br

C.

(4) Br   Br

D.
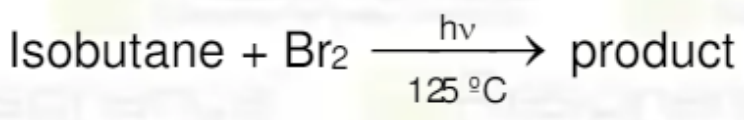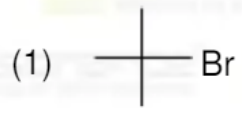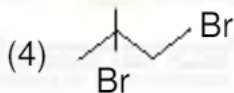
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577. Structure of chloroprene

A.   (1) $CH_3-\overset{\underset{\displaystyle |}{Cl}}{C}=CH-CH_3$

B.   (2) $CH_2=\overset{\underset{\displaystyle |}{Cl}}{C}-CH=CH_2$

C.   (3) $CH_2=CH-CH=CH_2$
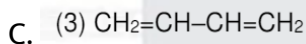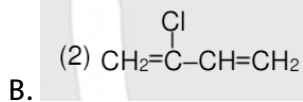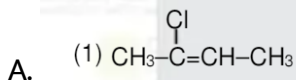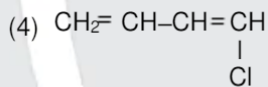
578. When excess of CO_2 is passed through lime water then, what will be sequence of the product

A. $Ca(HCO_3)_2$, CaO

B. CaO, $Ca(HCO_3)_2$

C. $CaCO_3$, $Ca(HCO_3)_2$

D. $Ca(HCO_3)_2$, CaO
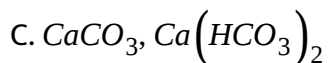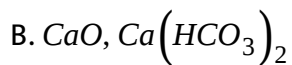
579. Number of compounds which have freezing point greater than freezing point of 0.1ethanol

    A. 0.1m Na_2SO_4

    B. 0.1m $Ba_3(PO_4)_2$

    C. 0.1m HCl

    D. 0.1m urea

580. Which of the following is negative sol?

    A. $AgNO_3$ in KI solution

    B. KI in $AgNO_3$ solution

    C. $Fe(OH)_3$

    D. None

581. what is the number of non-ionisable hydrogen in the compound formed upon hydrolysis of PCl_5

582. Total number of stereoisomers of

A. 2

B. 3

C. 4

D. 5

583. $A + B \leftrightarrow C + D$
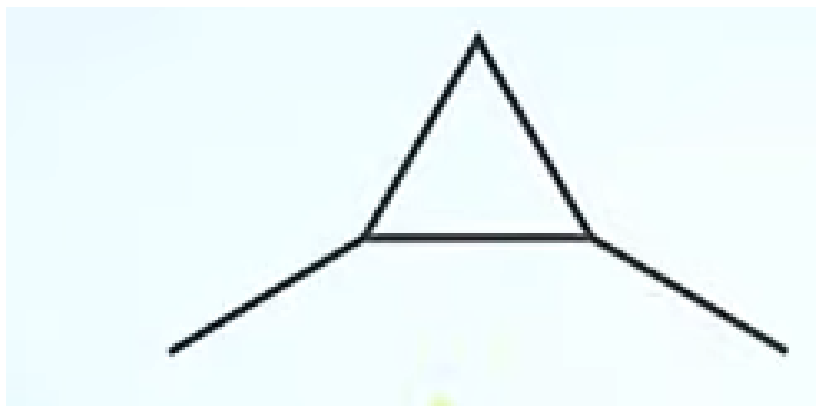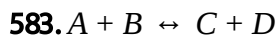
Initially all are 1M, K_c= 100. Final concentration of D will be

584. Complete the following reaction

$$\xrightarrow{Ac_2O}$$
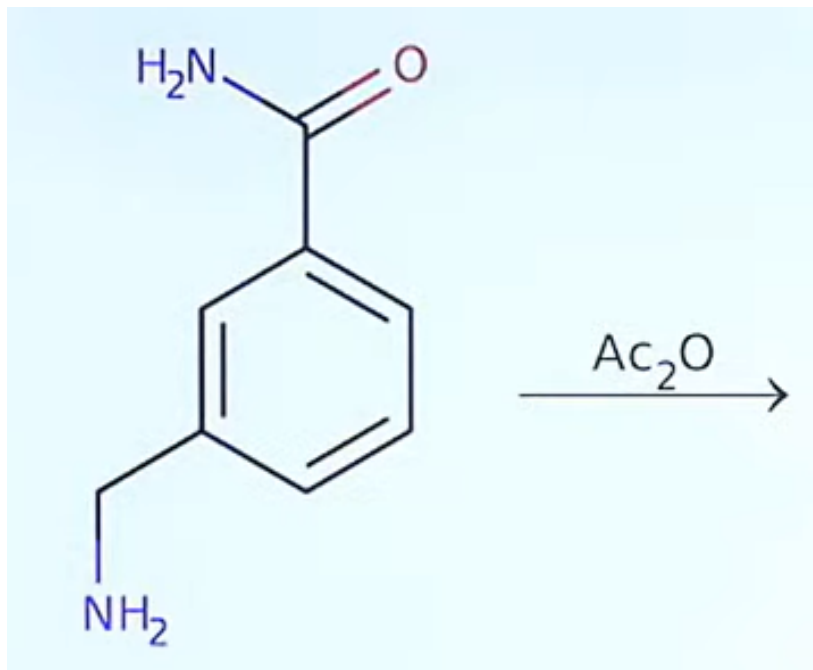
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585. Complete the following reaction

$$\xrightarrow{\ ?\ }$$

$$\xrightarrow{LiAlH_4} ?$$
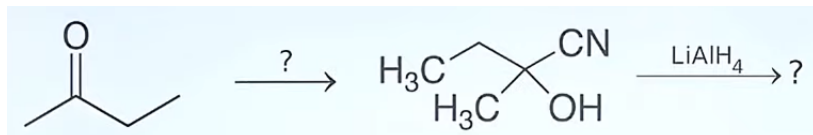
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586. Which of the following is not aromatic?

A.

B.

C.

D.
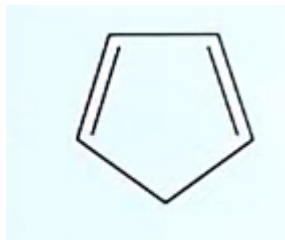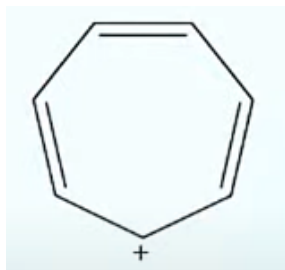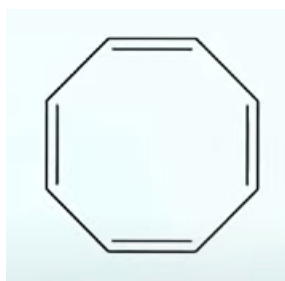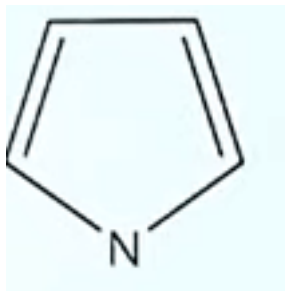
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587. 83g ethylene glycol is dissolved in 625g water. Find freezing point of ethylene glycol (Given K_f = 1.86

588. Two gases H_2 and CO_2 are taken 1mol and 2mol respectively in a container of volume 100ml at 400K. Find pressure of the mixture

589. Chlordiazepoxide is an example of

A. Analgesic

B. Antibiotics

C. Antacid

D. Tranquilizer

590. The magnetic moment and magnetic behaviour of O_2^- ion is

591. Which of the following is a set of chalcogens

A. O,S,Te,Po

B. P,S,Cl,Br

C. Na,Br,Cl,I

D. S,O,P,Mo

592. Statement 1: Sucrose is non reducing sugar

Statement 2: In sucrose, glycosidic linkage is between Cl of β-D glucose and C_2 of α-D-glucose

    A. Statement 1 is true, Statement 2 is true, Statement 2 is the correct

       explanation of statement 1.

    B. Statement 1 is true, Statement 2 is false

    C. Statement 1 is flase, Statement 2 is true

    D. Statement 1 is false, Statement 2 is false

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593. Statement 1: Sphalerite copper glance are the sulphide ores of zinc and copper

Statement 2: It is possible to separate two sulphide ores by adjusting proportion of oil to water or by using depressant

A. Statement 1 is true, Statement 2 is true, Statement 2 is the correct

explanation of statement 1.

B. Statement 1 is true, Statement 2 is false

C. Statement 1 is flase, Statement 2 is true

D. Statement 1 is false, Statement 2 is false

594. Which will not react with phthalic anhydride?

A.

B.

C.

D.
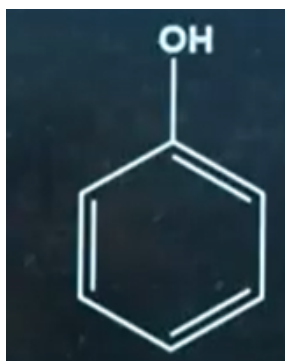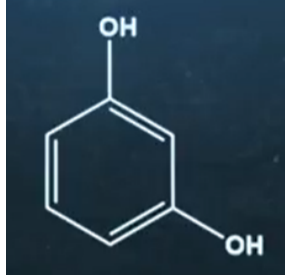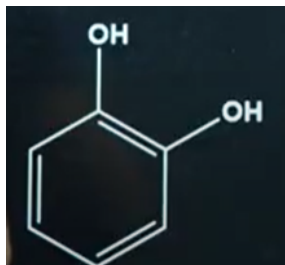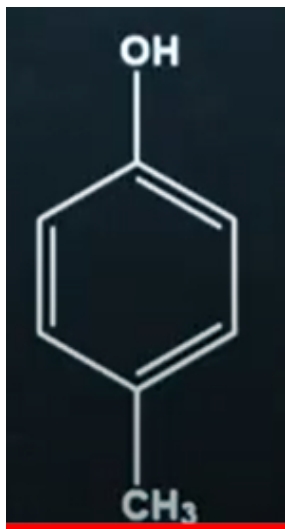
595. Which of the following complex do not show geometrical isomersm

A. $\left[Pt(en)_2Cl_2\right]$

B. $\left[Pt\left(NH_3\right)_4Cl_2\right]$

C. $\left[Co(CN)_5H_2O\right]$

D. $\left[Co\left(NH_3\right)_3NO_2\right)_3\right]$
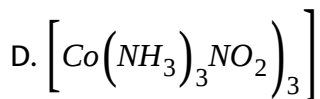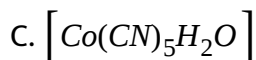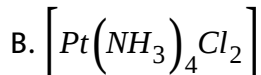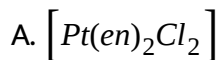
596. Statement 1: $BaCO_3$ is highly stable and insoluble in water

Statement 2: Stability of carbonates increase with increase in cationic size

   A. Statement 1 is true, Statement 2 is true

   B. Statement 1 is true, Statement 2 is false

   C. Statement 1 is flase, Statement 2 is true

   D. Statement 1 is false, Statement 2 is false

597. Statement 1: D_2O is used as a moderator in nuclear reactor and in exchange reactions for the study of aaction mechanisms

Statement 2: Bond energy of O-H is smaller then bond energy of O-D

A. Statement 1 is true, Statement 2 is true

B. Statement 1 is true, Statement 2 is false

C. Statement 1 is flase, Statement 2 is true

D. Statement 1 is false, Statement 2 is false

598. Identify the correct order of CFSE of following compound

$1 \left[Co(H_2O)_6 \right]^{3+}$

$2 \left[CoF_6 \right]^{3+}$

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

$4 \left[Co\left(NH_3\right)_6 \right]^{3+}$
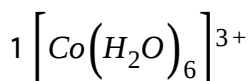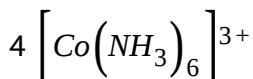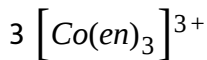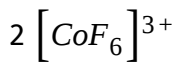
A. $2 < 1 < 4 < 3$

B. $1 < 2 < 3 < 4$

C. $4 < 3 < 2 < 1$

D. $2 < 1 < 3 < 4$

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599. 100ml solution of Na_3PO_4 contains 2.35g of Na^+ ion, then molarity of solution is [x] $\times 10^{-2}$, then x is

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600. In london forces interaction energy is proportional to r^x [where r is distance between two interactiog particles] then x is

A. -6

B. -3

C. 3

D. 6

601. What is the cell potential for following cell

$$Zn(s)/Zn^{2+}\left(0.04M \mid \mid Cu^{2+}(0.02M)/Cu(s)\right)$$

Given $E^{\circ}_{Zn/Zn^{2+}}$ = -0.76V & $E^{\circ}_{Cu/Cu^{2+}}$ = 0.34V

602. Which of the following is strong oxidising agent

A. O_3

B. H_2O_2

C. SO_2

D. $KMnO_4$
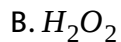
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603. Formation constant of $\left[Cu(NH_3)_4\right]^{2+}$ is K_f = 4×10^{11} then

dissociation constant of $\left[Cu(NH_3)_4\right]^{2+}$ is K_{diss}=[X]x10^{-13} then value of X

is

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604. Complete the following reaction

$$\xrightarrow[\text{AlBr}_3 \, /(\text{CH}_3\text{CO})_2\text{O}]{\text{Br}_2}$$ Product (P) is :

A.
(1)

B.
(2)

C.
(3)

D.
(4)
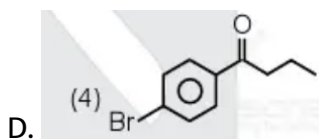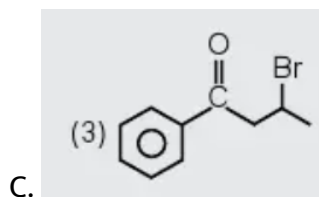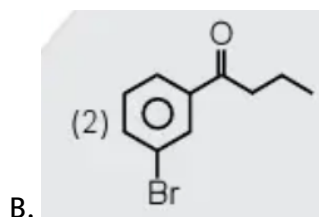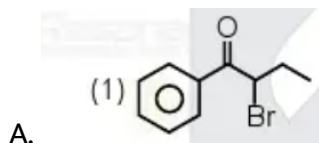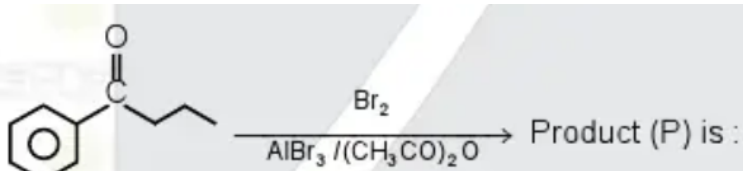
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605. Which statement is incorrect regarding photochemical smog

    A. Photochemical smog occur in warm,dry and sunny climate

    B. The main component of photochemical smog result from action of

       sunlight on unsaturated hydrocarbon

    C. It has high concentration of oxidising agent

    D. It occur by reaction of sunlight on saturated hydrocarbon

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606. What is the unit of 'a' in $\left(p + \dfrac{n^2 a}{V^2}\right)(V - nb) = nRT$

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607. Find the outermost electrons in f orbital in element Np

608. 1Kg of an aqueous solution of sucrose is cooled and maintained at $-4\,°C$. How much ice will be separated out of the solution if molality of the solution is 0.75. $K_f = 1.86$

609. Match column I and column II

Column I	Column II
Fe_2O_3	Paramagnetic
MnO	Ferromagnetic
NaCl	Diamagnetic
O_2	Antiferromagnetic

610. Deuterium is different from hydrogen in which property

A. Reacts more than hydrogen

B. Reacts less than hydrogen

C. It emits beta particles

D. Its reactivity is same as that of hydrogen

Answer: B

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611. Statement 1: Whether ethyl phenyl ether can be prepared by williamson synthesis

Statement 2: Bromo benzene on reaction with sodium ethoxide gives ethyl phenyl ether

A. Statement 1 is true, Statement 2 is true

B. Statement 1 is true, Statement 2 is false

C. Statement 1 is flase, Statement 2 is true

D. Statement 1 is false, Statement 2 is false

Answer: B

612. V_2O_3 and CrO respectively are

A. Acidic & basic

B. Basic & basic

C. Basic & acidic

D. Amphoteric and Basic

Answer: B

613. Number of water molecules present in gypsum,dead burnt plaster and plaster of paris respectively are

A. 2,0,0.5

B. 0.5,2,0

C. 2,0.5,0

D. 0,2,0.5

Answer: A

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614. The strucutre of uracil is

A.

B.

C.

D.
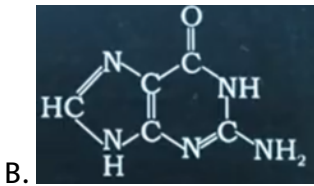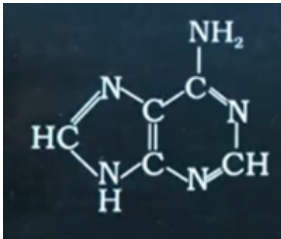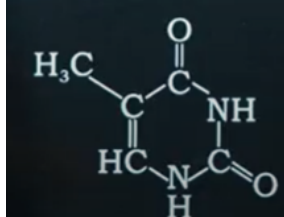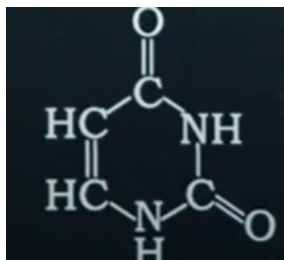
Answer: D

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615. Which will provide strong back bonding

A. BCl_3

B. BF_3

C. BBr_3

D. BI_3

Answer: B

616. Low melting point metals are purified by:

A. Liquation

B. Zone refinning

C. Chromatography

D. Distillation

Answer: A

617. Complete the following reaction

NaOCl
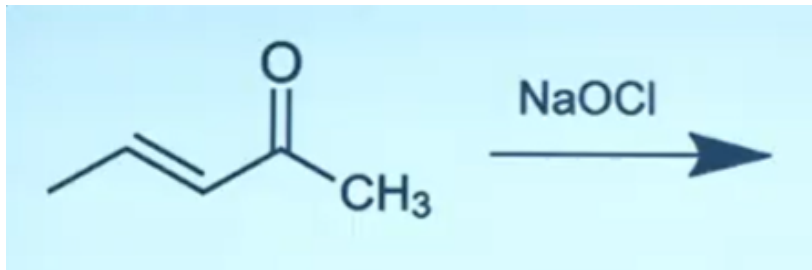
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618. Complete the following reaction

Find the B :

$\xrightarrow{\text{Mg / dry ether}}$ A $\xrightarrow{\text{Ethanol}}$ B
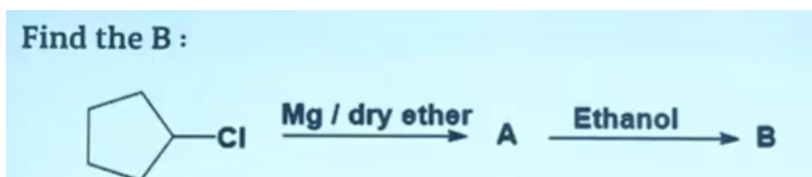
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619. 10ml of $KMnO_4$ reacts with equal volume of 0.1M ferrous sulphate in acidic medium. Find strength of $KMnO_4$ in g/lit

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620. one mole of octahedral complex ML_2Cl_3 reacts with $AgNO_3$ to give one mole of AgCl. The denticity of L is

621. Number of lone pair present on central atom in XeF_2, XeO_2, XeO_2F_2, XeO_3?

622. Tyndall effect shown effectively in which of the following

A. Suspension

B. Lyophilic sol

C. Lyophobic sol

D. True solution

Answer: C

---

623. $FeCl_3 + K_4\left[Fe(CN)_6\right] \rightarrow$?
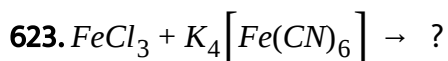
    A. Brown ring complex

    B. Sodium nitroprusside

    C. Turnbull's blue

    D. Prussian blue

Answer: D

---

624. From 0.2g of compound, 0.188g of AgBr is formed by Carius method.

Find % of Br?

A. 0.8

B. 0.2

C. 0.4

D. 0.1

Answer: C

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625. When the intensity of radiation incident on photographic plate is increased keeping frequency constant, thenthe number and K.E. of photoelectrons emitted?

A. Remains same and increases

B. Increases and remains same

C. Decreases and remains same

D. Decreases and decreases

Answer: B

---

626. Find the oxidation number of S in $H_2S_{x+2}O_6$

A. 0 & +5 only

B. 5only

C. 0 & +3 only

D. 3 only

---

627. Find the incorrect statement regarding primary aliphatic amines

A. They can be produced by Gabiel phthalimide process

B. Its solubility is greater than $2°$ amines

C. can be distinguised by Carbylamine test

D. It is less basic than aromatic amines

Answer: D

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628. For reaction $3A \rightarrow 2B$

Rate of formation of B = 2.67mol/(litre.sec)

Then rate of disapperance of A is

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629. 200ml 0.2M HCl is mixed with 400ml 0.1M NaOH solution then find change in temperature.

Given 1. Heat of neutralization of 1mole of HCl and 1mol of NaOH = 57.1KJ/mol

2 Specific heat of water = $4.18J/\left(g\,°C\right)$

3 Density of water = $1g/cm^3$

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630. Complete the following reaction

$+ NaNH_2$ $\xrightarrow{Br}$ (A) $\xrightarrow{H_2/Pd-C}$ (B) $\xrightarrow{CrO_3}$

A and B respectively are :

A.

B.

C.

D.
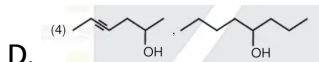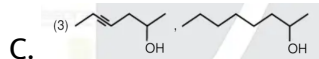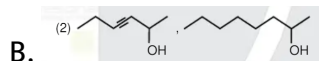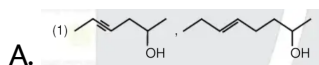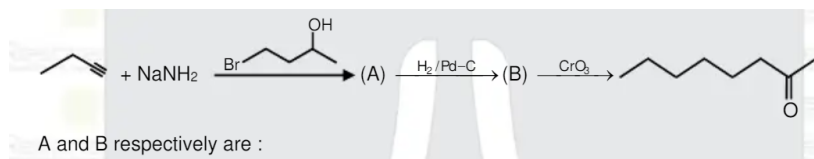
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631. $CFC \xrightarrow{UV} radical$ Radical formed in reaction will be:

A. $\overset{.}{C}FCl_2$

B. $\overset{.}{F}$

C. $\overset{.}{C}F_2Cl$

D. $\overset{.}{C}Cl_2$
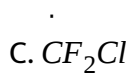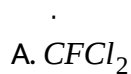
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632. Complete the following reaction

(a) (b) (c) (d)
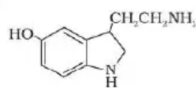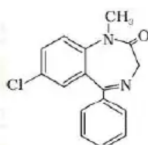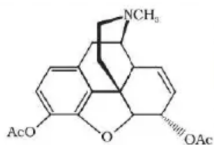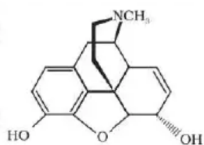
A. a,b&d are Narcotic analgesic

B. b&c are Narcotic analgesic

C. c&d are Tranquilizers

D. a,b&c are Tranquiliers

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633. Complete the following reaction
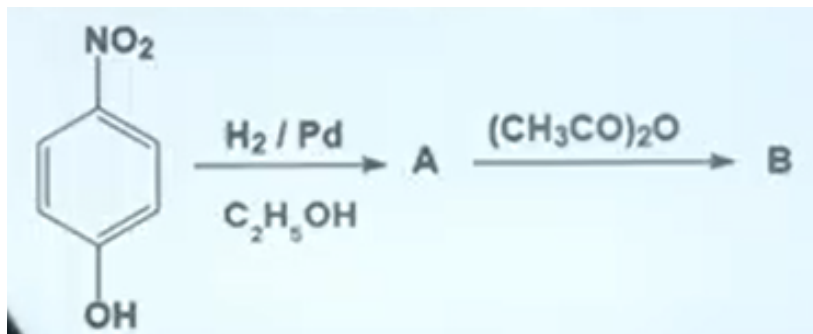
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634. How many of the following species will not show pyramidal geometry?

CO_3^{2-}, SO_3^{2-}, NO_3^-, PCl_3
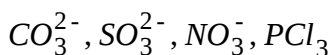
635. Ozone layer is depleted by which of the following rays?

A. UV rays

B. Gamma rays

C. X-rays

D. Visible rays

636. Number of optical isomers of $\left[Cr\left(C_2O_4\right)_3\right]^{3-}$

637. Why are lyophilic colloids stable?

A. They are solvated

B. They have strong intermolecular repulsion

C. They have negative charge

D. They have no charge

Answer: a

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638. Hydrolysis of sucrose gives:

A. α-glucose, β-fructose

B. α-glucose, α-fructose

C. β-glucose, β-fructose

D. β-glucose, α-fructose

Answer: a

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639. Potassium permanganate on heating gives -------colour which is ------in nature

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640. What we will get on heating red phorphous at 803K?

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641. Arrange in increasing order of ionic radius

$k^+, Cl^-, P^{3-}, S^{2-}, Ca^{2+}$

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642. $Cr^{3+} \quad \xrightarrow{dilNaOH} \quad A$

Find A

643. If Hydrogen like atom, the principal quantum number(excited) is 6,then find number of spectral lines.

644. In which of the following reagents, copper is not present?

A. Barfoed test

B. Seliwanoff test

C. Biuret test

D. Benedict's test

645. Plutonium from nuclear fuek is stabilized by which of the following:

A. O_2F_2

B. I_2O_5

C. ClF_3

D. BrF_5
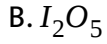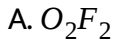
Answer: A

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646. The structure of the compound which enters the stomach and secretes which causes pain and irritation in the stomach is

A.

B.

C.

D.
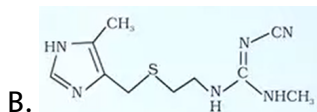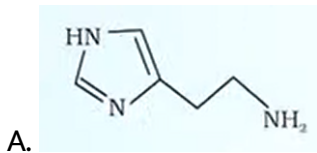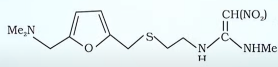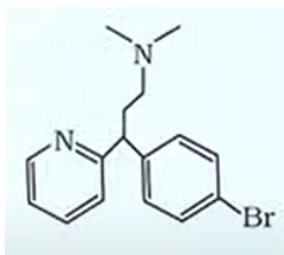
647. Complete the following reaction

Which of the following gives H_2O_2 on hydrolysis ?

(1) Na_2O_2 (2) Li_2O (3) MgO (4) KO_3

648. Match the following

Column I		Column II	
A.	Malachite	P.	$FeCO_3$
B.	Calamine	Q.	$CuCO_3.Cu(OH)_2$
C.	Siderite	R.	ZnS
D.	Sphalarite	S.	$ZnCO_3$

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649. If 100g of propane reacts with 1000g of oxygen, mole fraction of CO_2 at end?

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650. Complete the following reaction

(a)   (b)   (c)
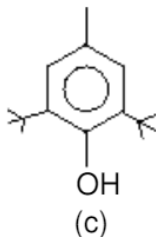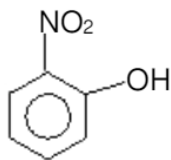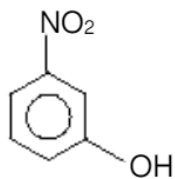
In which of the following intra molecular H-bonding possible

A. a&b only

B. only b

C. a,b &c

D. a &c

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651. Statement 1: Ethyl pent-3-ynoate react with CH_3MgBr than we will get $3°$ alcohol as a main product.

Statement 2: 1mole of ethyl pent-3-ynoate use 2 mole of CH_3MgBr to produce 3° alcohol.

A. Statement 1 is true, Statement 2 is true, Statement 2 is the correct explanation of statement 1.

B. Statement 1 is true, Statement 2 is true, Statement 2 is not the correct explanation of statement 1.

C. Statement 1 is flase, Statement 2 is true

D. Statement 1 is false, Statement 2 is false

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652. Complete the following reaction

In this following S_N^2 reaction which product will be.

Acetone
S_N^2
Major product?

A. (1) Ph–O–CH₂–CH=C with CH₃ and CH₃ groups

$(1)\ Ph{-}O{-}CH_2{-}CH{=}C{\Large\langle}^{CH_3}_{CH_3}$

B.

$(2)\ Ph{-}O{-}\overset{\overset{\displaystyle CH_3}{|}}{C}{=}C{\Large\langle}^{CH_3}_{CH_3}$

C.

(3)

OH (on benzene ring)

$CH_2{-}CH{=}C{\Large\langle}^{CH_3}_{CH_3}$

D.

(4)

OH (on benzene ring)

$H_2C{-}\overset{\overset{\displaystyle}{}}{\underset{\underset{\displaystyle CH_3}{|}}{C}}{-}CH_2{-}CH_2{-}Br$
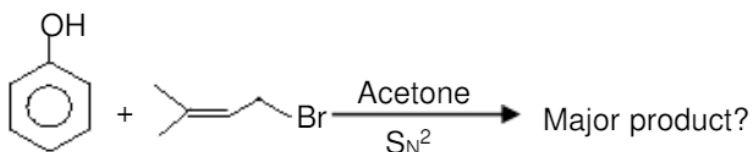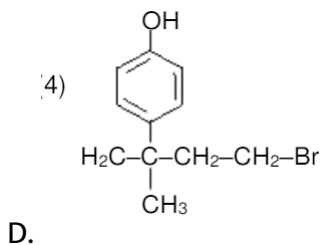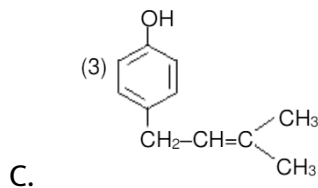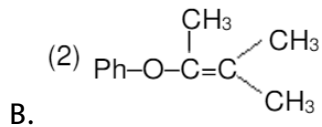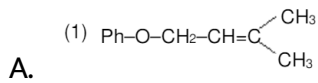
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653. What is pH of rain water?

A. 5.6

B. 7.6

C. 6.6

D. 4.6

654. Co-ordination number of Fe in $K_4\left[Fe(CN)_6\right]$ is

655. Find the ratio of $t_{75\%}$ and $t_{50\%}$ of first order reaction?

656. Which of the following aqueous solution of same concentration has highest depression in freezing point?

A. Glycine

B. Glycerol

C. $KHSO_4$

D. Glucose

Answer: C

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657. Structure of dichromate ion is:

A. Linear unsymmetrical Cr-O-Cr

B. Linear symmetrical Cr-O-Cr

C. Non-Linear unsymmetrical Cr-O-Cr

D. Non-Linear symmetrical Cr-O-Cr

Answer: D

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658. Statement 1: Metallic character decreases from left to right.

Statement 2: Ionization enthalpy increase and electronegativity decreases.

    A. Statement 1 is true, Statement 2 is true. Statement 1 is correct explanation of Statement 2

    B. Statement 1 is true, Statement 2 is true. Statement 1 is not correct explanation of Statement 2

    C. Statement 1 is true, Statement 2 is false

    D. Statement 1 is false, Statement 2 is true

Answer: C

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659. For Z=32 , Find the number of completely filled orbitals for which $m_l = 0$

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660. The number of water molecules connected through coordinate bond in $CuSO_4.5H_2O$?

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661. The molarity of 6.3g of $H_2C_2O_4.2H_2O$ in 250ml of water is $X \times 10^{-2}$. Find X?

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662. The number of halogens that form XO_3^- ion?

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663. Complete the following reaction

$$CH_3COOH \xrightarrow{SOCl_2} A \xrightarrow[AICl_3]{Benzene} B \xrightarrow[OH^-]{HCN} C$$

Find C

664. Complete the following reaction

$$H_3C-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{OH}{|}}{\overset{\overset{H}{|}}{C}}-CH_3 \xrightarrow{H_2SO_4} \text{Major product}$$
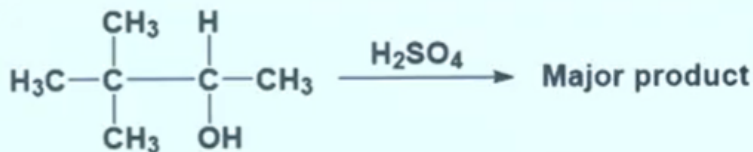
665. Which of the following has βC_1 - C_4 linkage

A. Amylose

B. Lactose

C. Sucrose

D. Maltose

666. The monomer of Navolac is:

A. O-Methylhydroxyphenol

B. Phenol and melamine

C. 1,3 Butadiene and Styrene

D. Melamine and Formaldehyde

667. Which of the following Lanthanoid is diamagnetic in +2 Oxidation state?

A. La

B. Yb

C. Ce

D. Nd

668. BOD value of clean and polluted water:

A. Clean BOD $>$ 17 and polluted $<$ 16

B. Clean BOD $>$ 5 and polluted $>$ 18

C. Clean BOD $<$ 5 and polluted $>$ 15

D. Clean BOD $>$ 18 and polluted $<$ 20

669. What is the denicity of ligands which form complex in biuret test?

A. 1

B. 2

C. 3

D. 4

670. The major component of portland cement is

A. Dicalcium aluminate

B. Dicalciul silicate

C. Tricalcium aluminate

D. Tricalcium silicate

671. Statement 1: Propene $\xrightarrow[H_2O]{Br_2}$ 1-Bromopropan-2-ol.

Statement 2: Reaction follows Markovnikov's addition.

A. Statement 1 is true, Statement 2 is true. Statement 1 is correct

explanation of Statement 2

B. Statement 1 is true, Statement 2 is true. Statement 1 is not correct

explanation of Statement 2

C. Statement 1 is true, Statement 2 is false

D. Statement 1 is false, Statement 2 is true

672. What is correct IUPAC name for the following compound?
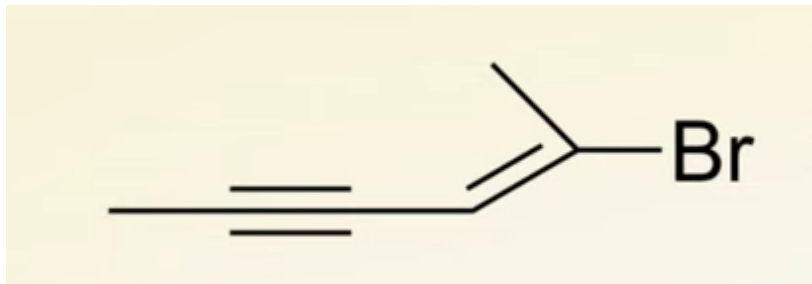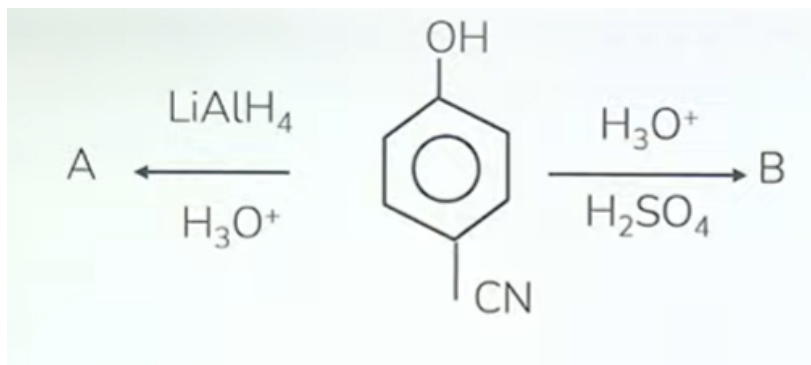
673.

Major products of A and B are?

674. How many of the following reagents can cause following reduction?
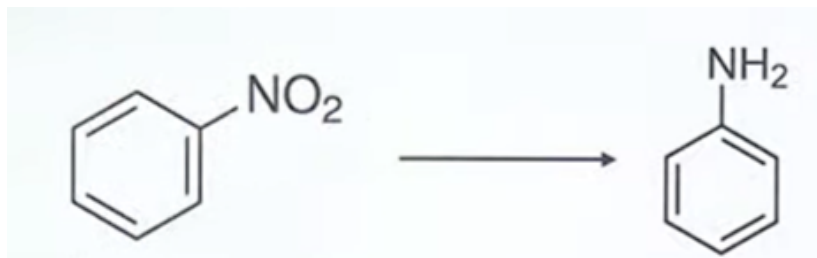
1) Sn+HCl

2) Fe+HCl

3) H_2/Pd

4) Raney Ni

5) Sn+NH_4OH

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675. Statement 1: Syn gas is produced by coal gasification

Statement 2: Syn gas products CO,CO_2,H_2 are in the ratio 1:1:1

A. Statement 1 is true, Statement 2 is true. Statement 1 is correct explanation of Statement 2

B. Statement 1 is true, Statement 2 is true. Statement 1 is not correct

explanation of Statement 2

C. Statement 1 is true, Statement 2 is false

D. Statement 1 is false, Statement 2 is true

---

676. A sparingly soluble salt A_3B_2 has molar mass M g/mole and solubility in water X g/L and its solubility product $K_{sp} = k\left(\dfrac{x}{m}\right)^5$ then value of k is -----

-

677. Which statement is true

The correct reactivity order of given compounds towards Acetate in Acetic acid solution is
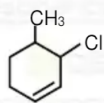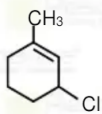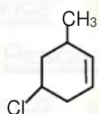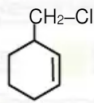
A. $ii > i > iii > iv$

B. $i > ii > iv > iii$

C. $ii > iii > i > iv$

D. $iv > ii > i > iii$

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678. For reaction $A + B \rightarrow M + N$ following energy diagram is obtained

Progress of reaction (or reaction coordinate) ⟶
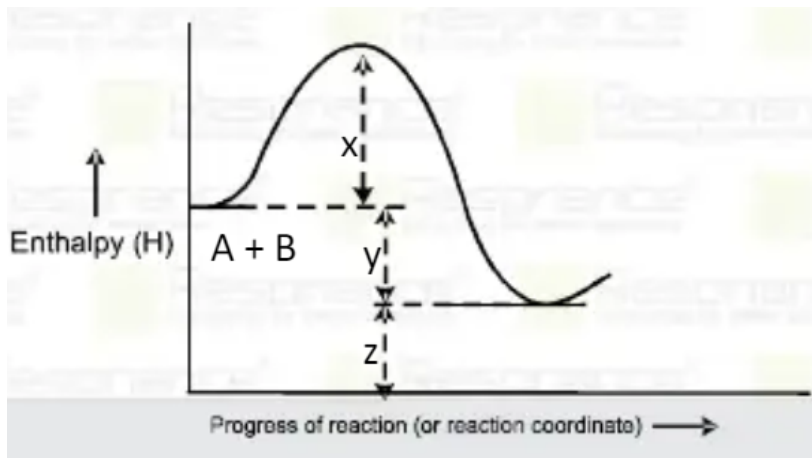
If $x = 50KJ/\text{mole}$, $y = 45KJ/\text{mole}$ and $z = 30KJ/\text{mole}$, then value of ΔH_{rxn}

(inKJ/mole) is-------.

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679. In a Radioactive decay $A \xrightarrow{k_1} B \xrightarrow{k_2} C \left(K_1 > K_2\right)$

Initially B is not present, then correct curve for centration of B with

respect to time is

A.
(1) [B]

Time →

B.
(2) [B]

Time →

C.
(3) [B]

Time →

D.
(4) [B]

Time →
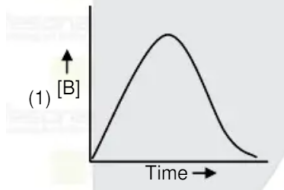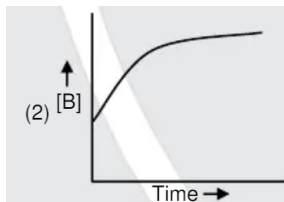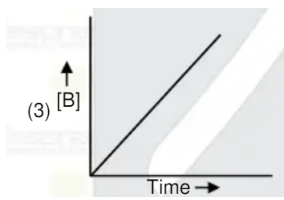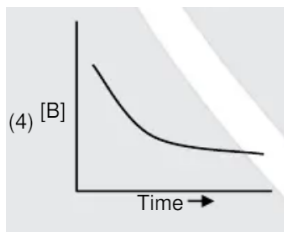
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680. How many of the following is/are soluble in 50% HNO_3 solution

CdS, PbS, As_2S_3, CuS, HgS, Bi_2S_3

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681. Statement 1: In electrolytic reduction of Al_2O_3 we use cryolyte.

Statement 2: Oxidation state of Al in cryolite is +3

A. Statement 1 is true, Statement 2 is true. Statement 1 is correct

explanation of Statement 2

B. Statement 1 is true, Statement 2 is true. Statement 1 is not correct

explanation of Statement 2

C. Statement 1 is true, Statement 2 is false

D. Statement 1 is false, Statement 2 is true

682. At constant temperature for given amount of an ideal gas the correct graph between PV vs P is

A.

(1)

B.

(2)

C.

(3)

D.

(4)
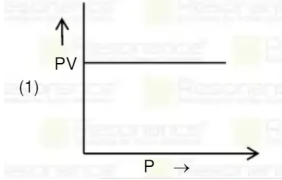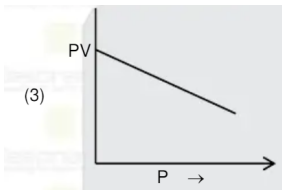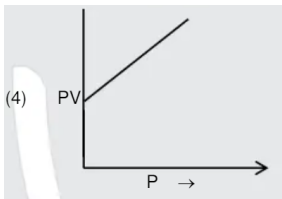
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683. The graph of $\left(\dfrac{x}{m}\right)$ vs P at two different temperature T_1 and T_2 is

[where $T_1 > T_2$]

A.

(1) $\left(\dfrac{x}{m}\right)$

T_2
T_1

$P \rightarrow$

B.

(2) $\left(\dfrac{x}{m}\right)$

T_1
T_2

$P \rightarrow$

C.

(3) $\left(\dfrac{x}{m}\right)$

T_1
T_2

$P \rightarrow$

D.

(4) $\left(\dfrac{x}{m}\right)$

T_2
T_1

$P \rightarrow$
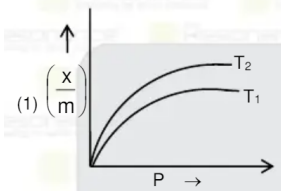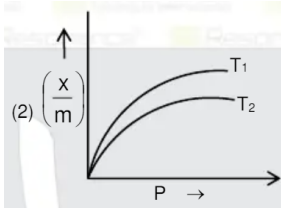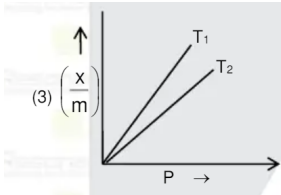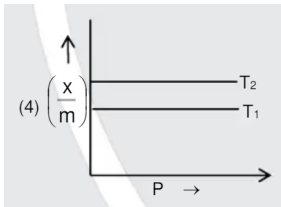
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684. Complete the following reaction
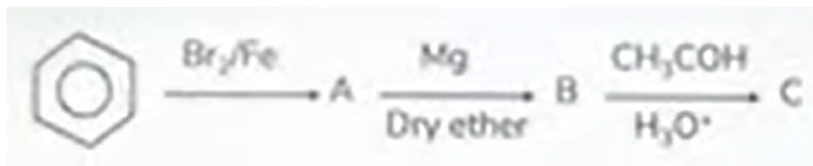
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685. Which of following is not fibrous protein?

A. Myosin

B. Keratin

C. Albumin

D. Collagens

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686. Which one is not polyester

A. Novolac

B. Dacron

C. Glyptal

D. phbv

687. Complete the following reaction

Match Qualitative analysis

Ions	Groups
Mn^{2+}	IV
Cu^{2+}	II
Al^{+3}	III

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688. Complete the following reaction
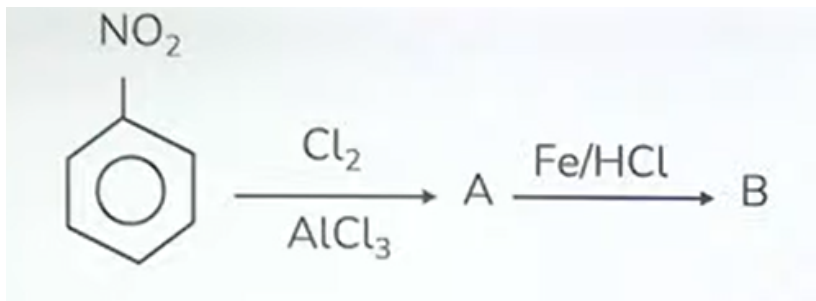
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689. Total number of unpaired electrons in O_2^{2-}

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690. Total number of main impurities in electrolysis of blister copper:

Au,Ag,Pt,Ru,Th,Te,Sb,Se

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691. Statement 1: Lithium form hydrated chlorides but other alkali metals do not form hydrated chlorides

Statement 2: Lithium has more polarising power than other

A. Statement 1 is true, Statement 2 is true. Statement 1 is correct explanation of Statement 2

B. Statement 1 is true, Statement 2 is true. Statement 1 is not correct explanation of Statement 2

C. Statement 1 is true, Statement 2 is false

D. Statement 1 is false, Statement 2 is true

692. The magnetic moment of $\left[Fe(CO)_4\left(C_2O_4\right)\right]^+$ is

693. The magnetic quantum number of last electron of Zn^+

694. Find pH of solution formed by mixing 50ml of 1M HCl and 30ml of 1M NaOH?

695. Outer electronic configuration of Eu^{2+}

696. What is the number of S=O bonds in Peroxodisulphuric acid, Sulphurous acid and pyrosulphuric acid?

697. What is the stability order of oxides in $\left(X_2O\right)$

    A. $Cl > Br > I$

    B. $Br > Cl > I$

    C. $Cl > I > Br$

    D. $I > Cl > Br$

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698. Which of the following participate in disproportionation reaction

$Cr_2O_7^{2-}, MnO_4^-, ClO^-, F_2, ClO_4^-, Cl_2$

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699. Incorrect statement about hydrogen

    A. Dihydrogen yields atomic hydrogen when irridiated with UV light

B. Dihydrogen can be prepared by reacting Zn with HCl and NaOH

C. Dihydrogen has the highest bond dissociation energy among all

   diatomic molecules linked with single bond

D. At 200K, only 8.1% of H_2 gets dissociated

700.   Complete   the   following   reaction
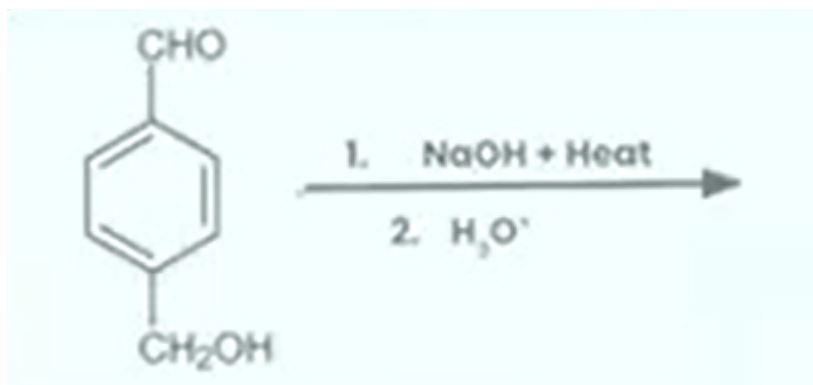
701. Anion and cation combine to form a FCC lattice. Cation occupies octahedral voids . The EMprirical formula of the compound is A_xB . Find x

702. Complete the following reaction

(1)

A.

(2)

B.

(3)

C.

D. (4)
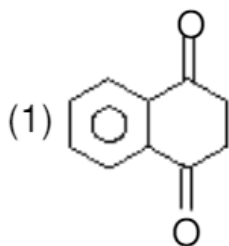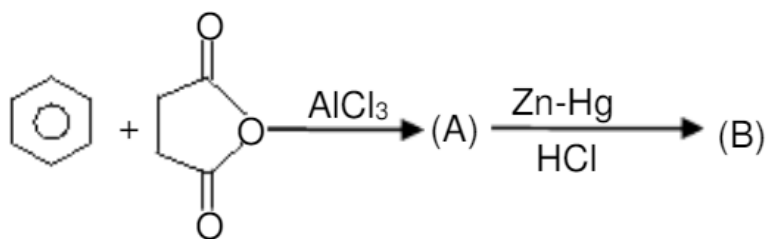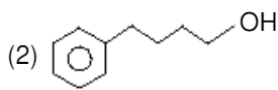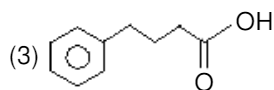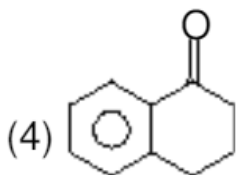
703. Complete the following reaction

Find the product A and B :

$$\text{(ring)} \xrightarrow[\text{H}_2\text{SO}_4]{\text{HNO}_3} \text{(A)} \xrightarrow{\text{Fe/HCl}} \text{(B)}$$

A.
(1)

B.
(2)

C.
(3)

NH₂–Cl

NO₂

(4)

D.
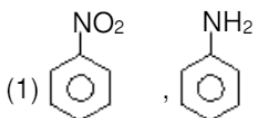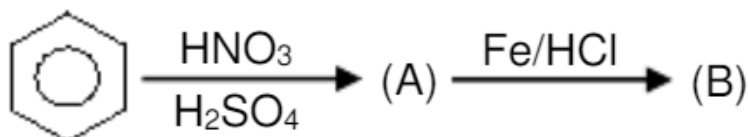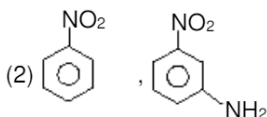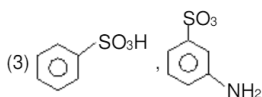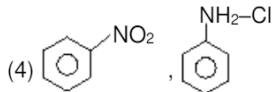
704. Which order is correct

CH₃
CH₃

H
H

I

CH₃
H·····H
H
CH₃

II

CH₃
H·····CH₃
H
H

III

CH₃
H
H
CH₃ H

IV
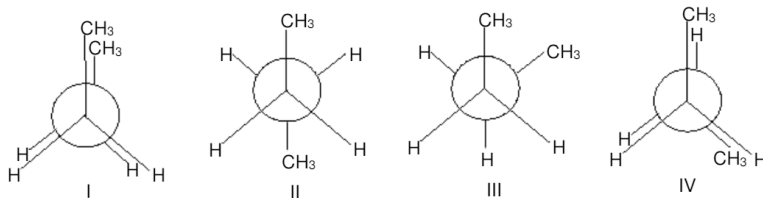
The order Potential energy of above conformations is

A. $III > II > IV > I$

B. $II > III > IV > I$

C. $I > II > IV > III$

D. $IV > II > III > I$

705. A solution of 20g substance in 200g of benzene shows elevation in B.P. is 0.17 and an another solution which contains 20g of same substance in 200g of C_2H_5OH shows elevation in B.P. is "X". The value of X

Given: Substance form dimer (100%) in benzene while substance exists as monomer in ethyl alcohol $\left(C_5H_5OH\right)$.

K_b of C_6H_6 = 2.53 ° $C/molal$, $K_b ofC_2H_5OH$ = 0.37 ° $C/molal$

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706. Match the following columns

Match the following :

Column-I	Column-II
(p) Cell constant	(i) $\Omega^{-1} m^{-1}$
(q) Conductivity	(ii) m^{-1}
(r) Molar conductivity	(iii) Dimensionless
(s) Degree of dissociation	(iv) $Sm^2 mole^{-1}$

A. p-i,q-ii,r-iii,s-iv

B. p-ii,q-i,r-iv,s-iii

C. p-iii,q-iv,r-i,s-ii

D. p-i,q-iii,r-ii,s-iv

707. Which nitrogen oxide has no N-N bond?

A. N_2O_4

B. N_2O

C. N_2O_3

D. N_2O_5
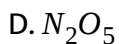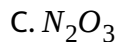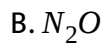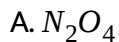
Answer: D

708. Calamine and Malachite respectively are ores of

A. Cu & Zn

B. Cu & Cu

C. Zn & Cu

D. Fe & Cu

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709. What is added to potassium ferrocyanide (Lassaigne nitrogen test) to give Prussian blue color?

A. $FeCl_3$

B. $FeCl_2$

C. $CoCl_3$

D. $CoCl_2$

Answer: A

710. Identify the elements for which electronic confugiration in +3 oxidation state is $[Ar]3d^5$

    A. Mn

    B. Fe

    C. Rn

    D. Co

711. The monomers of dacron is

    A. Salicyclic acid

    B. Terepthalic acid

    C. Glycerol

D. Isoprene

712. H_2O_2 on reaction with I_2 in basic medium gives?

A. IO_3^-

B. IO^-

C. I^-

D. IO_4^-

713. Reaction of aniline with $K_2Cr_2O_7$ gives

A. Nitrobenzene

B. Quinol

C. Acetophenone

D. Parabenzoquinone

---

714. Stereoisomers that are formed electrophilic addition of bromine to Trans but-2-ene

A. (±)-2,3-Dibromobutane

B. Meso-2,3-Dibromobutane

C. Neither

D. Either

715. How many of the following are paramagnetic?

$MgO, KO_2, Na_2O_2, BaO_2, BeO, CaO, Li_2O$

716. The sum of oxidation state of complex $\left[Ag\left(NH_3\right)_2\right]\left[Ag(CN)_2\right]$ is:

717. The magnetic moment of B_2^+ is:

718. The colors of Fe^{2+} and Fe^{3+} respectively are:

A. Green & yellow

B. Yellow & green

C. Yellow and blue

D. Blue and yellow

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719. The BOD value of clean and water is

A. 11ppm

B. 21ppm

C. 3ppm

D. 18ppm

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720. Calculate the number of atoms in 8g of sodium

721. Crystal field energy is 0.8 and magnetic moment of 3.87. Find the metal

    A. Mn^{4+}

    B. Cr^{3+}

    C. Co^{2+}

    D. V^{3+}

722. Statement 1: $NaHSO_3$ involves protonation for the formation of stable species on reaction with aldehyde and ketones

Statement 2: HCN +aldehyde/Ketone give amide

A. Statement 1 is true, Statement 2 is true. Statement 1 is correct

explanation of Statement 2

B. Statement 1 is true, Statement 2 is true. Statement 1 is not correct

explanation of Statement 2

C. Statement 1 is true, Statement 2 is false

D. Statement 1 is Flase, Statement 2 is false
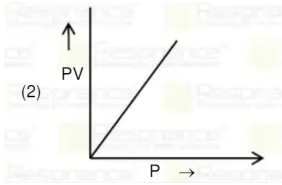
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723. A bulb of 120watts emits of light of wave length 920nm, then number

of photon enitted by bulb per second are $[X] \times 10^{20}$ then value of X is

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724. For endothermic reaction which is correct graph

A.
(1)

B.
(2)

C.
(3)

D.
(4)
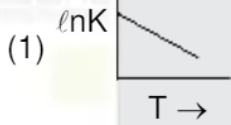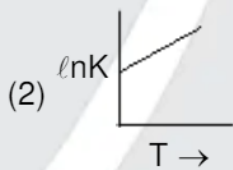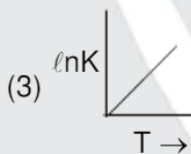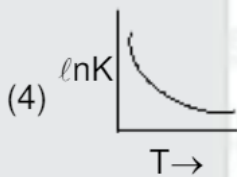
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725. For a reaction $\Delta H = -158.73 KJ/mol$, $\Delta S = -58.1 J/K$, T= 298K then value of ΔG (in KJ) is

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726. Chemical formula of phosgene is:

A. $COCl_2$

B. $CaOCl_2$

C. $CaCO_3$

D. $COCl$
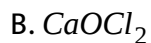
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727. Which of the following metal ion have magnetic moment 3.78B.M

A. Co^{3+}

B. Mn^{2+}

C. V^{3+}

D. Cr^{3+}

SECTION-A

1. The product formed in the first step of the reaction of
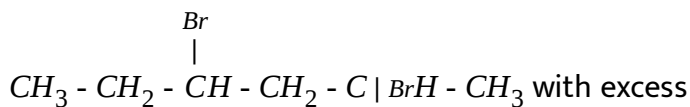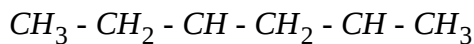
$$CH_3 - CH_2 - \overset{\overset{\displaystyle Br}{\displaystyle |}}{CH} - CH_2 - C|BrH - CH_3 \text{ with excess}$$

$$Mg/Et_2O\left(Et = C_2H_5\right) \text{ is :}$$

A.
$$CH_3 - CH_2 - \overset{|}{CH} - CH_2 - \overset{|}{CH} - CH_3$$
$$CH_3 - CH - CH_2 - CH - CH_2 - CH_3$$

B.
$$CH_3 - CH_2 - \overset{|}{CH} - CH_2 - \overset{|}{CH} - CH_3$$
$$CH_3 - CH_2 - CH - CH_2 - CH - CH_3$$

C.
$$CH_3 - CH \overset{\nearrow CH_2}{\underset{\searrow CH-CH_3}{\overset{|}{}}}$$

D. $CH_3CH_2 - \overset{\overset{\displaystyle MgBr}{\displaystyle |}}{C}H - CH_2 - C|MgBrH - CH_3$
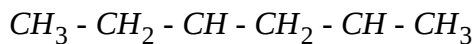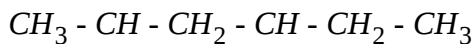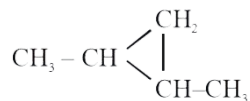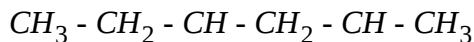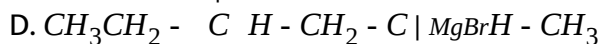
Answer: D

2. Arrange Mg,Al,P,Si,S in decreasing order of ionization enthalpy

A. $Mg < Al < Si < S < P$

B. $A < Mg < Si < S < P$

C. $Mg < Al < Si < P < S$

D. $Al < Mg < Si < S < P$

Answer: B

3. A' and 'B' in the following reactions are :

A.

(A) : [benzene ring with $\overset{+}{N_2Cl^-}$ substituent] (B) : [benzene ring with CHO substituent]

B.

(A) : [benzene ring with $\overset{+}{N_2Cl^-}$ substituent] (B) : [benzene ring with Cl substituent]

C.

(A) : [benzene ring with CN substituent] (B) : [benzene ring with CHO substituent]

D.

(A) : [benzene ring with CN substituent] (B) : [benzene ring with Cl substituent]
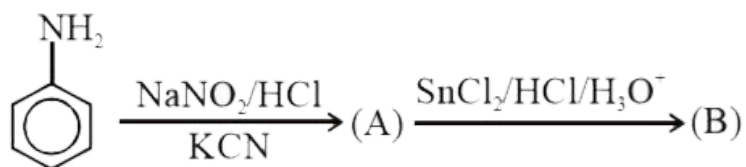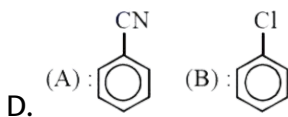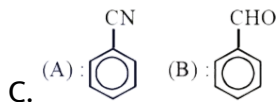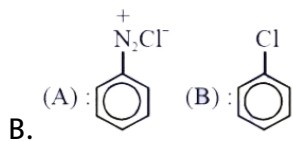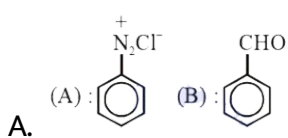
Answer: C

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4. Which of the following are is concentrated using group 1 cyanide salt

A. Sphalerite

B. Calamine

C. Siderite

D. Malachite

Answer: A

5. Al_2O_3 was leached with alkali to get X. The solution of X on passing of gas Y, forms Z,X,Y and Z respectivily are :

A. $X = NA\left[Al(OH)_4\right]$, $Y = SO_2$. $Z = Al_2O_3$

B. $X = NA\left[Al(OH)_4\right]$, $Y = CO_2$, $Z = Al_2O_3 \cdot xH_2O$

C. $X = \left[Al(OH)_3\right]$, $Y = CO_2$, $Z = Al_2O_3$

D. $X = \left[Al(OH)_3\right]$, $Y = SO_2$, $Z = Al_2O_3 \cdot XH_2O$
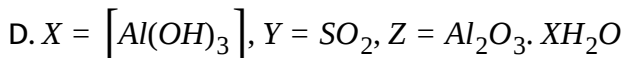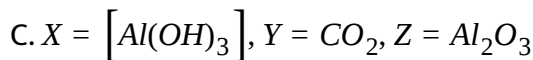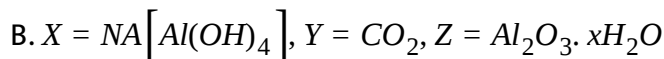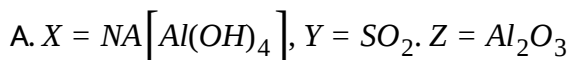
Answer: B

6. Which of the following are isostructural pairs

A. SO_4^{-2} and CrO_4^{-2}
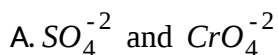
B. $SiCl_4$ and $TiCl_4$

C. NH_3 and NO_3^-

D. BCl_3 and $BrCl_3$

A. C and D only

B. A and B only

C. A and C only

D. B and C only

Answer: B

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7. What is the final product (major)'A' in the given reaction?

A.

B.

C.

D.
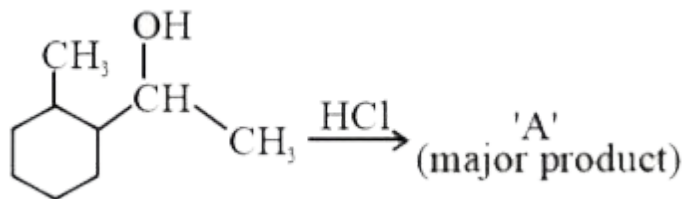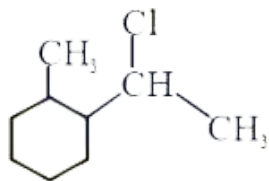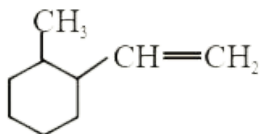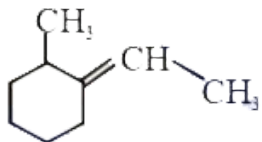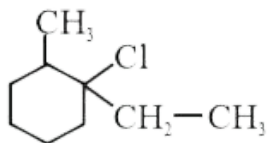
Answer: A

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8. In the following reaction the reason why meta-nitro product also

formed is

$$\underset{\text{NH}_2}{\text{(benzene ring)}} \xrightarrow[\text{Conc.H}_2\text{SO}_4,\ 288\text{K}]{\text{Conc.HNO}_3}$$

[A]	[B]	[C]
51%	47%	2%
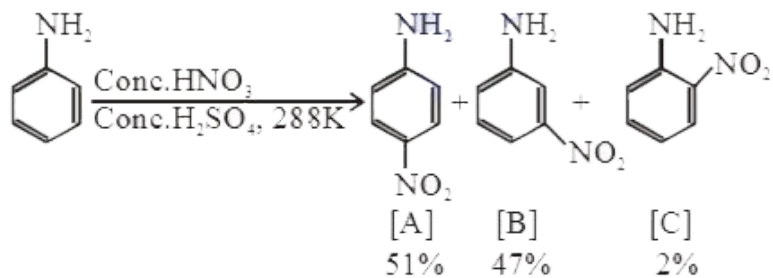
A. low tempreature

B. $-NH_2$ group is highly meta-dirctive

C. Formation of anilinium ion

D. $-NO_2$ subsititution always takes place at meta-position

Answer: C

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9. In Freundlich adsorption isothem, slope of AB line is :
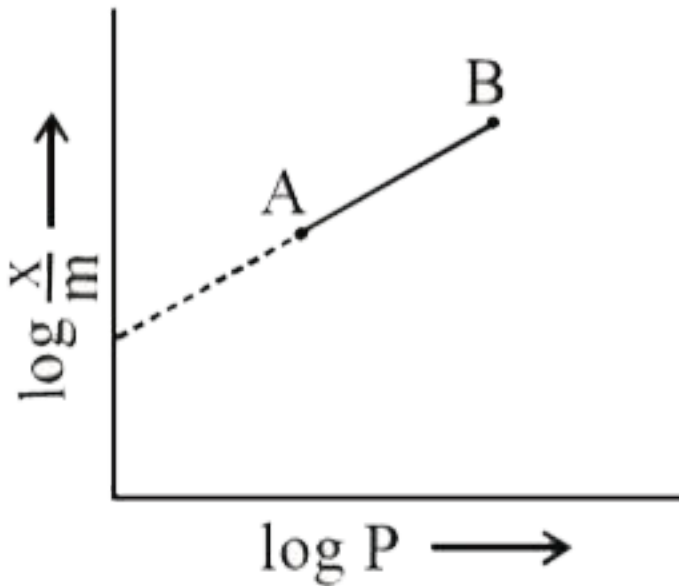
A. $\log n$ with $(n > 1)$

B. n with $(n, 0.1 \text{ to } 0.5)$

C. $\dfrac{\log 1}{n}$ with$(n < 1)$

D. $\dfrac{1}{n}$ with $\left(\dfrac{1}{n} = 0 \text{ to } 1\right)$

Answer: D

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10. $HOCl + H_2O_2 \rightarrow H_3O^+ + Cl^- + O_2$

$I_2 + H_2O_2 + 2OH^- \rightarrow 2I^- + 2H_2O + O_2$
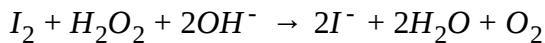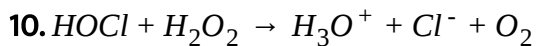
Choose the correct option

A. H_2O_2 acts as rfucing and oxidising agent respectively in equation

(A) and (B)

B. H_2O_2 acts as oxidising agent in equation (A) and (B)

C. H_2O_2 acts as reducing agent in equation (A) and (B)

D. H_2O_2 act as oxidizing and reducing agent rspctively in equation (A)

and (B)

Answer: C

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11. What is thee majoor product formed by HI reaction with

$$CH_3 \diagdown \overset{CH_3}{\underset{CH_3}{\overset{|}{C}}} \diagup CH = CH_2 \ ?$$

A. $CH_3 - \overset{CH_3}{\overset{|}{C}} \mid CH_3 - C \mid HH - CH_2I$

B. $CH_3 - \overset{CH_3}{\overset{|}{C}} \mid CH_3 - C \mid IH - CH_3$

C. $CH_3 - \overset{CH_3}{\overset{|}{C}} \mid I - C \mid CH_3H - CH_3$

D. $CH_3 - CH \mid CH_3 - C \mid IH - CH_2 - CH_3$
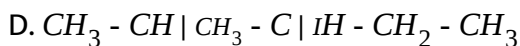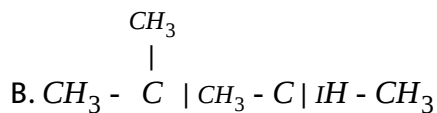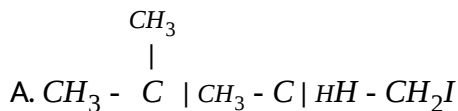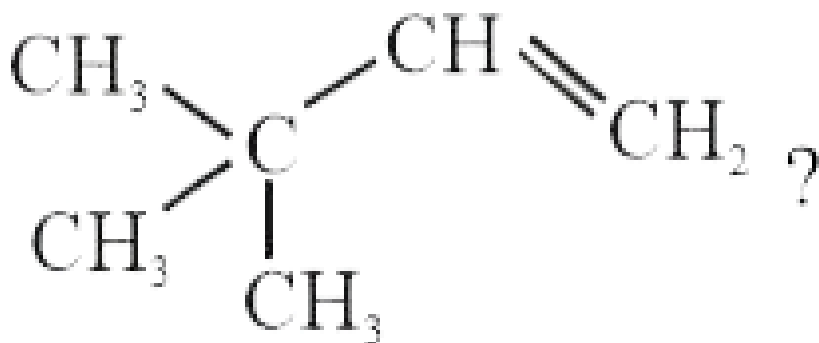
Answer: C

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12. Which of the following reagent is used for the following reaction

$$CH_3CH_2CH_3 \rightarrow CH_3CH_2CHO$$
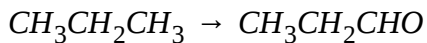
    A. Manganese acetate

    B. Copper at high temperature and pressure

    C. Molybdenum oxide

    D. Potassium permanganate

Answer: C

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13. Given below are two statements

Statement 1: Colourless cuprie metaborate is reduced to cuprous metaborate in a luminous flame.

Statement II : Cuprous metaborate is obtained by heating boric anhydride and copper sulphate in a non-luminous flame.

In the light of the above statements, choose the most appropriate answer from the options given below

    A. Statement I is true but Statement II is false

    B. Both Statement I and Statement II are false

    C. Statement I is false but Statement. II is true

    D. Both Statement I and Statement II are true

Answer: B

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14. Out of the following, which type of interaction is responsible for the stabilisation ofa-helix structure of proteins?

    A. Ionic bonding

    B. Hydrogen bonding

    C. Covalent bonding

D. vander Waals forces

Answer: B

15. Match List I with List II

List I	ListII
(Monomer unit)	(Polymer)
(a) Carprolactum	(i) Natural ruber
(b)2-Chloro-1-,3-butadience	(ii) Buna-N
(c) Isoperene	(iii) Nylon 6
(d) Acrylonitrile	(iv) Neoprene

Chosse the correct answer from the options given below

A. $(a) \rightarrow (iv), (b) \rightarrow (iii), (c) \rightarrow (ii), (d) \rightarrow (i)$

B. $(a) \rightarrow (ii), (b) \rightarrow (i), (c) \rightarrow (iv), d \rightarrow (iii)$

C. $(a) \rightarrow (iii), (b) \rightarrow (iv), (c) \rightarrow (i), (d) \rightarrow (ii)$

D. $(a) \rightarrow (i), (b) \rightarrow (ii), (c) \rightarrow (iii), (d) \rightarrow (iv)$

Answer: C

16. The gas released during anaerobic degradation of vegetation may lead to :

A. Ozone hole

B. Acid rain

C. Corrosion of metals

D. Global warming and cancer

Answer: D

17. The major components in "Gun Metal" are :

A. Cu, Zn and Ni

B. Cu, Sn and Zn

C. Al, Cu, Mg and Mn

D. Cu, Ni and Fe

Answer: B

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18. The electrode potential of M^{2+}/M of 3d-series elements shows positive value of:

A. Zn

B. Fe

C. Co

D. Cu

Answer: D

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19. Identify products A and B

$$\xrightarrow[273\ K]{dil.\ KMnO_4} A \xrightarrow{CrO_3} B$$

A.
A : (structure with CH₃, OH, OH)   B : (structure with CH₃, O)

B.
A : (structure with CH₃, OH, OH)   B : (structure with CH₃, OH, O)

C.
A : OHC—CH₂CH₂CH₂—C(=O)—CH₃

B : HOOC—CH₂CH₂CH₂—C(=O)—CH₃

D.
A : (structure with CH₃, OH)   (4) (structure with CH₃, O)
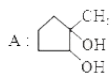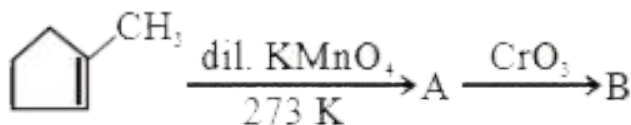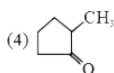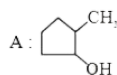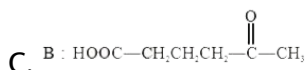
Answer: B

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20. Which of the following compound gives pink colour on reaction with pthalic anhydride in conc. H_2SO_4 followed by reatment with NaOH?

A.

B.

C.

D.
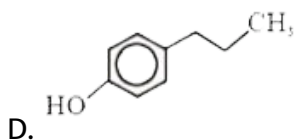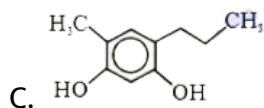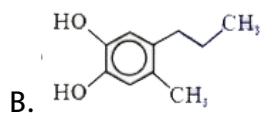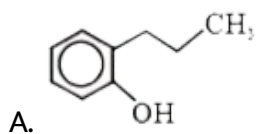
Answer: A

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21. Statement 1: CeO_2 is used for oxidation of aldehyde and ketone

statement 2: Aqueous solution of $Cuso_4$ acts as strong reducing agent.

A. Statement I is false but statement II is true

B. Statment. I is true but statement II is false

C. Both statement i and statement II are true

D. Both statement I and statement II are false

Answer: C

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22. According to molecular theory, the species among the following that does not exist is:

A. $He_2{}^+$

B. $He_2{}^-$

C. Be_2

D. O_2^{2-}
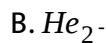
Answer: C

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23. Which of the following reactions will not give p- aminoazobenzene?

(A)

NO_2

(i) Sn/HCl
(ii) HNO_2
(iii) Aniline

(B)

NO_2

(i) $NaBH_4$
(ii) NaOH
(iii) Aniline

(C)

NH_2

(i) HNO_2
(ii) Aniline, HCl
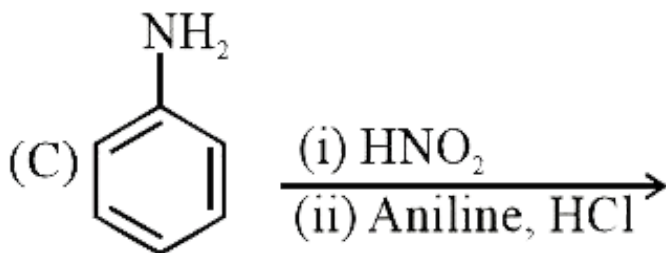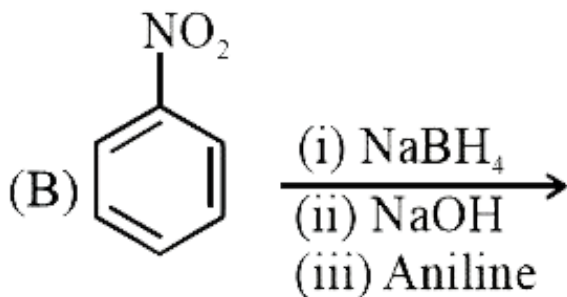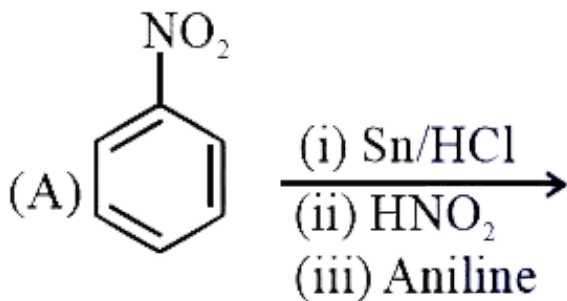
A. A only

B. B only

C. C only

D. A and B

Answer: B

24. Which of the following equations depicts the oxidizing nature of H_2O_2
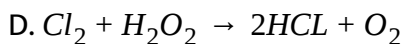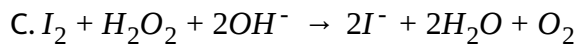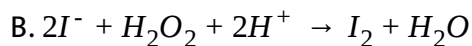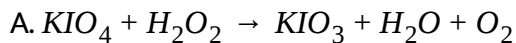
    A. $KIO_4 + H_2O_2 \rightarrow KIO_3 + H_2O + O_2$

    B. $2I^- + H_2O_2 + 2H^+ \rightarrow I_2 + H_2O$

    C. $I_2 + H_2O_2 + 2OH^- \rightarrow 2I^- + 2H_2O + O_2$

    D. $Cl_2 + H_2O_2 \rightarrow 2HCL + O_2$

Answer: B

25. Identify A in the given chemical reaction

$$\text{(branched structure with } CH_3, CH_2, CH_2, CH_2, CH, CH_3, CH_3 \text{)} \quad \xrightarrow[\text{773 K, 10-20 atm}]{Mo_2O_3} \quad \text{'A' major product}$$

A.

B.

C.

CH_3

D.

CH_3
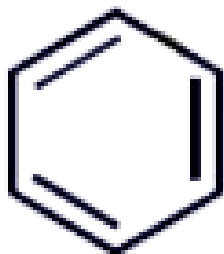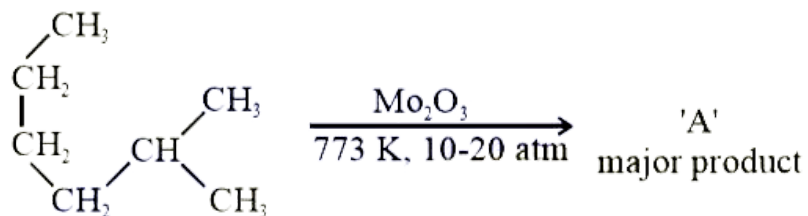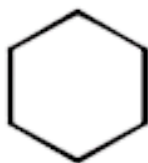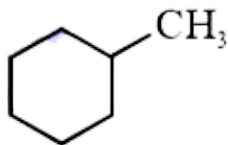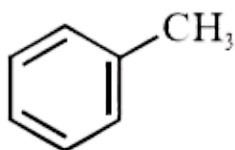
Answer: D

26. Complete combustion of 1.18 g of organic compound gives 2.64 g of CO_2 &1.26g of H_2O. Find emprical formula of compound ?

27. Which one of the following reactions will not form acetaldehyde

A. $CH_3CH_2OH \xrightarrow[573K]{cu}$

B. $CH_3CN \xrightarrow[(ii)H_2O]{(i) DIBAL-H}$

C. $CH_2 = CH_2 + O_2 \xrightarrow{Pd(II)/Cu(II)} H_2O$

D. $CH_3CH_2OH \xrightarrow{CrO_3-H_2SO_4}$
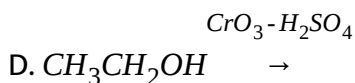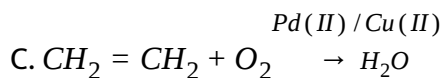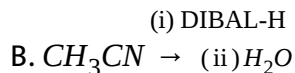
Answer: D

28. The correct statement about B_2H_6 is:

A. Terminal B-H bonds have less p-character when compared to briging

bonds

B. The two B-H-B bonds are not of same length

C. All B-H-B angles are of $120\,°$

D. Its fragment ,BH_3, behaves as a Lewis base

Answer: A

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29. The plots of radial distribution function for various orbitals of

hydrogen atom against 'r' are given below

(A) $4\pi r^2 R_n^2(r)$ vs $r(\text{Å})$

(B) $4\pi r^2 R_n^2(r)$ vs $r(\text{Å})$

(C) $4\pi r^2 R_n^2(r)$ vs $r(\text{Å})$

(D) $4\pi r^2 R_n^2(r)$ vs $r(\text{Å})$
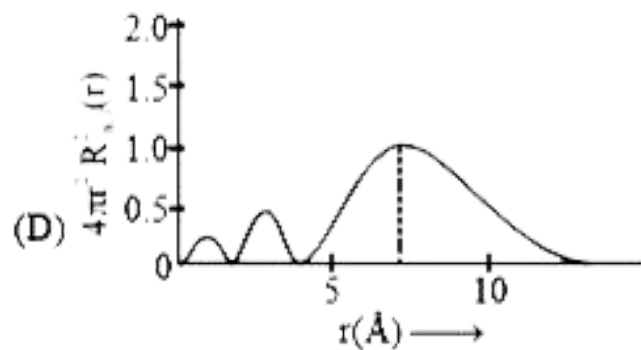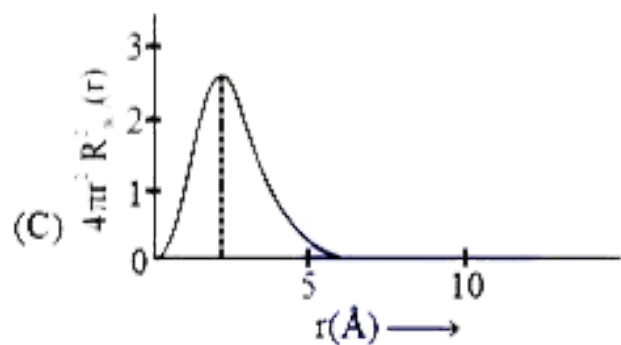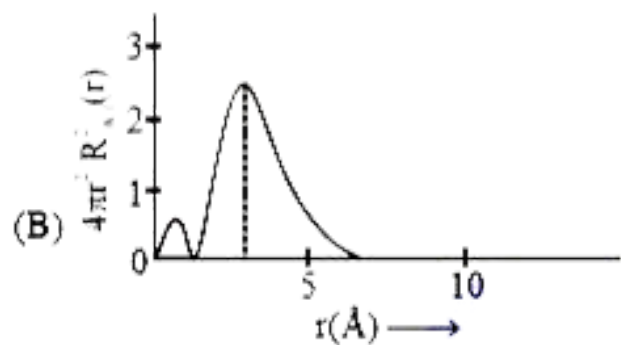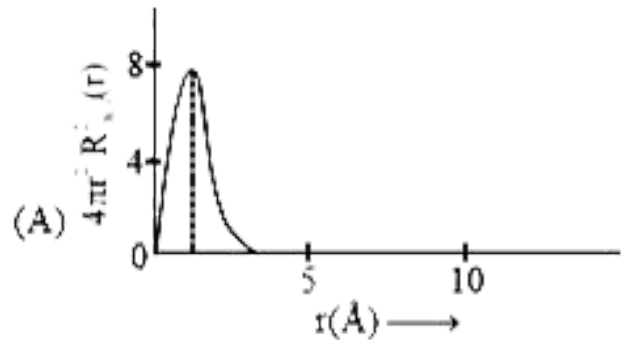
The correct plot for 3s orbital is :

A. (B)

B. (A)

C. (D)

D. (C)

Answer: C

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30. Given below are two statements:

Statement I: An allotrope of oxygen is an important intermediate in the formation of reducing smog

Statement II : Gases such as oxides of nitrogen and sulphur present in troposphere contribute to the formation of photochemical smog. In the light of the above statements, choose the correct answer from the options given below:

A. Both statement 1 and Statement II are false

B. Statement I is true but Statement II is false

C. Both Statement I and Statement II are true

D. Statement I is false but Statement II is true

Answer: A

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31. In which of the following pairs, the outer most electronic configuration will be the same?

A. Cr^+ and Mn^{2+}

B. Ni^{2+} and Cu^+

C. Fe^{2+} and Co^+

D. V^{2+} and Cr^+

Answer: A

32. Which of the glycosidic linkage between galactose and glucose is present in lactose?

    A. C-1 of galactose and C-4 of glucose

    B. C-1 of glucose and C-6 of galactose

    C. C-1 of glucose and C-4 of galactose

    D. C-1 of galactose and C-6 of glucose

Answer: A

33. Compound(s) which will liberate carbon dioxide with sodium bicarbonate solution is/are:

A =

B =

C =
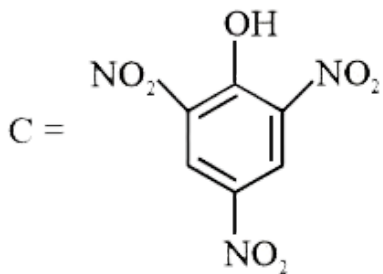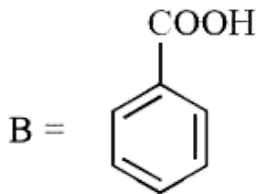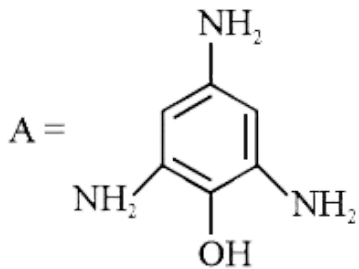
A. B only

B. C only

C. B and C only

D. A and B only

Answer: C

34. The hybridization and magnetic nature of $\left[Mn(CN)_6\right]^{4-}$ and $\left[Fe(CN)_6\right]^{3-}$ respectively are

A. d^2sp^3 and diamagnetic

B. sp^3d^2 and diamagnetic

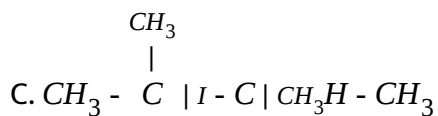C. d^2sp^3 and paramagnetic

D. sp^3d^2 and paramagnetic

Answer: C

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35. Ellingham diagram is a graphical representation of :

A. ΔH vs T

B. ΔG vs T

C. ΔG vs P

D. $(\Delta G - T\Delta S)$ vs T

Answer: B

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36. The solubilty of AgCN in a buffer solution of pH = 3 is x . The value of x is

[Assume : No cyano complex is formed, $K_{sp}(AgCN) = 2.2 \times 10^{-16}$ and $K_a(HCN) = 6.2 \times 10^{-10}$]

A. 0.625×10^{-6}

B. 1.9×10^{-5}

C. 2.2×10^{-16}

D. 1.6×10^{-6}

Answer: B

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37. In Freundlich adsorption isotherm at moderate pressure, the extent oof adsorption $\left(\dfrac{x}{m}\right)$ is directly proportional to P^x. The value of x is

A. zero

B. $\dfrac{1}{n}$

C. 1

D. ∞

Answer: B

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38. Identify A and B in the chemical reaction

A.

A =

OCH₃

Cl

NO₂

B =

OCH₃

Cl

NO₂

B.

A =

OCH₃

Cl

NO₂

B =

I

Cl

NO₂

C.

A =

OCH₃

Cl

NO₂

B =

I

Cl

NO₂

D.

A =

OCH₃

Cl

NO₂

B =

OCH₃

I

NO₂
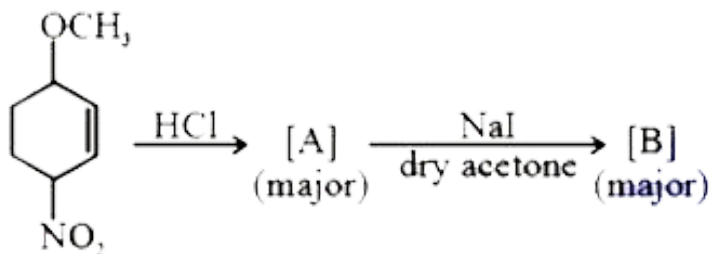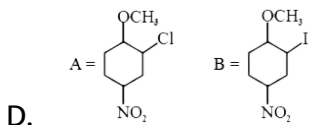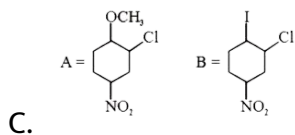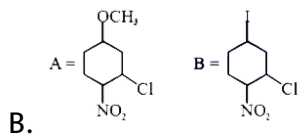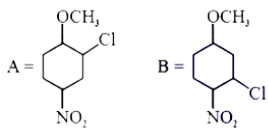
Answer: D

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39. Which statement is correct?

A. Synthesis of Buna-S needs nascent oxygen

B. Neoprene is an addition copolymer used in plastic bucket

manufacturing

C. Buna-S is a synthetic and linear thermosetting polymer

D. Buna-N is a natural polymer,

Answer: A

---

40. The major product of the following chemical reaction is:

$$CH_3CH_2CN \xrightarrow[\substack{(2)SOCl_2 \\ (3)pd/BaSO_4,H_2}]{(1)H_3O^+ \quad \Delta} ?$$
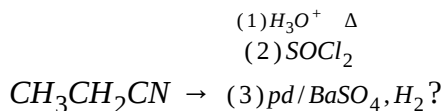
A. $CH_3CH_2CH_3$

B. $CH_3CH_2CH_2OH$

C. $\left(CH_3CH_2CO\right)_2O$

D. CH_3CH_2CHO

Answer: D

41. The structure of Neoprene is -

A. $\left[-- CH_2CH = CH - CH_2 - CH_2 - C\,|\,CNN -- \right]_n$

B. $\left[-- CH_2 - C\,|\,CNN -- \right]_n$

C. $\left[-- CH_2 - \overset{\overset{Cl}{|}}{C} = CN - CH_2 -- \right]_n$

D.
(4) $\left[NH \underset{\underset{NH}{\underset{|}{}}}{\overset{N}{\underset{N}{\bigcirc}}} NHCN_2 \right]_n$
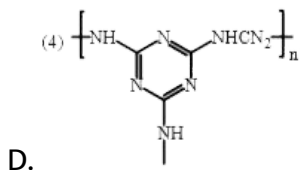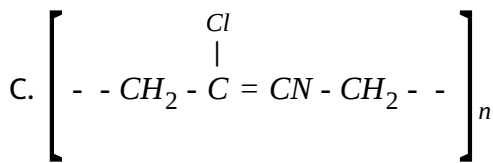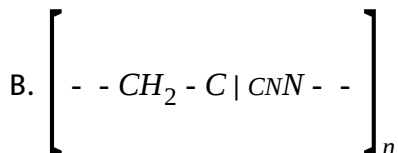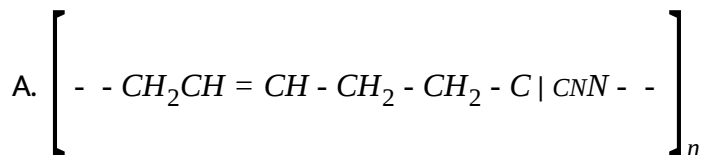
Answer: C

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42. Find A, B and C in the following reactions :

$$NH_3 + A + CO \rightarrow \left(NH_4\right)_2 CO_3$$

$$\left(NH_4\right)_2 CO_3 + H_2O + B \rightarrow NH_4HCO_3$$

$$NH_3HCO_3 + NaCl \rightarrow NH_4Cl + C$$

    A. $A - O_2$, $B - CO_2$, $C - Na_2CO_3$

    B. $A - H_2O$, $B - O_2$, $C - Na_2CO_3$
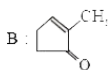
    C. $A - H_2O$, $B - O_2$, $C - NaHCO_3$

    D. $A - H_2O$, $B - CO_2$, $C - NaHCO_3$
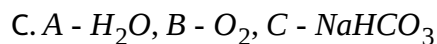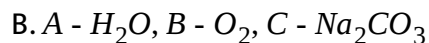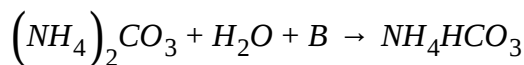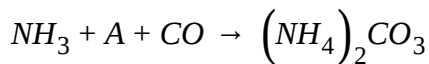
Answer: D

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43. The presence of ozone in troposphere

    A. Protects us from the UV radiation

    B. Protects us from the X-ray radiation

C. Protects us from greenhouse effect

D. generates photochemical smog

Answer: D

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44. Match List - I with List- II

List - I	List - II
Electronic configuration of elements	Δ_i in kJ mol^{-1}
(a) $1s^2 2s^2$	(i) 801
(b) $1s^2 2s^2 2p^4$	(ii) 899
(c) $1s^2 2s^2 2p^3$	(iii) 1314
(d) $1s^2 2s^2 2p^1$	(iv) 1402

Choose the most appropriate answer from the options given below -

A. $(a) \rightarrow (ii), (b) \rightarrow (iii), (c) \rightarrow (iv), (d) \rightarrow (i)$

B. $(a) \rightarrow (i), (b) \rightarrow (iv), (c) \rightarrow (iii), (d) \rightarrow (ii)$

C. $(a) \rightarrow (i), (b) \rightarrow (iii), (c) \rightarrow (iv), (d) \rightarrow (ii)$

D. $(a) \rightarrow (iv), (b) \rightarrow (i), (c) \rightarrow (ii), (d) \rightarrow (iii)$

Answer: A

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45. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : Dipole-dipole interactions are the only non-covalent interactions, resulting in hydrogen bond formation.

Reason R : Fluorine is the most electronegative element and hydrogen bonds in HF are symmetrical.

In the light of the above statements, choose the most appropriate answer from the options given below.

A. A is false but R is true

B. Both A and R are true and R is the correct explanation of A

C. A is true R is false

D. Both A and R are true but R is NOT the correct explanation of A

Answer: A

46. Statement about heavy water are given below .

A. Heavy water is used in exchange reactions for the study of reaction mechanisms.

B. Heavy water is prepared by exhaustive electrolysis of water

C. Heavy water has higher boiling point than ordinary water.

D. Viscosity of H_2O is greater than D_2O

    A. A, B and C only

    B. A and B only

    C. A and D only

    D. A and C only

Answer: A

47. The orbital having two radial as well as two angular nodes is

A. 3p

B. 4f

C. 4d

D. 5d

Answer: D

48. Match List - I with List- II

List - I (Ore)	List - II (Element Present)
(a) Kernite	(i) Tin
(b) Cassiterite	(ii) Boron
(c) Calamine	(iii) Fluorine
(d) Cryolite	(iv) Zinc

Choose the most appropriate answer from the options given below -

A. $(a) \rightarrow (i), (b) \rightarrow (iii), (c) \rightarrow (iv), (d) \rightarrow (ii)$

B. $(a) \rightarrow (ii), (b) \rightarrow (i), (c) \rightarrow (iv), (d) \rightarrow (iii)$

C. $(a) \rightarrow (ii), (b) \rightarrow (iv), (c) \rightarrow (i), (d) \rightarrow (iii)$

D. $(a) \rightarrow (iii), (b) \rightarrow (i), (c) \rightarrow (ii), (d) \rightarrow (iv)$

Answer: B

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49. Identify the major products A and B respectively in the following reactions of phenol.

$$\text{(B)} \xleftarrow[\text{(ii) } H_3O^-]{\text{(i) } CHCl_2, \text{ NaOH}} \text{(phenol)} \xrightarrow[273K]{Br_2 \text{ in } CS_2} \text{(A)}$$

A.

B.

C.

D.
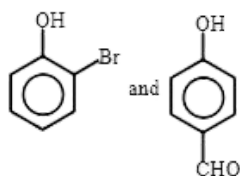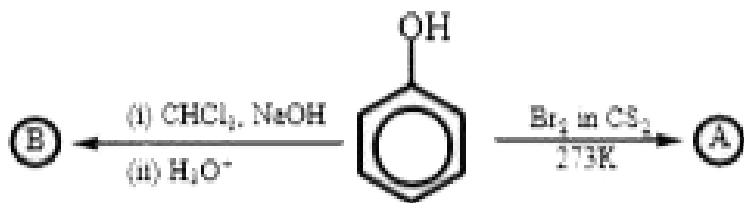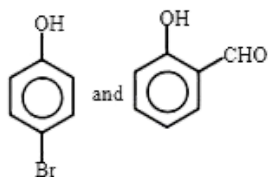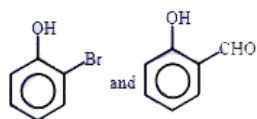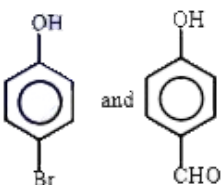
Answer: B

50. Given below are two statements : Statement I : A mixture of chloroform and aniline can be separated by simple distillation.

Statement II : When separating aniline from a mixture of aniline and water by steam distillation aniline boils below its boiling point. In the light of the above statements, choose the most appropriate answer from the options given below.

A. Statement-I is false but Statement II is true

B. Both Statement-I and Statement II are false

C. Statement-I is true but Statement II is false

D. Both Statement-I and Statement II are true

Answer: D

51. For the given reaction :

$$HC\!\!=\!\!CHBr\ \underset{CH_3}{\mid}\ \xrightarrow[\text{2. Red hot iron tube , 873 K}]{\text{1. NaNH}_2}\ \overset{\text{A}}{\bigcirc}\ \text{(major product)}$$

A. $CH_3CH_2CH_2NH_2$

B. $C \mid CH_3H = CH - NH_2$

C.

D.
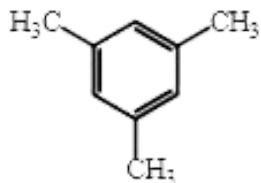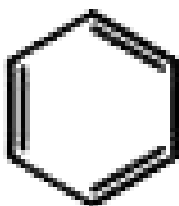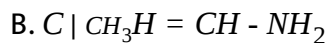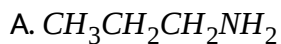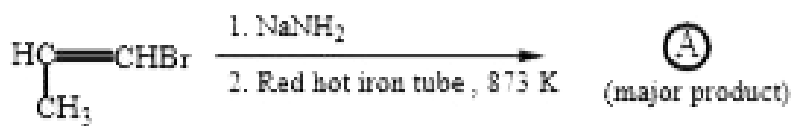
Answer: D

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52. On treating a compound with warm dil. H_2SO_4, gas X is evolved which turns $K_2Cr_2O_7$ paper acidified with dil. H_2SO_4 to a green compound Y. X and Y respectively are -

A. $X = SO_2, Y = Cr_2O_3$

B. $X = SO_3, Y = Cr_2O_3$

C. $X = SO_2, Y = Cr_2(SO_4)_3$

D. $X = SO_3, Y = Cr_2(SO_4)_3$
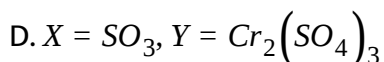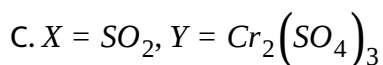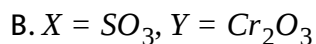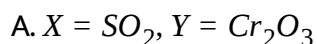
Answer: C

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53. Which of the following is 'a' FALSE statement

A. Carius tube is used in the estimation of sulphur in an organic compound

B. Carius method is used for the estimation of nitrogen in an organic compound

C. Phosphoric acid produced on oxidation of phosphorus present in an organic compound is precipitated as $Mg_2P_2O_7$ by adding magnesia mixture.

D. Kjeldahl's method is used for the estimation of nitrogen in an organic compound

Answer: B

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54. Which of the following vitamin is helpful in delaying the blood clotting -

A. Vitamin C

B. Vitamin B

C. Vitamin E

D. Vitamin K

Answer: D

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55. $A\left(C_4H_8Cl_2\right) \xrightarrow[\text{}]{\text{Hydrolysis}} 373KB\left(C_4H_8O\right)$
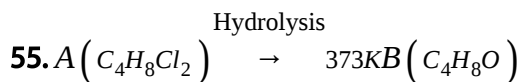
B reacts with Hydroxyl amine but does not give Tollen's test . Identify A and B

A. 1,1 Dichlorobutane and 2-Butanone

B. 2,2- Dichlorobutane and Butanal

C. 1,1 - Dichlorobutane and Butanal

D. 2,2-Dichlorobutane and 2-butane-one

Answer: D

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56. Compound A used as a strong oxidizing agent is amphoteric in nature. It is the part of lead storage batteries. Compound A is :

A. PbO_2

B. PbO

C. $PbSO_4$

D. Pb_3O_4
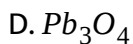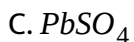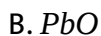
Answer: D

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57. Which of the following lanthanoids does not form MO_2 ? [M is lanthanoid metal]

A. Pr

B. Dy

C. Nd

D. Yb

Answer: D

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58. Given below are two statements :

Statement I : o-Nitrophenol is steam volatile due to intramolecular hydrogen bonding.

Statement II : o-Nitrophenol has high melting due to hydrogen bonding.

In the light of the above statements, choose the most appropriate answer from the options given below :

A. Statement I is false but Statement II is true

B. Both statement I and statement II are true

C. Both statement I and statement II are false

D. Statement I is true but statement II is false

Answer: C

59. For the given reaction :
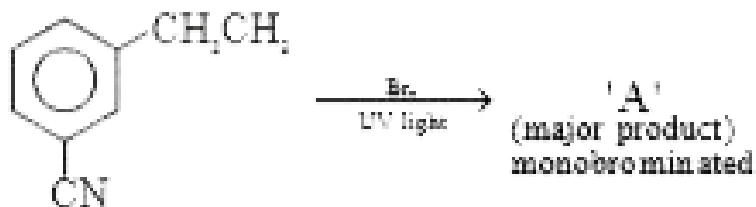
What is 'A' ?

A.

B.

C.

D.
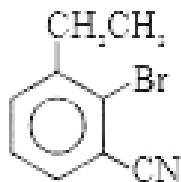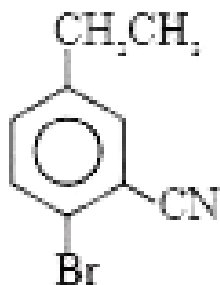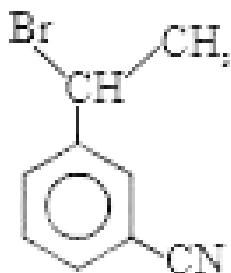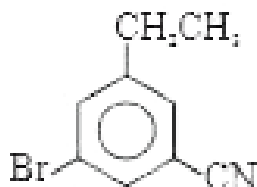
Answer: A

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60. An amine reacts with benzene sulphonyl chloride to give a precipitate insoluble in alkali. It undergoes ammonolysis possible structure will be:

A.

B. $CH_3CH_2NH_2$

C. $CH_3CH_2CH_2NHCH_3$

$$H$$

D. $CH_3CH_2CH_2N - CH_2CH_3$
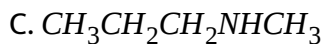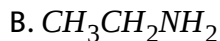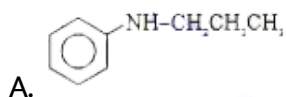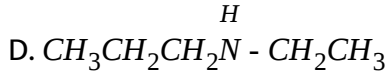
Answer: D

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61. What is the correct sequence of reagents used for converting nitrobenzene into m-dibromobenzene ?

A. $\xrightarrow{NaNO_2}$ / $\xrightarrow{HCl}$ / $\xrightarrow{KBr}$ / $\xrightarrow{H^+}$

B. $\xrightarrow{Br_2/Fe}$ / $\xrightarrow{Sn/HCl}$ / $\xrightarrow{NaNO_2/HCl}$ / $\xrightarrow{CuBr/HBr}$

C. $\xrightarrow{Sn/HCl}$ / $\xrightarrow{KBr}$ / $\xrightarrow{Br_2}$ / $\xrightarrow{H^+}$

D. $\xrightarrow{Sn/HCl}$ / $\xrightarrow{Br_2}$ / $\xrightarrow{NaNO_2}$ / $\xrightarrow{NaBr}$
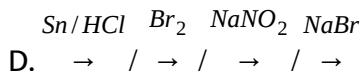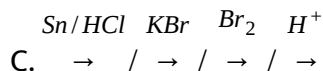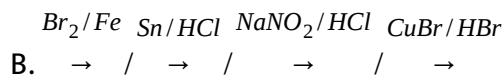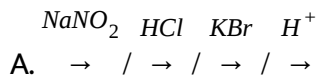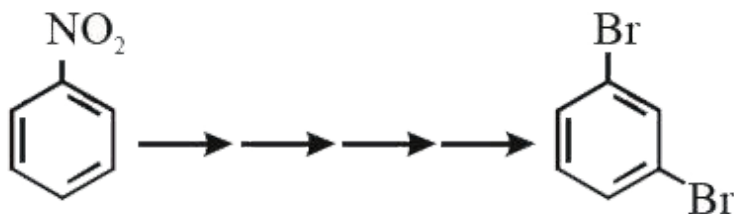
Answer: B

62. Most suitable salt which can be used for efficient clotting of blood will be :

A. $NaHCO_3$

B. $FeSO_4$

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

D. $FeCl_3$
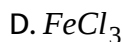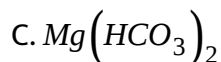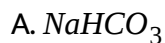
Answer: D

63. The correct order of the following compounds showing increasing tendency towards nucleophilic substitution reaction is :

Cl / NO$_2$ ... structures (i), (ii), (iii), (iv)
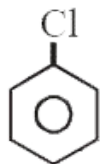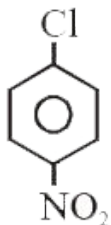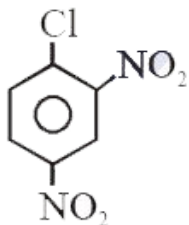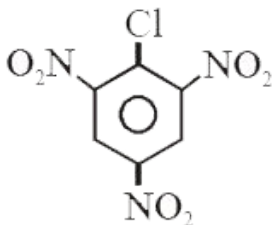
(i)   (ii)   (iii)   (iv)

A. $(iv) < (iii) < (ii) < (i)$

B. $(iv) < (i) < (ii) < (iii)$

C. $(iv) < (i) < (iii) < (ii)$

D. $(i) < (ii) < (iii) < (iv)$

Answer: D

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64. According to Bohr's atomic energy :-

(A) Kinetic energy of electron is $\propto \dfrac{z^2}{n^2}$.

(B) The product of velocity (v) of electron and principal quantum number(n), 'vn' $\propto z^2$.

(C) Frequency of revolution of electron in an orbit is $\propto \dfrac{Z^3}{n^3}$.

(D) Coulombic force of attraction on the electron is $\propto \dfrac{Z^3}{n^4}$.

Choose the most appropriate answer from the option given below:

A. (C) only

B. (A) only

C. (A),(C) and (D) only

D. (A) and (D) only

Answer: C::D

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65. Match List-I and List - II .

List-I	List-II
(a) $R-\overset{\overset{O}{\|\|}}{C}-Cl \rightarrow R-CHO$	(i) $Br_2/NaOH$
(b) $R-CH_2-COOH \rightarrow R-\underset{\underset{Cl}{\|}}{CH}-COOH$	(ii) $H_2/Pd-BaSO_4$
(c) $R-\overset{\overset{O}{\|\|}}{C}-NH_2 \rightarrow R-NH_2$	(iii) $Zn(Hg)/Conc.HCl$
(d) $R-\overset{\overset{O}{\|\|}}{C}-CH_3 \rightarrow R-CH_2-CH_3$	(iv) $Cl_2/Red\ P,\ H_2O$
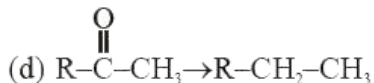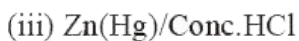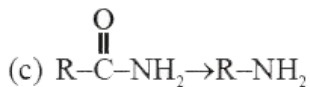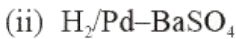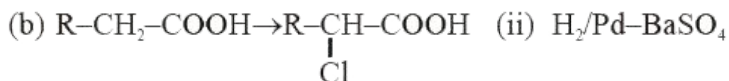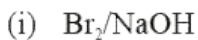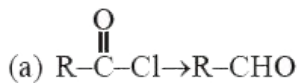
Choose the correct answer from the options given below :

A. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

B. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

C. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

D. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

Answer: C

66. The calculated magnetic moments (spin only value) for species

$\left[FeCl_4\right]^{2-}$, $\left[Co\left(C_2O_4\right)_3\right]^{3-}$ and MnO_4^{2-} respectively are :

A. 5.82,0 and 0BM

B. 4.90 , 0 and 1.73 BM

C. 5.92, 4.90 and 0 BM

D. 4.90 , 0 and 2.83 BM

Answer: B

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67. Match List-I and List - II .

	List-I (Salt)		List-II (Flame colour wavelength)
(a)	LiCl	(i)	455.5 nm
(b)	NaCl	(ii)	670.8 nm
(c)	RbCl	(iii)	780.0 nm
(d)	CsCl	(iv)	589.2 nm

Choose the correct answer from the options given below :

A. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

B. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

C. (a)-(i), (b)-(iv), (c)-(ii), (d)-(iii)

D. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

Answer: D

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68. Which one of the following carbonyl compounds cannot be prepared by addition of water on an alkyne in the presence of $HgSO_4$ and H_2SO_4 ?

A. $CH_3 - \overset{\overset{\displaystyle O}{||}}{C} - H$

B.

C. $CH_3 - CH_2 - \overset{\overset{\displaystyle O}{||}}{C} - H$

D. $CH_3 - \overset{\overset{\displaystyle O}{||}}{C} - CH_2CH_3$
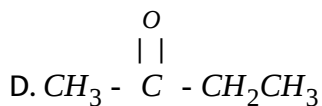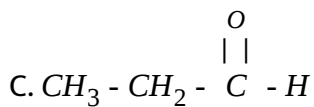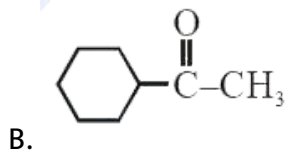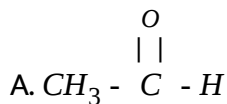
Answer: C

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69. In polymer Buna-S: 'S' stands for :

A. Sulphonation

B. Strength

C. Sulphur

D. Styrene

Answer: D

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70.
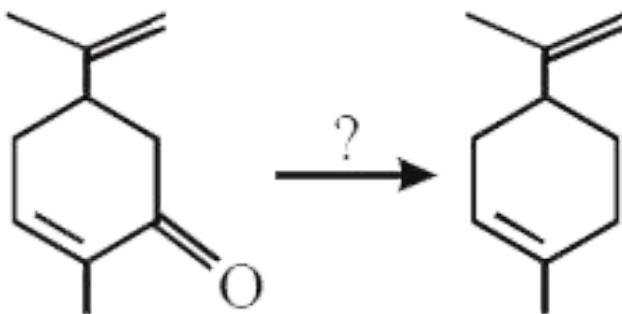
Which of the following reagent is suitable for the preparation of the product in the above reaction ?

A. $NaBH_4$

B. $NH_2 - NH_2/C_2H_5\overset{\ominus}{O}\overset{\oplus}{N}a$

C. Ni/H_2

D. Red P + Cl_2

Answer: B

---

71. Match List-I and List-II.

	List-I		List-II
(a)	Valium	(i)	Antifertility drug
(b)	Morphine	(ii)	Pernicious anaemia
(c)	Norethindrone	(iii)	Analgesic
(d)	Vitamin B_{12}	(iv)	Tranquilizer

A. (a)-(iv),(b)-(iii) , (c) - (ii) , (d)-(i)

B. (a)-(iv), (b)-(iii),(c)-(i), (d)-(ii)

C. (a)-(ii),(b)-(iv),(c)-(iii),(d)-(i)

D. (a)-(i),(b)-(iii),(c)-(iv),(d)-(ii)

Answer: B

72. Match List-I with List-II.

	List-I (Metal)		List-II (Ores)
(a)	Aluminium	(i)	Siderite
(b)	Iron	(ii)	Calamine
(c)	Copper	(iii)	Kaolinite
(d)	Zinc	(iv)	Malachite

Choose the correct answer from the options given below :

A. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

B. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

C. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

D. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

Answer: D

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73. Which one of the following compounds is nonaromatic ?

A.

B.

C.

D.
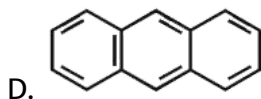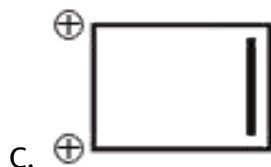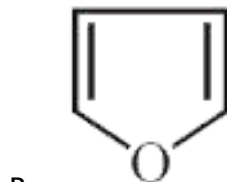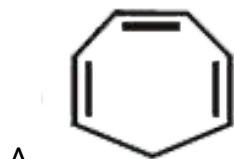
Answer: A

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74. What is the correct order of the following elements with respect to

their density ?

A. Cr < Zn < Co < Cu < Fe

B. Zn < Cu < Co < Fe < Cr

C. Zn < Cr < Fe < Co < Cu

D. Cr < Fe < Co < Cu < Zn

Answer: C

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75. Given below are two statements :

Statement I : The value of the parameter "Biochemical Oxygen Demand (BOD)" is important for survival of aquatic life.

Statement II : The optimum value of BOD is 6.5 ppm.

In the light of the above statements, choose the most appropriate answer from the options given below :

A. Statement I is false but Statement II is true

B. Both Statement I and Statement II are true

C. Statement I is true but Statement II is false

D. Both Statement I and Statement II are false

Answer: C

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76. The incorrect statement among the following is :

A. $VOSO_4$ is a reducing agent

B. Cr_2O_3 is an amphoteric oxide

C. RuO_4 is an oxidizing agent

D. Red colour of ruby is due to the presence of Co^{3+}

Answer: D

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77. The correct shape and I-I-I bond angles respectively in I_3^- ion are :

A. Distorted trigonal planar , $135\,°$ and $90\,°$

B. T-shaped, $180\,°$ and $90\,°$

C. Trigonal planar , $120\,°$

D. Linear , $180\,°$

Answer: D

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78. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : Hydrogen is the most abundatn element in the Universe, but it is not the most abundant gas in the troposphere .

Reason R : Hydrogen is the lightest element . In the light of the above statements , choose the correct answer from the options given below :

A. A is true but R is false

B. Both A and R are true and R is the correct explanation of A

C. A is false but R is true

D. Both A and R are true but R is NOT the correct explanation of A

Answer: B

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79. The diazonium salt of which of the following compound will form a coloured dye on reaction with β-Naphthol in NaOH ?

A.

$$CH_2NH_2$$

B.

$$\underset{|}{\overset{CH_3}{N}}-CH_3$$

C.

D.
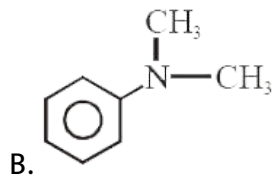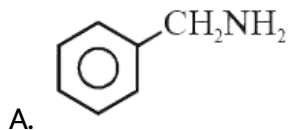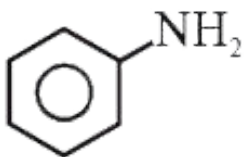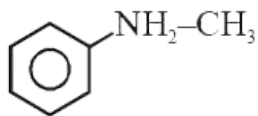
Answer: C

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80. The correct set from the following in which both pairs are in correct order of melting point is :

    A. $LiF > LiCl, MgO > NaCl$

    B. $LiCl > LiF, NaCl > MgO$

    C. $LiF > LiCl, NaCl > MgO$

    D. $LiCl > LiF, MgO > NaCl$

Answer: A

81. Which among the following species has unequal bond lengths ?

A. BF_4^-

B. XeF_4

C. SF_4

D. SiF_4
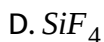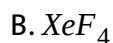
Answer: C

82. Carbylamine test is used to detect the presence of primary amino group in an organic compound. Which of the following compound is formed when this test is performed with aniline?

A.

B.

C.

D.
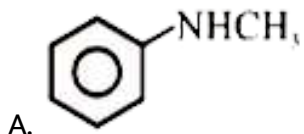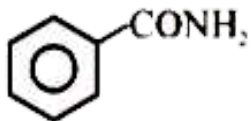
Answer: D

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83. Which of the following is correct structure of α-anomer of maltose ?

A.

B.

C.

D.
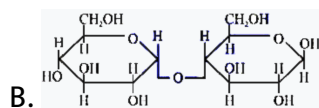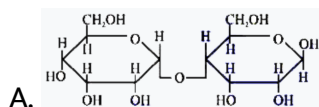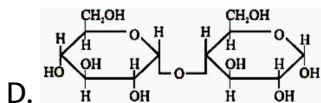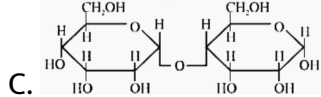
Answer: D

84. The major product of the following reaction is

NO_2

$\xrightarrow{H_2SO_4}$

A.

NO_2

B.

C.

D.
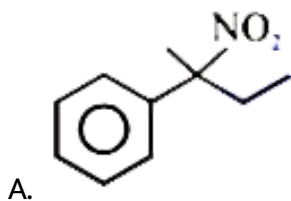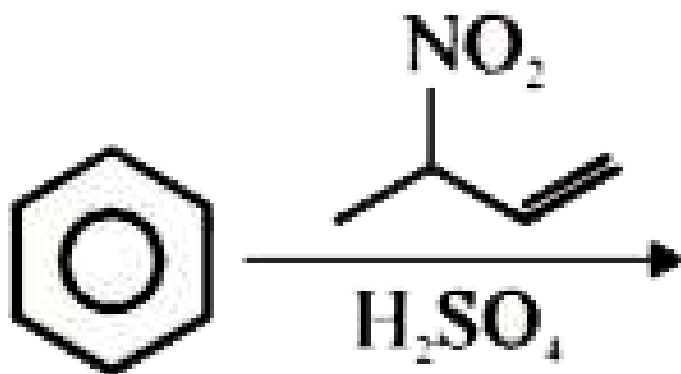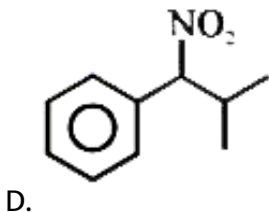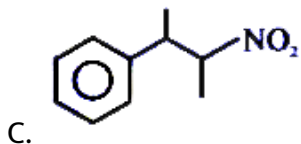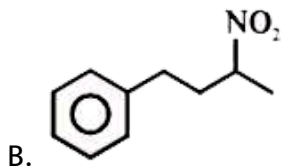
Answer: C

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85. The correct sequence of reagents used in the preparation of 4-bromo-

2-nitroethyl benzene from benzene is :

A. HNO_3/H_2SO_4, $Br_2/AlCl_3$. $CH_3COCl/AlCl_3$, Zn - Hg/HCl

B. $Br_2/AlBr_3$, $CH_3COCl/AlCl_3$, HNO_3/H_2SO_4, Zn/HCl

C. $CH_3COCl/AlCl_3$, $Br_2/AlBr_3$, HNO_3/H_2SO_4, Zn/HCl

D. $CH_3COCl/AlCl_3$, Zn - Hg/HCl, $Br_2/AlBr_3$, HNO_3/H_2SO_4

Answer: D

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86. Water does not produce CO on reacting with

A. CO_2

B. C

C. CH_4

D. C_3H_8

Answer: A

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87. The correct order of acid character of the following compounds is

OH	COOH	COOH	COOH
	NO$_2$		CH$_3$
I	II	III	IV

Option

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$$\text{(NH}_2\text{-benzene)} \xrightarrow[\text{288 K}]{\text{HNO}_3\,.\,\text{H}_2\text{SO}_4}$$

(A)   (B)   (C)
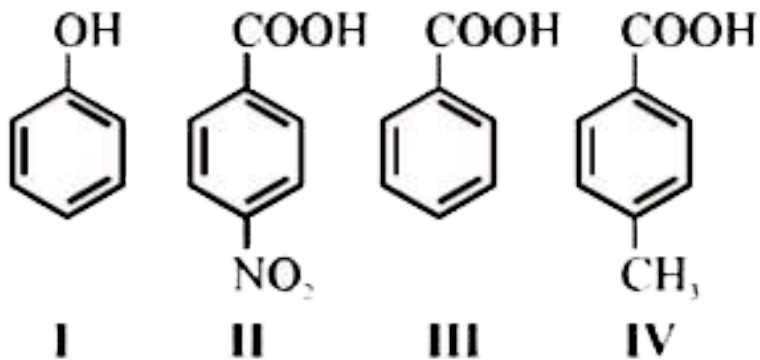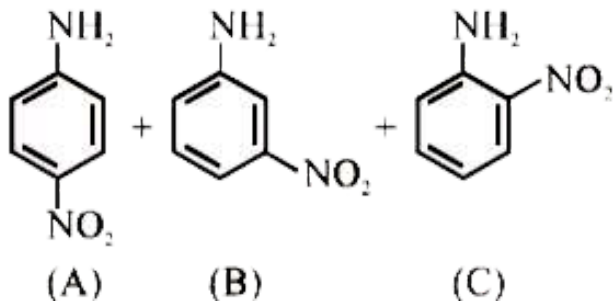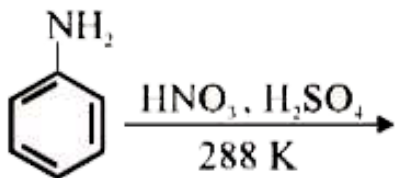
88.

Correct statement about the given chemical reaction is :

A. $-NH_2$ group is ortho and para directive, so product (B) is not

possible.

B. Reaction is possible and compound (B) will be the major product .

C. The reaction will form sulphonated product instead of nitration.

D. Reaction of possible and compound (A) will be major product.

Answer: D

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89. Correct order of bond dissociation energy of Halogen

A. $Cl_2 > F_2 > Br_2 > I_2$

B. $I_2 > Br_2 > Cl_2 > F_2$

C. $Cl_2 > Br_2 > F_2 > I_2$

D. $F_2 > Cl_2 > Br_2 > I_2$
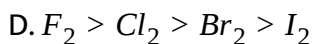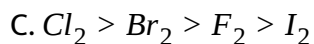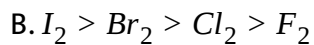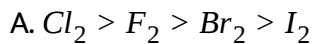
Answer: C

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90. Given below are two statements :

Statement I : The pH of rain water is normally 5.6.

Statement II : If the pH of rain water drops below 5.6, it is called acid rain.

In the light of the above statements, choose the correct answer from the options given below:

A. Statement I is true but Statement II is false.

B. Both Statement I and Statement II are false

C. Statement I is false but Statement II is true

D. Both Statement I and Statement II are true

Answer: D

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91. What are the major components of german silver?

A. Ge, Cu and Ag

B. Zn, Ni and Ag

C. Cu, Zn and Ni

D. Cu, Zn and Ag

Answer: C

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92. In which of the following order the given complex ions are arranged correctly with respect to their decreasing spin only magnetic moment?

$(i) \left[FeF_6 \right]^{3-} (ii) \left[Co\left(NH_3 \right)_6 \right]^{3+} (iii) \left[NiCl_4 \right]^{2-} (iv) \left[Cu\left(NH_3 \right)_4 \right]^{2+}$
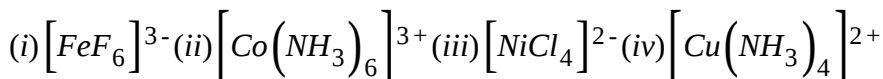
A. $(i) > (iii) > (iv) > (ii)$

B. $(ii) > (iii) > (i) > (iv)$

C. $(iii) > (iv) > (ii) > (i)$

D. $(ii) > (i) > (iii) > (iv)$

Answer: A

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93. Which of the following compound is added to the sodium extract before addition of silver nitrate for testing of halogens?

A. nitric acid

B. ammonia

C. hydrochloric acid

D. sodium hydroxide

Answer: A

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94. Which one of the following statements is FALSE for hydrophilic sols?

A. Their viscosity is of the order of that of H_2O

B. The sols cannot be easily coagulated.

C. They do ot require electroytes for stability .

D. These sols are reversible in nature .

Answer: A

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95. The solubility of $Ca(OH)_2$ in water is : [Given : The solubility product of $Ca(OH)_2$ in water $= 5.5 \times 10^{-6}$]

A. 1.77×10^{-6}

B. 1.11×10^{-6}

C. 1.11×10^{-2}

D. 1.77×10^{-2}

Answer: C

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96. Given below are two statements :

Statement I : The identification of Ni^{2+} is carried out by dimethyl glyoxime in the presence of NH_4OH.

Statement II : The dimethyl glyoxime is a bidentate neutral ligand.

In the light of the above statements, choose the correct answer from the options given below:

A. Statement I is true but Statement II is false.

B. Both Statement I and Statement II are false

C. Statement I is false but Statement II is true

D. Both Statement I and Statement II are true

Answer: C

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97. The major product of the following reaction is

$$CH_3CH_2CH = CH_2 \quad \xrightarrow[Rhcatalyst]{H_2/CO} \quad$$
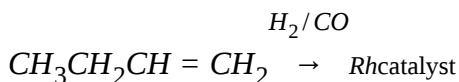
A. $CH_3CH_2CH = CH - CHO$

B. $CH_3CH_2\overset{|}{C}CHO = CH_2$

C. $CH_3CH_2CH_2CH_2CHO$

D. $CH_3CH_2CH_2CHO$

Answer: C

98. The method used for the purification of Indium is :

A. van arkel method

B. liquation

C. zone refining

D. vapour phase refining

Answer: C

99. The 'X' in the given reaction ?

CH_2OH
$|$ $\quad$ + oxalic acid $\xrightarrow{210\,^\circ C}$ X(major product)
CH_2OH

A. CH_2
   $||$
   CH_2

B. $CH - OH$
   $||$
   CH_2

C. CHO
   $|$
   CHO

D. CH_2OH
   $|$
   CHO
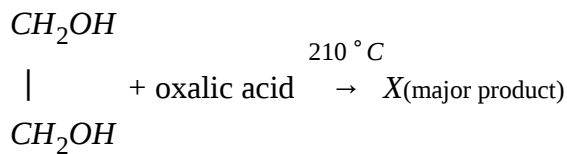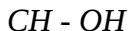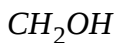
Answer: A

100. Given below are two statements :

Statement-I : α and β forms of sulphur can change reversibly between themselves with slow heating or slow cooling.

Statement-II : At room temperature the stable crystalline form of sulphur is monoclinic sulphur.

In the light of the above statements, choose the correct answer from the options given below:

A. Statement I is true but Statement II is false.

B. Both Statement I and Statement II are false

C. Statement I is false but Statement II is true

D. Both Statement I and Statement II are true

Answer: C

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1. When 9.45 g of $CICH_2COOH$ is added to 500 mL of water, its freezing point drops by $0.5\,°C$. The dissociation constant of $CICH_2COOH$ is $x \times 10^{-3}$. The value of x is _____

(Rounded off to the nearest integer)

$$\left[K_f(H_2O) = 1.86 \ \text{K kg mol}^{-1}\right]$$

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2. 4.5 g of compound.A (MW=90) was used to make 250 mL of its aqueous solution. The molarity of the solution in Mis $x \times 10^{-1}$. The value of x is (Rounded off to the nearest integer)

3. At 1990 K and 1 atm pressure, there are equal number of Cl_2, molecules and Cl atoms in the reaction mixture. The value K_p for the reaction $Cl_{2(g)} \Leftrightarrow 2Cl_g$ under the above conditions is $x \times 10^{-1}$. The value of x is _____

(Rounded of to the nearest integer)

4. Number of amphoteric compound among the following is _____

(a) BeO

(b) BaO

(c) $Be(OH)_2$

(d) $Sr(OH)_2$
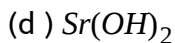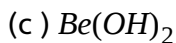
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5. The reaction of sulphur in alkaline medium is the below:

$$S_{8(s)} + aOH_{aq}^- \rightarrow bS_{(aq)}^{2-} + cS_2O_3^{2-}{}_{aq} + dH_2O_{(l)}$$
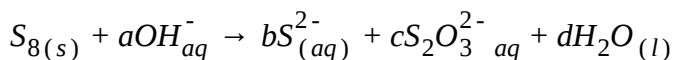
The values of 'a' is _____. (Integer answer)

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6. For the reaction $A_{(g)} \rightarrow (B)_{(g)}$, the value of the equilibrium constant at 300 K and I atm is equal to 100.0. The value of $\Delta_r G$ for the reaction at 300 K and I atm in $J\ mol^{-1}$ is - xR, where x is _____

(Rounded of to the nearest integer) (R=8.31 J $mol^{-1}K^{-1}$ and In10 = 2.3)

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7. A proton and a Li^{3+} nucleus are accelerated by the same potential. If λ_{Li} and λ_p denote the de Broglie wavelengths of Lit and proton respectively, then the value $\dfrac{\lambda_{Li}}{\lambda_p}$ is $x \times 10^{-1}$. The value of x is _____.

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8. The stepwise formation of $\left[Cu(NH_3)_4\right]^{2+}$ is given below

$$Cu^{2+} + NH_3 \overset{K_1}{\Leftrightarrow} \left[Cu(NH_3)\right]^{2+}$$

$$\left[Cu(NH_3)\right]^{2+} + NH_3 \overset{K_2}{\Leftrightarrow} \left[Cu(NH_3)_2\right]^{2+}$$

$$\left[Cu(NH_3)_2\right]^{2+} + NH_3 \overset{K_3}{\Leftrightarrow} \left[Cu(NH_3)_3\right]^{2+}$$

$$\left[Cu(NH_3)_3\right]^{2+} + NH_3 \overset{K_4}{\Leftrightarrow} \left[Cu(NH_3)_4\right]^{2+}$$
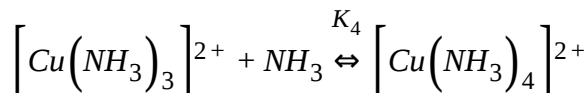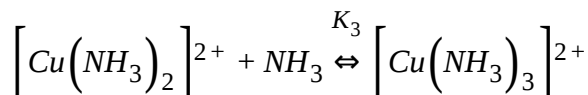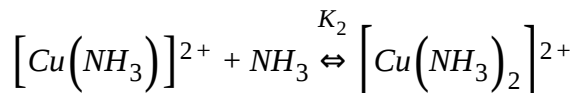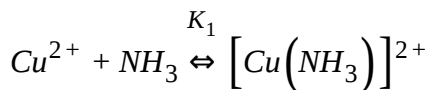
The value of stability constants K_1, K_2, K_3 and K_4 are $10^4, 1.58 \times 10^3, 5 \times 10^2$ and 0^2 respectively. The overall equilibrium constant for dissociation of $\left[Cu(NH_3)_4\right]^{2+}$ is $x \times 10^{-12}$. The value of x is _____. (Rounded off to the nearest integer)

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9. The coordination number of an atom in a body- centered cubic structure is

[Assume that the lattice is made up of atoms.)

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10. Gaseous cyclobutane isomerizes to butadiene in a first order process which has k value at $153\,°C$ of $3.3 \times 10^{-4}s^{-1}$. How many minutes would it take for the isomerization to proceeds 40% to completion at this temperature ?

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11. Among the following, the number of halide(s) which is/are inert to hydrolysis is _____

(a)BF_3

(b) $SiCl_4$

(c) PCl_5

(d) SF_6

12. 1 molal aqueous solution of an electrolyte A_2B_3 is 60% ionised. The boiling point of the solution at 1 atm is _____ K. (Rounded-off to the nearest integer)

[given K_b for $\left(H_2O\right) = 0.52 Kmol^{-1}$]

13. In basic medium CrO_4^{2-} oxidises $S_2O_3^{2-}$ to form SO_4^{2-} and itself changes into $Cr(OH)_4^-$. The volume of 0.154 M CrO_4^{2-} required to react with 40 mL of 0.25 M $S_2O_3^{2-}$ is ____ mL.

14. A Tyre is filled with $N_2(g)$ at 35 psi and $27\,^\circ C$ temperature. tyre can exert maximum pressure 40 psi, then find the temperature (in k) at which tyre can burst.

15. The reaction of cyanamide, $NH_2CN(s)$, with dioxygen was carried out in a bomb calorimeter, and ΔU was found to be $-742.7 kJmol^{-1}$ at $298K$. Calculate enthalpy change for the reaction at $298K$.

$$NH_2CN(g) + \frac{3}{2}O_2(g) \rightarrow N_2(g) + CO_2(g) + H_2O(l)$$
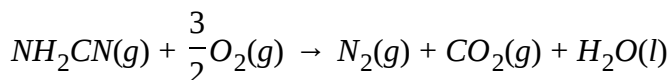
16. Using the provide information in the following paper chromatogarm
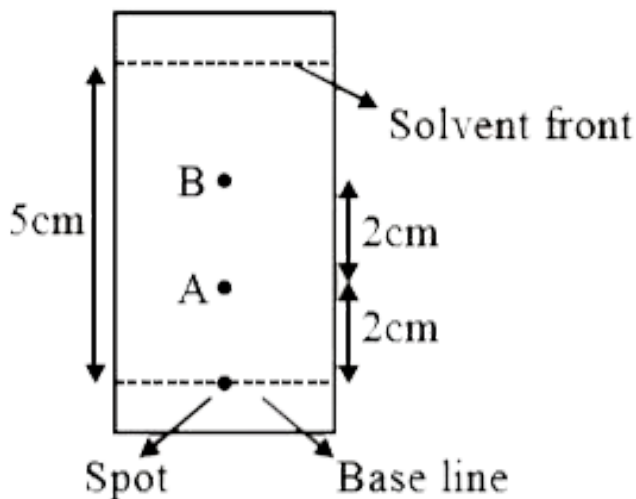
Figure : Paper chromatography for compounds A and B.

the calculate R_f value of A _____ $\times 10^{-1}$

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17. For the reaction $aA + bB \rightarrow cC + dD$, the plot of log k vs $\frac{1}{T}$ is given below,
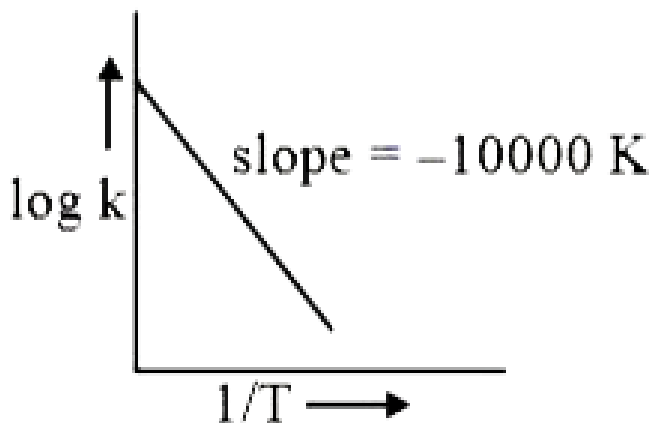
The temperature at which the rate constant of the reaction is $10^{-4}s^{-1}$ is

____K.

(Rouded -off the nerest integer)

[Given : The rate constant of the reaction is $10^{-5}s^{-1}$ at 500 K.]

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18. 0.4 g mixture of $NaOH$, Na_2CO_3, and some inert N impurities was first titrated with $\dfrac{N}{10}$HCl using phenolphthalein as an indicator, 17.5 ml. of HCl was required at the end point. After this methyl orange was added and titrated. 1.5 mL of same HCl was required for the next end point. The

weight percentage of Na_2CO_3, in the mixture is (Rounded-off to the nearest integer)

19. $HC \equiv CH \xrightarrow{RedHotFe} AlCl_3[X] \xrightarrow{CO, HCl/AlCl_3} Y.$
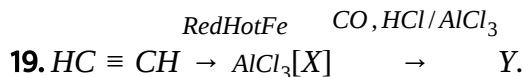
Find the number of sp_2 hybridised C-atoms in Y?

20. The ionization enthalpy of Na^+ formation from Nad is $495.8 kJmol^{-1}$, while the electron gain enthalpy of Bris $-325.0 kJmol^{-1}$ .Given the lattice enthalpy of NaBr is $-728.4 kJmol^{-1}$ The energy for the formation of NaBr ionic solid is (-)_____ $\times 10^{-1} kJmol^{-1}$

21. For a chemical reaction A+ B $\Leftrightarrow C + D \left(\Delta_r H^0 = 80 \text{ KJ mol}^{-1} \right)$ the entropy change $\Delta_r S^0$ depends on the temperature T (in K) as $\left(\Delta_r S^0 = 2T \left(JK^{-1} \text{mol}^{-1} \right) \right)$.

Minimum temperature at which it will become spontaneous is _____ K. (Integer)

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22. Find the significant figure in 50000.020×10^{-3}

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23. An exothermic reaction X $\rightarrow$ Y has an activation energy 30 KJ mol^{-1}. If energy change ΔE during the reaction is -20 KJ, then the activation energy for the reverse reaction in KJ is _____ . (Integer answer)

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24. Consider the following reaction

$$MnO_4^- + 8H^+ 5e^- \rightarrow Mn^{2+} + 4H_2O, E^\circ = 1.51V.$$
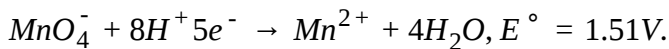
The quantity of electricity required in Faraday to reduce five moles of MnO_4^- is _____ .

25. For a real gas following vander waal equation is obtained $P\left(V_m - b\right) = RT$ and ((deltaZ)/(deltaP))_T = (xb)/(RT)`. Then find value of X

26. A homogeneous ideal gaseous reaction $AB_{2(g)} \Leftrightarrow A_{(g)} + 2B_{(g)}$ is carried out in a 25 litre flask at $27\,^\circ C$. The initial amount of AB_2 was 1 mole and the equilibrium pressure was 1.9 atm. The value of K_P is x $\times 10^{-2}$. The value of x is _____.(Integer answer)

27. Dichromate ion is treated with base, the oxidation number of Cr in the product formed is _____.

28. 224 mL of $SO_{2(g)}$ at 298 K and 1 atm is passed through 100 mL of 0.1 M NaOH solution. The non-volatile solute produced is dissolved in 36 g of water. The lowering of vapour pressure of solution (assuming the solution is dilute)

$\left(P\left(_{H_2O}\right) = 24\text{mm of Hg}\right)$ is $\times 10^{-2}$ mm of Hg, the value of x is _____.

(Integer answer)

29. 3.12 g of oxygen is adsorbed on 1.2 g of platinum metal. The volume of oxygen adsorbed per gram of the adsorbent at 1 atm and 300 K is L is

------------.

$[R = 0.0821 \text{ L atm } K^{-1}\text{mol}^{-1}]$

30. Number of bridging CO ligands in $\left[Mn_2(CO)_{10}\right]$ is _____.

31. The total number of amines among the following which can be synthesized by Gabriel synthesis is _____

(A) $\underset{CH_3}{\overset{CH_3}{>}}CH-CH_2-NH_2$ (B) $CH_3CH_2NH_2$

(C) [benzene ring] $-CH_2-NH_2$

(D) [benzene ring] $-NH_2$
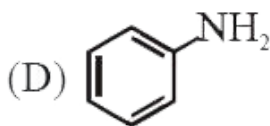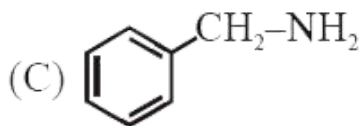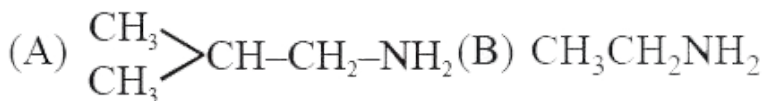
32. Among the following allotropic forms of sulphur , the number of allotropic forms , which will show paramagnetism is _____

(A) α-sulphur (B) β-sulphur (C) S_2- form

33. The formula of a gaseous hydrocarbon which requires 6 times of its own volume of O_2 for complete oxidation and produces 4 time its own volume of CO_2 is C_xH_y. The value of y is _____

34. The volume occupied by 4.75g of acetylene gas at $50 \degree C$ and 740 mmHg pressure is _____L. (Rounded off to the nearest integer)

[Given R= 0.0826 L atm K^{-1} mol $^{-1}$]

35. C_6H_6 freezes at $5.5\,°C$. The temperature at which a solution 10 g of C_4H_{10} in 200g of C_6H_6 freeze is _____ $°C$. (The molal freezing point depression constant of C_6H_6 is $5.12\,°C/m$.)

36. The magnitude of the change in oxidising power of the MnO_4^-/Mn^{2+} couple is $x \times 10^{-4}V$, if the H^+ concentration is decreased from 1M to 10^{-4} M at $25\,°C$. (Assume concentration of MnO_4^- and Mn^{2+} to be same on change in H^+ concentration) . The value of x is _____. (Rounded off to the nearest integer)

[Given : $\dfrac{2.303RT}{F} = 0.059$]

37. The solubility product of PbI_2 is 8.0×10^{-9}. The solubility of lead iodide in 0.1 molar solution of lead nitrate is $x \times 10^{-6}$ mol /L. The value of

x is _____. (Rounded off to the nearest integer).

[Given : $\sqrt{2} = 1.41$]

38. Sucrose hydrolyses in acid solution into glucose and fructose following first order rate law with a half-life of 3.33 h at $25\degree C$. After 9h , the fraction of sucrose remaining if f. The value of $\log_{10}\left(\dfrac{1}{f}\right)$ is _____ $\times 10^{-2}$. (Rounded off to the nearest integer)

[Assume , $\ln 10 = 2.303$, $\ln 2 = 0.693$]

39. 1.86 g of aniline completely reacts to form acetanilide. 10% of the product is lost during purification. Amount of acetanilide obtained after purification (in g) is _____ $\times 10^{-2}$.

40. Assuming ideal behaviour , the magnitude of log K for the following reaction at $25\,°C$ is $x \times 10^{-1}$. The value of x is _____. (Integer answer)

$$3HC \equiv CH_{(g)} \Leftrightarrow C_6H_{6(l)}$$
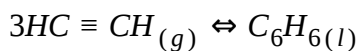
[Given

:

$\Delta_f G°(HC \equiv CH) = -2.04 \times 10^5 Jmol^{-1}, \Delta_f G°\left(C_6H_6\right) = -1.24 \times 10^5 J\ mol^{-1},$

]

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41. If a compound AB dissociates to the extent of 75% in an aqueous solution, the molality of the solution which shows a 2.5 K rise in the boiling of the solution is____ molal. (Rounded-off to the nearest integer)

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42. The number of compound/s given below which contains -COOH group is ____. (A) sulphanilic acid (B) picric acid (C) aspirin (D) ascorbic acid

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43. The rate constant of a reaction increases by five times on increase in temperature from $27\,^\circ C$ to $52\,^\circ C$. The value of activation energy in $k J \mathrm{mol}^{-1}$ is _____ (Rounded-off to the nearest integer)

44. Among the following , number of metals which can be used as electrodes in the photoelectric cell is ____(Integer answer) (A) Li (B) Na (C) Rb (D) Cs

45. The spin only magnetic moment of a divalent ion in aqueous solution (atomic number 29) is _____ BM

46. Electromagnetic radiation of wavelength 663 nm is just sufficient to ionise the atom of metal A. The ionization energy of metal A in $kJmol^{-1}$ is _____. (Rounded-off to the nearest integer)

$[h = 6.63 \times 10^{-34} Js, c = 3.00 \times 10^8 ms^{-1}, N_A = 6.02 \times 10^{23} mol^{-1}]$

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47. Consider titration of NaOH solution versus 1.25M oxalic acid solution. At the end point following burette readings were obtained.

(i) 4.5mL (ii) 4.5mL (iii) 4.4mL (iv) 4.4mL (v) 4.4 mL

If the volume of oxalic acid taken was 10.0 mL then the molarity of the NaOH solution is _____M. (Rounded-off to the nearest integer)

NaOH solution is _____M. (Rounded-off to the nearest integer)

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48. Five moles of an ideal gas at 293 K is expanded isothermally from an initial pressure of 2.1 MPa to 1.3MPa against at constant external pressure 4.3MPa. The heat transferred in this process is _____ $kJmol^{-1}$

49. Copper reduced NO_3^- into NO and NO_2 depending upon cone. Of HNO_3 in solution. Assuming $\left[Cu^{2+}\right] = 0.1M$ and $P_{NO} = P_{NO_2} = 10^{-3}$ atm and using given data answer the following question:

$E^\circ_{Cu^{2+} \mid Cu} = +0.34$ volt

$E^\circ_{NO_3^- \mid NO} = +0.96$ volt

$E^\circ_{NO_\# \mid NO_3} = +0.79$ volt

at 298K $\dfrac{RT}{F}(2.303) = 0.06$ volt

At what HNO_3 concentration thermodynamic tendency for reduction of NO_3^- into NO and NO_3 by copper is same?

50. The unit cell of copper corresponds to a face centered cube of edge length 3.596 Å with one copper atom at each lattice point. The calculated density of copper in kg/m^3 is _____.

CHEMISTRY (SECTION-A)

1. Which of the following forms of hydrogen emits low energy β particles?

    A. Deuterium ^2_1H

    B. Tritium ^3_1H

    C. Protium ^1_1H

    D. Proton H^+

Answer: B

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2. Given below are two statements one is labelled as Assertion A and the other is labelled as Reason R

Assertion A : In TlI_3, isomorphous to CsI_3 the metal is present in +1

oxidation state.

Reason R: Tl metal has fourteen f electrons in the electronic configuration.

In the light of the above statements, choose the most appropriate answer from the options given below:

A. A is correct but R is not correct

B. Both A and R are correct and R is the correct explanation of A.

C. A is not correct but R is correct

D. Both A and R are correct but R is NOT the correct explanation of A.

Answer: D

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3. Match List-I with List-II

List-I	List-II
(a) Sucrose	(i) β-D-Galactose and β-D-Glucose
(b) Lactose	(ii) α-D-Glucose and β-D-Fructose
(c) Maltose	(iii) α-D-Glucose and α-D-Glucose

Choose the correct answer from the options given below :

A. $(a) \rightarrow (i), (b) \rightarrow (iii), (c) \rightarrow (ii)$

B. $(a) \rightarrow (iii), (b) \rightarrow (i), (c) \rightarrow (iii)$

C. $(a) \rightarrow (ii), (b) \rightarrow (i), (c) \rightarrow (iii)$

D. $(a) \rightarrow (iii), (b) \rightarrow (ii), (c) \rightarrow (ii)$

Answer: C

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4. A- N,N-Dimethyl aniline

B-N-Methyl aniline

C-Benzenamine

D-Phenylmethanamine

Correct order of basic strength is:

A. $A > C > B > D$

B. $D > C > B > A$

C. $D > B > C > A$

D. $A > B > C > D$

Answer: D

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5. The correct order of electron gain enthalpy is

A. $S > Se > Te > O$

B. $Te > Se > S > O$

C. $O > S > Se > Te$

D. $S > O > Se > Te$

Answer: A

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$$\overset{1}{C}H_2 = \overset{2}{C} = \overset{3}{C}H - \overset{4}{C}H_3$$

6. In $CH_2 = C = CH - CH_3$ molecule, the hybridization of carbon 1,2,3 and

4 respectively are :

A. sp^3, sp, sp^3, sp^3

B. sp^2, sp^2, sp^2, sp^3

C. sp^2, sp, sp^2, sp^3

D. sp^2, sp^3, sp^2, sp^3

Answer: C

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7. Seliwanoff's test and Xanthoprotetic test are respectively used for the

identification of:

A. Aldoses, ketoses

B. Proteins, ketoses

C. Ketoses, proteins

D. Ketoses, aldoses Official

Answer: C

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8. 2,4-DNP test can be used to identify :

A. Amine

B. Aldehyde

C. Ether

D. Halogens

Answer: B

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9. Ceric ammonium nitrate and $CHCl_3$ / alc. KOH are used for the identification of functional groups present in _____ and _____ respectively.

    A. Alcohol, phenol

    B. Amine, alcohol

    C. Alcohol, amine

    D. Amine, phenol

Answer: C

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10. Which pair of oxides is acidic in nature?

    A. B_2O_3, CaO

    B. B_2O_3, SiO_2

    C. N_2O, BaO

    D. CaO, SiO_2

Answer: B

11. Identify A in the given chemical reaction,

$$\text{(benzene ring with } CH_2CH_2CHO \text{ and } CH_2CH_2CHO \text{)} \xrightarrow[\underset{\Delta}{C_2H_5OH, H_2O}]{NaOH} A(\text{Major product})$$

A.

B.

C.

D.
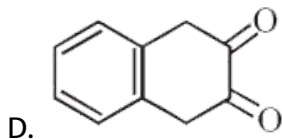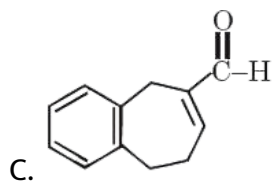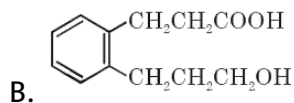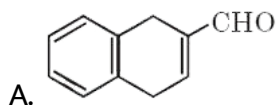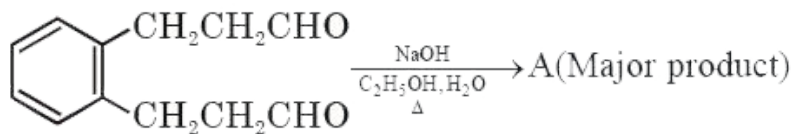
Answer: C

12. Identify A in the following chemical reaction

A.

B.

C.

D.
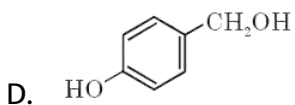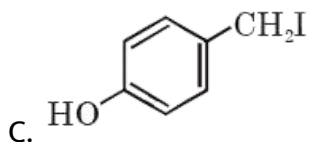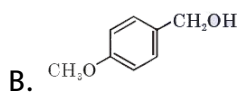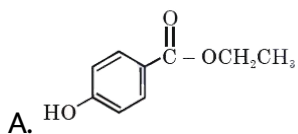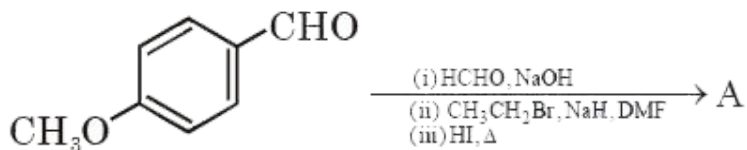
Answer: C

13. Calgon is used for water treatment. Which of the following statement is NOT true about Calgon?

A. Calgon contains the 2nd most abundant element by weight in the Earth's crust.

B. It is polymeric compound and is water soluble.

C. It is also known as Graham's salt

D. It does not remove Ca^{2+} ion by precipitation.

Answer: A

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14. Match List-I with List-II

(a)

$$2CH_3CH_2Cl + 2Na \xrightarrow{\text{Ether}} C_2H_5 - C_2H_5 + 2NaCl$$

(d) $2C_6H_5Cl + 2Na \xrightarrow{\text{Ether}} C_6H_5 - C_6H_5 + 2NaCl$
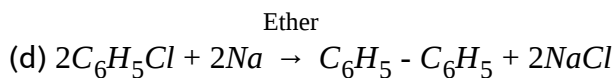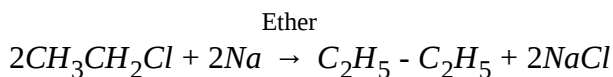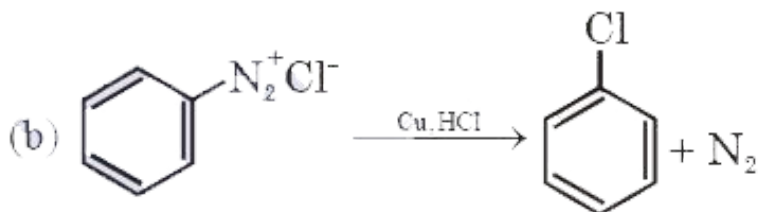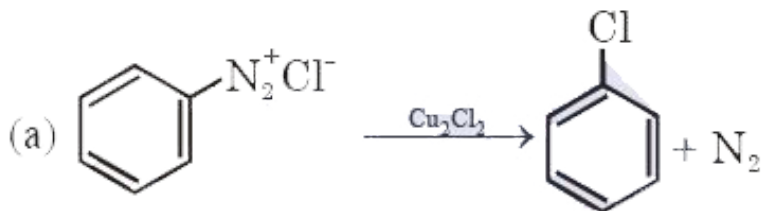
List -II

(i) Wurtz reaction

(ii) Sandmeyer reaction

(iii) Fittig reaction

(iv) Gatterman reaction

Choose the correct answer from the options given below:

A. $(a) \rightarrow (iii), (b) \rightarrow (i), (c) \rightarrow (iv), (d) \rightarrow (ii)$

B. $(a) \rightarrow (ii), (b) \rightarrow (i), (c) \rightarrow (iv), (d) \rightarrow (iii)$

C. $(a) \rightarrow (ii), (b) \rightarrow (iv), (c) \rightarrow (i), (d) \rightarrow (iii)$

D. $(a) \rightarrow (iii), (b) \rightarrow (iv), (c) \rightarrow (i), (d) \rightarrow (ii)$

Answer: C

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(1) Zn/HCl
(2) Cr_2O_3, 773 K
10–20 atm
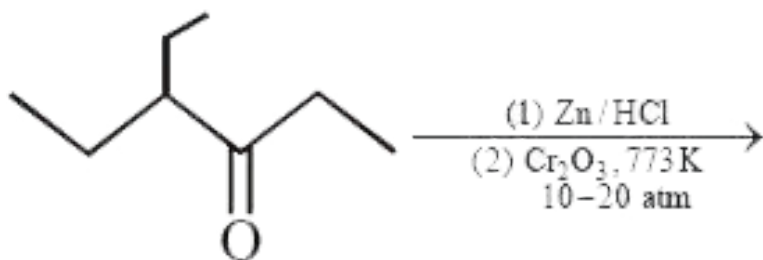
15.

considering the above reaction, the major product among the following is :

CH_2CH_3

A.

B.

CH₃

CH₃

C.

COCH₂CH₃

D.
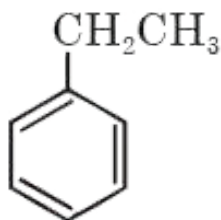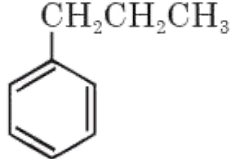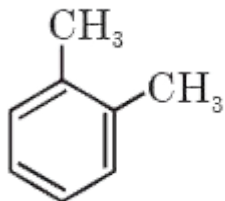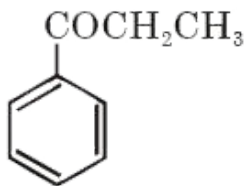
Answer: A

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16. Match List-I with List-II. List-I

	List-I (Molecule)		List-II (Bond order)
(a)	Ne_2	(i)	1
(b)	N_2	(ii)	2
(c)	F_2	(iii)	0
(d)	O_2	(iv)	3

Choose the correct answer from the options given below:

A. $(a) \rightarrow (iii), (b) \rightarrow (iv), (c) \rightarrow (i), (d) \rightarrow (ii)$

B. $(a) \rightarrow (i), (b) \rightarrow (ii), (c) \rightarrow (iii), (d) \rightarrow (iv)$

C. $(a) \rightarrow (ii), (b) \rightarrow (i), (c) \rightarrow (iv), (d) \rightarrow (iii)$

D. $(a) \rightarrow (iv), (b) \rightarrow (iii), (c) \rightarrow (ii), (d) \rightarrow (i)$

Answer: A

17. Identify A in the given reaction.

SOCl₂ → A (Major Product)

A.

B.

C.

D.
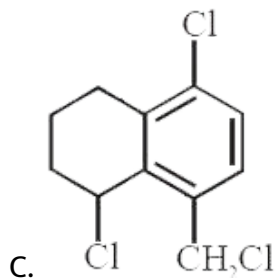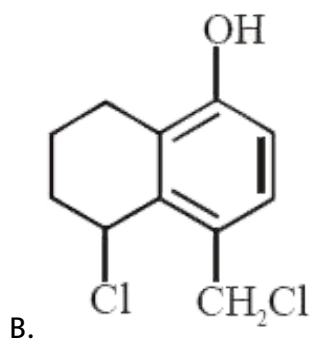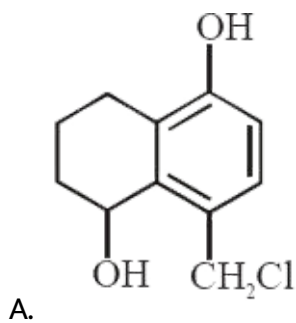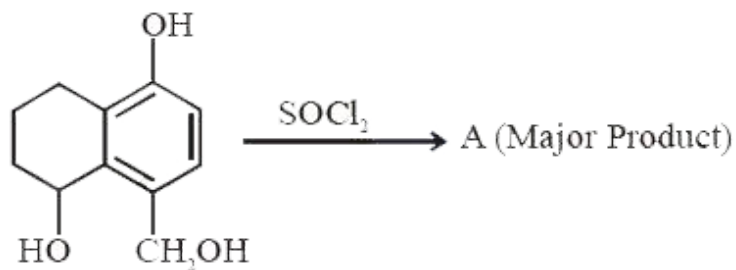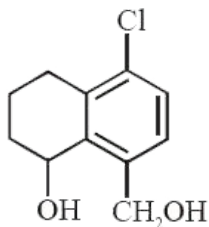
Answer: B

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18. Match List-I with List-II. List-I

	List-I		**List-II**
(a)	Siderite	(i)	Cu
(b)	Calamine	(ii)	Ca
(c)	Malachite	(iii)	Fe
(d)	Cryolite	(iv)	Al
		(v)	Zn

Choose the correct answer from the options given below :

A. $(a) \rightarrow (iii), (b) \rightarrow (i), (c) \rightarrow (v), (d) \rightarrow (ii)$

B. $(a) \rightarrow (i), (b) \rightarrow (ii), (c) \rightarrow (v), (d) \rightarrow (iii)$

C. $(a) \rightarrow (iii), (b) \rightarrow (v), (c) \rightarrow (i), (d) \rightarrow (iv)$

D. $(a) \rightarrow (i), (b) \rightarrow (ii), (c) \rightarrow (iii), (d) \rightarrow (iv)$

Answer: C

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19. The nature of charge on resulting colloidal particles when $FeCl_3$ is added to excess of hot water is :

A. Positive

B. Sometimes positive and sometimes negative

C. Neutral

D. Negative

Answer: A

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20. Match List-I with List-II. List-I

	List-I		List-II
(a)	Sodium Carbonate	(i)	Deacon
(b)	Titanium	(ii)	Castner-Kellner
(c)	Chlorine	(iii)	Van-Arkel
(d)	Sodium hydroxide	(iv)	Solvay

Choose the correct answer from the options given below :

A. $(a) \rightarrow (iv), (b) \rightarrow (iii), (c) \rightarrow (i), (d) \rightarrow (ii)$

B. $(a) \rightarrow (i), (b) \rightarrow (iii), (c) \rightarrow (iv), (d) \rightarrow (ii)$

C. $(a) \rightarrow (iv), (b) \rightarrow (i), (c) \rightarrow (ii), (d) \rightarrow (iii)$

D. $(a) \rightarrow (iii), (b) \rightarrow (ii), (c) \rightarrow (i), (d) \rightarrow (iv)$

Answer: A

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CHEMISTRY (SECTION-B)

1. The $NaNO_3$ weighed out to make 50 mL of an aqueous solution containing 70.0 mg Na^+ per mL is_____ g. (Rounded off to the nearest integer)

[Given : Atomic weight in g mol^{-1} - Na: 23, N: 14, O: 16]

2. mf of the following cell at 298 K in V is $x \times 10^{-2}$. $Zn|Zn^{2+}(0.1M)||Ag^+(0.01M)|Ag$ The value of x is _____ Rounded off the the nearest integer)

Givne $E^0_{Zn^+/Zn}$ = - 0.76V, $E^0_{Ag^+/Ag}$ = + 0.80V, $\dfrac{2.303RT}{F}$ = 0.059]

3. 12.2g of benzoic acid in 100 g water decreases freezing point upto -0.93 ° C

K_f = 1.86KKG/mole. if there is 100% polymerisation, the number of molecules of benzoic acid in associated state is

4. The average S-F bond energy in kJ mol^{-1} of SF_6 is _____ (Rounded off to the nearest integer)

[Given : The values of standard enthalpy of formation of $SF_6(g)$, $S(g)$ and F(g) are -1100, 275 and 80 kJ mol^{-1} respectively.]

5. A ball weighing 10 g is moving with a velocity of $90ms^{-1}$. If the uncertainty in its velocity is 5%, then the uncertainty in its position is _____ $\times 10^{-33}m$. Rounded off to the nearest integer)

[Given $h = 6.63 \times 10^{-34} Js$]

6. The number of octahedral voids per lattice site in a lattice is _____ (Rounded off to the nearest integer)

7. In mildly alkaline medium, thiosulphate ion is oxidized by MnO_4^- to "A". The oxidation state of sulphur in "A" is _____

8. Find total number of possible stereoisomers of $\left[Co(OX)_2Br(NH_3) \right]$

9. If the activation energy of a reaction is 80.9 kJ mol^{-1}, the fraction of molecules at 700 K, having enough energy to react to form products is e^{-x}. The value of x is _____

((Rounded off to the nearest integer) [Use $R = 8.31 JK^{-1}mol^{-1}$]

10. The pH of ammonium phosphate solution, if pK_a of phosphoric acid and pK_b of ammonium hydroxide are 5.23 and 4.75 respectively, is _____.

CHEMISTRY (SECTION A)

1. Which among the following pairs of Vitamins is stored in our body relatively for longer duration ?

    A. Thiamine and Ascorbic acid

    B. Vitamin A and Vitamin D

    C. Ascorbic acid and Vitamin D

    D. Thiamine and Vitamin A

2. Assertion A: Enol form of acetone $\left[CH_3COCH_3\right]$ exists in $< 0.1\%$ quantity. However, the enol form of acetyl acetone $\left[CH_3COCH_2OCH_3\right]$ exists in approximately 15% quantity

Reason R: Enol form of acetyl acetone is stabilized by intramolecular hydrogen bonding which is not possible in enol form of acetone.

Choose the correct statement :

A. Both A and R are true but R is not the correct explanation of A

B. Both A and R are true and R is the correct explanation of A

C. A is false but R is true

D. A is true but R is false

3. Among the following, the aromatic compounds are :

(A) $=CH_2$

(B)

(C)

(D)
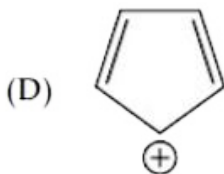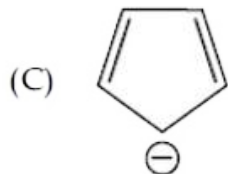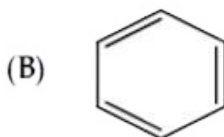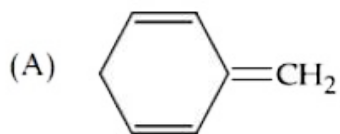
Choose the correct answer from the following options :

A. (A), (B) and (C) only

B. (B) and (C) only

C. (B), (C) and (D) only

D. (A) and (B) only

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4. Given below are two statements :

Statement 1: The E value for Ce^{4+}/Ce^{2+} is $+ 1.74V$.

Statement II: Ce is more stable in Ce^{4+} state than Ce^{3+} state

In the light of the above statements, choose the most appropriate answer from the options given below:

A. Both statement I and statement II are incorrect

B. Statement I is incorrect but statement II is correct

C. Both statement I and statement II are correct

D. Statement I is correct but statement II is incorrect

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5. Given below are two statement : one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: Size of Np^{3+} ion is greater than Bk^{3+} ion.

Reason R: The above is a consequence of the lanthanoid contraction.

In the light of the above statements, choose the correct answer from the options given below :

A. A is true but R is false

B. A is false but R is true

C. Both A and R are true but R is not the correct explanation of A

D. Both A and R are true and R is the correct explanation of A

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6. The functions of antihistamine are :

A. Antiallergic and antidepressant

B. Antiallergic and Analgesic

C. Analgesic and antacid

D. Antacid and antiallergic

NH$_2$ OH

$$\xrightarrow[273 - 278 \text{ K}]{\text{NaNO}_2,\ \text{HCl}}\ "X" \xrightarrow{"A"}$$

Major Product
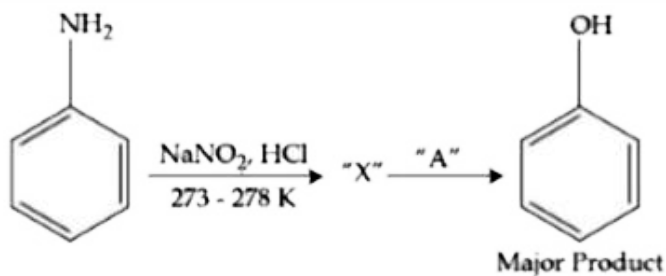
7.

In the above chemical reaction, intermediate "X" and reagent/condition "A" are :
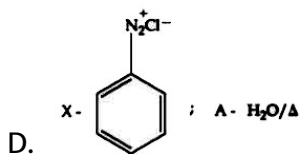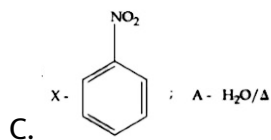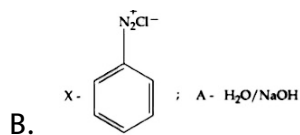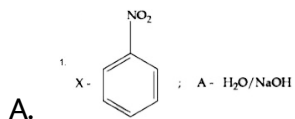
A.
X - [structure with NO$_2$ group] ; A - H$_2$O/NaOH

B.
X - [structure with N$_2^+$Cl$^-$ group] ; A - H$_2$O/NaOH

C.
X - [structure with NO$_2$ group] ; A - H$_2$O/Δ

D.
X - [structure with N$_2^+$Cl$^-$ group] ; A - H$_2$O/Δ

8. Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: The H-O-H bond angle in water molecule is $104.5°$

Reason R: The lone pair - lone pair repulsion of electrons is higher than the bond pair - bond pair repulsion.

In the light of the above statements, choose the correct answer from the options given below:

A. Both A and R are true, and R is the correct explanation of A

B. A is false but R is true

C. A is true but R is false

D. Both A and R are true, but R is not the correct explanation of A

9. The type of pollution that gets increased during the day time and in the presence of O_3 is:

A. Reducing smog

B. Global warming

C. Oxidising smog

D. Acid rain

10. The process that involves the removal of sulphur from the ores is :

A. Smelting

B. Roasting

C. Refining

D. Leaching

11. In chromotography technique, the purification of compound is independent of:

A. Mobility or flow of solvent system

B. Physical state of the pure compound

C. Solubility of the compound

D. Length of the column or TLC plate

12. Which of the following reaction DOES NOT involve Hoffmann bromamide degradation ?

A.

B.

i) NH₃, NaOH
ii) Br₂ NaOH

C.

i) Br₂ NaOH/H⁺
ii) NH₃/Δ
iii) LiAlH₄/H₂O

D.

Br₂ NaOH

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13.

H₃C   OH

$$\xrightarrow[358\ K]{20\%\ H_3PO_4}$$ "A"
(Major Product)

H₃C   Cl

$$\xrightarrow[]{(CH_3)_3CO^-K^+}$$ "B"
(Major Product)
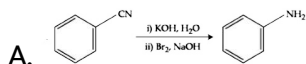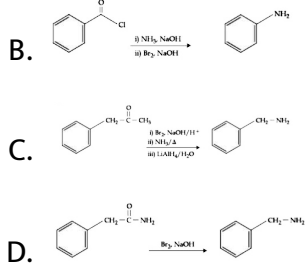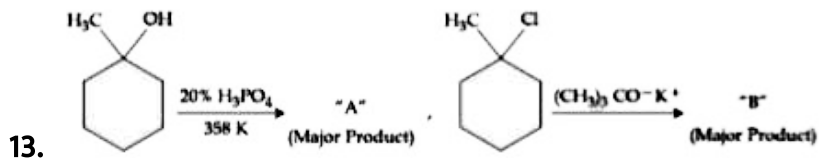
The products "A" and "B" formed in above reactions are:

A.

A –
CH₂

B –
CH₂

B.

A –
CH₂

B –
CH₃

C.

A –
CH₃

B –
CH₃

D.

A –
CH₃

B –
CH₂
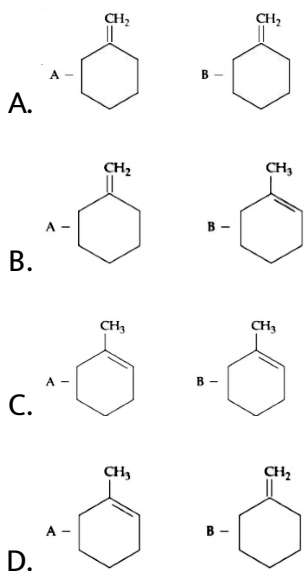
14. Which of the following is Lindlar catalyst ?

    A. Zinc chloride and HCl

    B. Cold dilute solution of $KMnO_4$

    C. Sodium and Liquid NH_3

    D. Partially deactivated palladised charcoal

15. A group 15 element, which is a metal and forms a hydride with strongest reducing power among group 15 hydrides. The element is:

    A. P

B. As

C. Bi

D. Sb

16. Match List - I with List - II :

List - I		List - II
Name of oxo acid		Oxidation state of 'P'
(a) Hypophosphorous acid	(i)	+ 5
(b) Orthophosphoric acid	(ii)	+ 4
(c) Hypophosphoric acid	(iii)	+ 3
(d) Orthophosphorous acid	(iv)	+ 2
	(v)	+ 1

Choose the correct answer from the options given below :

A. $(a) - (v), (b) - (i), (c) - (ii), (d) - (ii)$

B. $(a) - (v), (b) - (iv), (c) - (i), (d) - (iii)$

C. $(a) - (iv), (b) - (v), (c) - (ii), (d) - (ii)$

D. $(a) - (iv), (b) - (i), (c) - (ü), (d) - (iii)$

17. Given below are two statements :

Statement 1: Both $CaCl_2, 6H_2O$ and $MgCl_2H_2O$ undergo dehydration on heating

Statement II: BO is amphoteric whereas the oxides of other elements in the same group are acidic.

In the light of the above statements, choose the correct answer from the options given below:

A. Both statement I and statement II are false

B. Both statement I and statement II are true

C. Statement I is true but statement II is false

D. Statement I is false but statement II is true

i) DIBAL-H, Toluene, −78°C

ii) H_3O^+

"P"

(Major Product)

18.
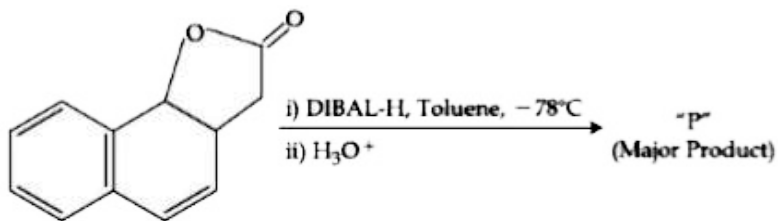
The product "P" in the above reaction is :

A.

B.

C.

D.
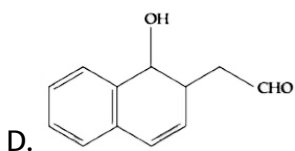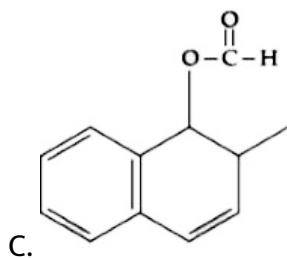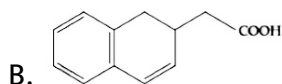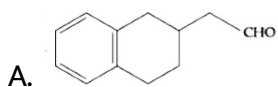
19. Match List - I with List - II :

	List - I		List - II
	Industrial process		**Application**
(a)	Haber's process	(i)	HNO_3 synthesis
(b)	Ostwald's process	(ii)	Aluminium extraction
(c)	Contact process	(iii)	NH_3 synthesis
(d)	Hall-Heroult process	(iv)	H_2SO_4 synthesis

Choose the correct answer from the options given below :

A. $(a) - (iii), (b) - (i), (c) - (iv), (d) - (ii)$

B. $(a) - (iv), (b) - (i), (c) - (ü), (d) - (iii)$

C. $(a) - (ii), (b) - (iv), (c) - (i), (d) - (ii)$

D. $(a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)$

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20. Given below are two statements:

Statement 1: H_2O_2 can act as both oxidising and reducing agent in basic medium.

Statement II: In the hydrogen economy, the energy is transmitted in the form of dihydrogen.

In the light of the above statements, choose the correct answer from the options given below:

A. Both statement I and statement II are false

B. Statement I is true but statement II is false

C. Statement I is false but statement II is true

D. Both statement I and statement II are true

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21. The correct order of conductivity of ions in water is :

A. $K^+ > Na^+ > Cs^+ > Rb^+$

B. $Rb^+ > Na^+ > K^+ > Li^+$

C. $Na^+ > K^+ > Rb^+ > Cs^+$

D. $Cs^+ > Rb^+ > K^+ > Na^+$
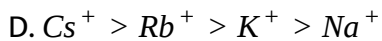
22. Mesityl oxide is a common name of :

    A. 2,4-Dimethyl pentan -3-one

    B. 4-Methyl pent-3-en-2-one

    C. 2-Methyl cyclohexanone

    D. 3-Methyl cyclohexane carbaldehyde

23. Which of the following compound CANNOT act as a Lewis base ?

    A. PCl_5

B. NF_3

C. CIF_3

D. SF_4

24. Reducing smog is a mixture of :

A. Smoke, fog and $CH_2 = CH - CHO$

B. Smoke, fog and SO_2

C. Smoke, fog and N_2O_3

D. Smoke, fog and O_3

25. Hoffmann bromamide degradation of benzamide gives product A, which upon heating with $CHCl_3$ and NaOH gives product B.

The strucures of A and B are :

A.

B.

C.

D.
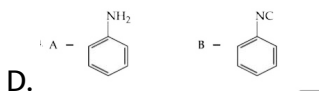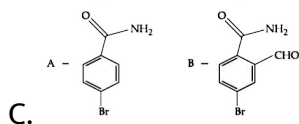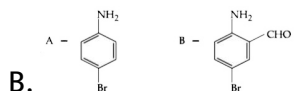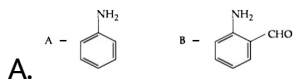
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26. The point of intersection and sudden increase in the slope, in the diagram given below, respectively, indicates :
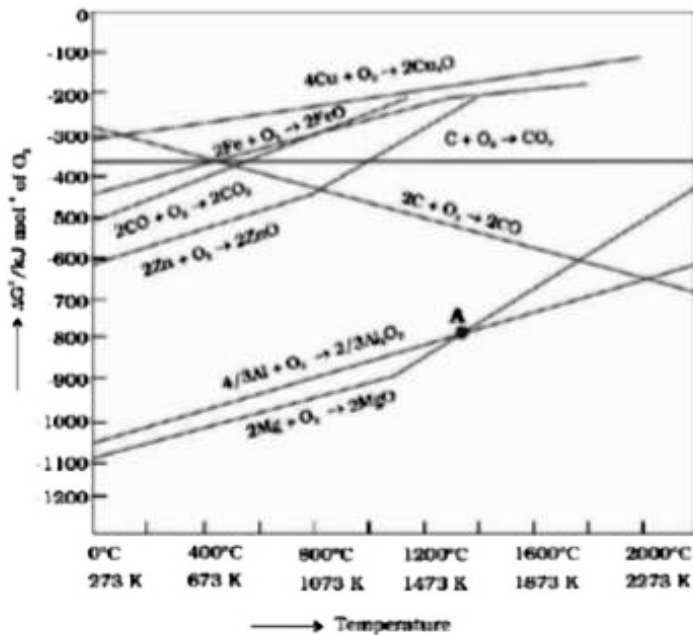
A. $\Delta G = 0$ and reduction of the metal oxide

B. $\Delta G = 0$ and melting or boiling point of the metal oxide

C. $\Delta G > 0$ and decomposition of the metal oxide

D. $\Delta G < 0$ and decomposition of the metal oxide

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27. With respect to drug-enzyme interaction, identfy the wrong statement

A. Allosteric inhibitor competes with the enzyme's active site

B. Allosteric inhibitor changes the enzyme's active site

C. Non-Competitive inhibitor binds to the allosteric site

D. Competitive inhibitor binds to the enzyme's active site

28. Give below are two statements :

Statement-I : Retardation factor $\left(R_f\right)$ can be measured in meter / centimeter.

Statement II : R_f value of a compound remains constant in all solvents.

Choose the most appropriate answer from the options given belwo :

A. Both statement- I and statement II are false

B. Statement I is false but statement II in true

C. Statement I is true but statement II is false

D. Both statement I and statement II are true

29. Which of the following reaction is an example of ammonolysis ?

A. $C_6H_5COCl + C_6H_5NH_2 \rightarrow C_6H_5CONHC_6H_5$

B. $C_6H_5NH_2 \xrightarrow{HCl} C_6H_5\overset{+}{NH_3}Cl^-$

C. $C_6H_5CH_5Cl + NH_3 \rightarrow C_6H_5CH_2NH_2$

D. $C_6H_5CH_2CN \xrightarrow{[H]} C_6H_5CH_2CH_2NH_2$
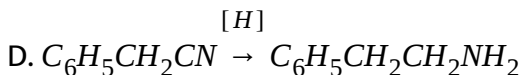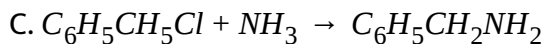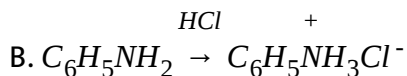
30. What is the spin-only magnetic moment value (BM) of a divalent metal ion with atomic number 25, in it's aqueous solution ?

A. zero

B. 5.26

C. 5.0

D. 5.92

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31. Which of the following is correct structure of tyrosine ?

A.

COOH
H₂N —— H
OH

B.

COOH
H₂N —— H
OH

C.

COOH
H₂N —— H
OH

D.
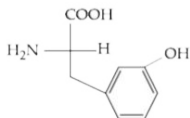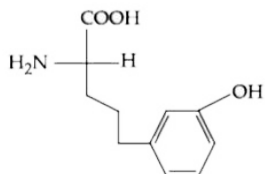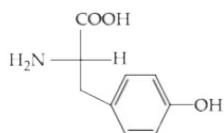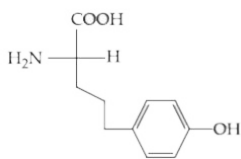
32. Given below are two statements :

Statement I : Potassium permanganate on heating at 500K forms potassium manganate.

Statement II : Both potasium permanganate and potassium manganate are tetrahedral and paramaganetic in nature.

In the light of the above statement, choose the most appropriate answer from the options given below :

    A. Both statement I and statement II are true

   B. Both statement I and statement II are false

    C. Statement I is true but statement II is false

    D. Statement I is false but statement II is true

33. A colloidal system consisting of a gas dispersed in a solid is called a /

an :

A. gel

B. solid sol

C. aerosol

D. foam

34.
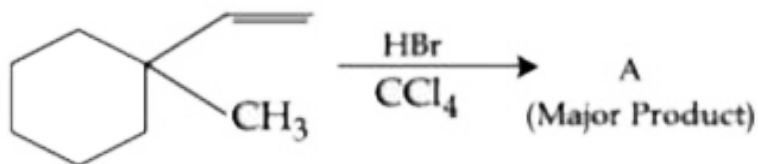
Product "A" in the above chemical reaction is :

A.

B.

C.

D.

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35.
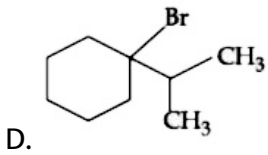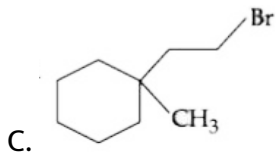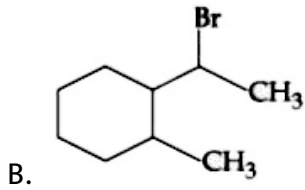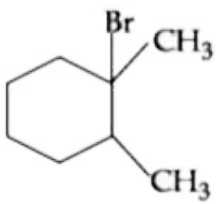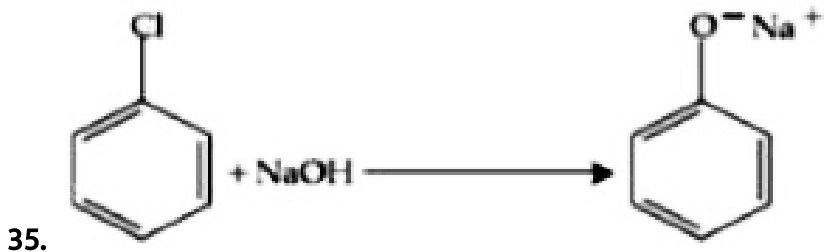
The above reaction requires which of the following reaction conditions ?

A. 573K , 300 atm

B. 623K, 300 atm

C. 573K, Cu, 300atm

D. 623K, Cu, 300 atm

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36. The absolute value of the electron gain enthalpy of halogens satisfies

:

A. $I > Br > Cl > F$

B. $F > Cl > Br > I$

C. $Cl > F > Br > I$

D. $Cl > Br > F > I$
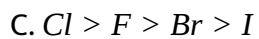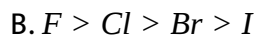
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37. Which of the following is an aromatic compound ?

A.

B.

C.

D.
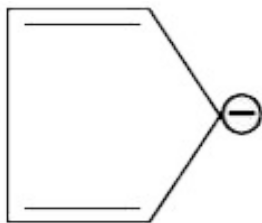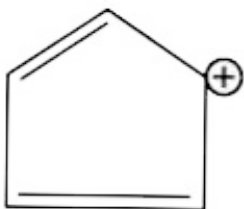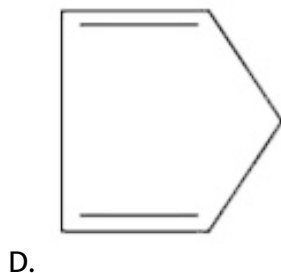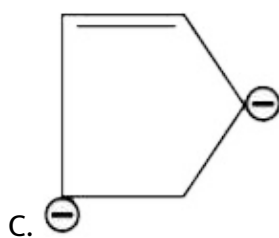
38. A central atom in a molecule has two lone pairs of electrons and forms three single bonds. The shape of this molecule is :

A. T-shaped

B. planar triangular

C. trigonal pyramidal

D. see-saw

39. The INCORRECT statement (s) about heavy water is (are)

(A) used as a moderator in nuclear reactor

(B) obtained as a by-product in fertilizer industry

(C) used for the study of reaction mechanism

(D) has a higher dielectric constant than water

Choose the correct answer from the options given below :

A. (C) only

B. (B) only

C. (B) and (D) only

D. (D) only

40.
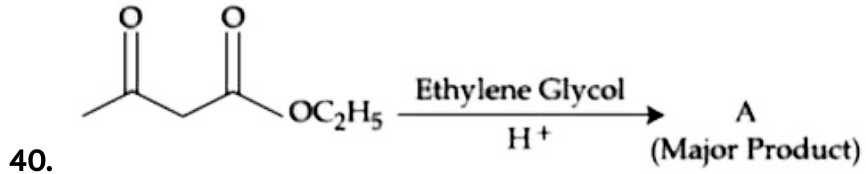
The product "A" in the above reaction is :

A.

B.

C.

D.
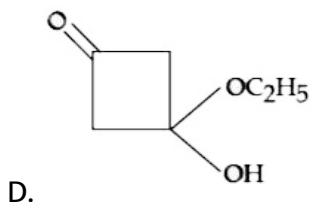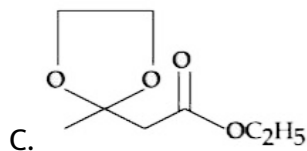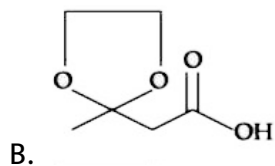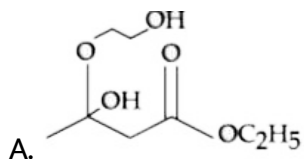
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1. Two salts A_2X and MX have the same value of solubility product of 4.0×10^{-12}. The ratio of their molar solubilities i.e. $\dfrac{S(A_2X)}{S(MX)} =$ _____

(Round off to the Nearest Integer).

2. $2MnO_4^- + bC_2O_4^{2-} + cH^+ \rightarrow xMn^{2+} + yCO_2 + zH_2O$
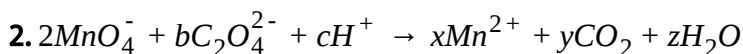
If the above equation is balanced with integer coefficients, the value of c

is _____

(Round off to the Nearest Integer).

3. AB_2 is 10% dissociated in water to A^{2+} and B^- The boiling point of a 10.0 molal aqueous solution of AB_2 is_____ $°C$. (Round off to the Nearest Integer).

[Given : Molal elevation constant of water $k_b = 0.5 Kkgmol^{-1}$ boiling point of pure water $= 100°C]$

4. The equivalents of ethylene diamine required to replace the neutral ligands from the coordination sphere of the trans-complex of $CoCl_3 4NH_3 is$_____ (Round off to the Nearest Integer).

5. The decomposition of formic acid on gold surface follows first order kinetics. If the rate constant at $300Kis1.0 × 10^{-3}s^{-1}$ and and the activation energy $E_a = 11,488Kjmol^{-1}.$ the rate constant at $200Kis$_____$× 10^{-5}s^{-1}.$ (Round off to the Nearest Integer). (Given : $R = 8.314Jmol^{-1}K^{-1}$)

6. When light of wavelength 248 nm falls on a metal of threshold energy 3.0 eV, the de-Broglie wavelength of emitted electrons is _____Å (Round off to the Nearest Integer).

[Use : $\sqrt{3}$ = 1.73, h - 6.63 × 10^{-34} Js

m_c = 9.1 × 10^{-31} kg, c = 3.0 × 10^8 ms^{-1}, $1eV$ = 1. 6 × 10^{-19})]

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7. Complete combustion of 750 g of an organic compound provides 420 g of CO_2 and 210g of H_2O. The percentage composition of carbon and hydrogen in organic compound is 15.3 and _____ respectively. (Round off to the Nearest Integer).

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8. A 650 molar solution of KOH (aq.) has a density of1.89gcm^{-3}. The molarity of the solutio is _____ mol dm^{-3} (Round off to the Nearest

Integer).

[Atomic mass : $K: 39.0u, O: 16u, H: 1.0u$]

9. For the reaction $A(g) = B(g)$ at$495K, \Delta_r G° = -9.478kJmol^{-1}$.

If we start the reaction in a closed container at 495 K with 22 millimoles

of A, the amount of B in the equilibrium mixture is _____

millimoles. (Round off to the Nearest Integer).

$[R = 8.314]mol^{-1}K^{-1}, \ln10 = 2.303]$

10. A certain element crystallises in a bcc lattice of unit cell edge length

27Å. If the same element under the same conditions crystallises in the

fcc lattice, the edge length of the unit cell in Å will - (Round off to the

Nearest Integer).

[Assume each lattice point has a single atom]

[Assume $\sqrt{3} = 1.73, \sqrt{2} = 1.41$]

11. A certain orbital has n = 4 and m_L = - 3 . The number of radial nodes in this orbital is _____ . (Round off to the Nearest Integer) .

12. The pressure exerted by a non-reactive gaseous mixture of 6.4g of methane and 8.8 g of carbon dioxide in a 10L vessel at $27\,^{\circ}C$ is _____ kPa. (Round off to the Nearest Integer).

[Assume gases are ideal, R = 8.314] $mol^{-1}K^{-1}$

Atomic masses : C : 120 u, H : 1.0 u, O : 16.0 u]

13. The oxygen dissolved in water exerts a partial pressure of 20 kPa in the vapour above water. The molar solubiliyt of oxygen in water is _____ $\times 10^{-5} moldm^{-3}$. (Round off to the Nearest Integer).

[Given : Hengry's law constant $= K_H = 8.0 \times 10^4 kPa$ for O_2 .

Density of water with dissolved oxygen $= 1.0 kgdm^{-3}$]
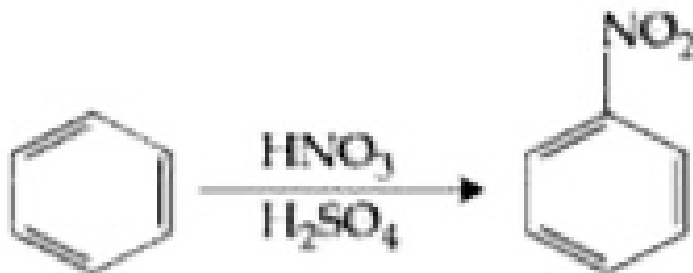
14.

In the above reaction, 3.9 g of benzene on nitration gives 4.92 g of nitrobenzene. The percentage yield of nitrobenzene in the above reaction is _____ %. (Round off to the Nearest Integer).

(Given atomic mass : C : 12.0 u, H : 1.0 u, O : 16.0 u, N : 14.0 u)

15. For a certain first order reaction 32% of the reactant is left after 570s. The rate constant of this reaction is _____ $\times 10^{-3}s^{-1}$. (Round off to the Nearest Integer).

[Given : $\log_{10}2 = 0.301$, $\ln10 = 2.303$]

16. 15 mL of aqueous solution of Fe^{2+} in acidic medium completely reacted with 20 mL of 0.03 M aqueous $Cr_2O_7^{2-}$. The molarity of the Fe^{2+} solution is _____ $\times 10^{-2}M$. (Round off to the Nearest Integer).

17. 0.01 moles of a weak acid $HA\left(K_a = 2.0 \times 10^{-6}\right)$ is dissolved in 1.0 L of 0.1 M HCl solution. The degree of dissociation of HA is _____ $\times 10^{-5}$ (Round off to the Nearest Integer).

[Neglect volume change on adding HA. Assume degree of dissocaition $<\,< 1$]

18. The mole fraction of a solution in a 100 molal aqueous solution is

_____ $\times 10^{-2}$ (Round off to the Nearest Integer).

[Given : Atomic masses : H : 1.0 u, O : 16.0 u]

19. The standard enthalpies of formation of Al_2O_3 and CaO are - 1675 kJ

mol^{-1} and $-635 kJmol^{-1}$ respectively

For the reaction

$3CaO + 2Al \rightarrow 3Ca + Al_2O_3$ the standard reaction enthalpy

$\Delta_r H^0 =$ _____$kJ.$ (Round off to the Nearest Integer).

20. The reaction of white phosphorus on boiling with alkali in inert

atmosphere resulted in the formation of production 'A'. The reaction of 1

mol of 'A' with excess of $AgNO_3$ in aqueous medium gives _____ mol(s) of Ag. (Round off to the Nearest Integer).

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CHEMISTRY SECTION A

1.   The   correct   structures   of   trans-

$$\left[NiBr_2\left(PPh_3\right)_2\right] \text{ and meridonial - } \left[Co\left(NH_3\right)_3\left(NO_2\right)_3\right], \text{ respectively, are :}$$

A.

B.

C.

D.
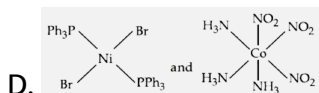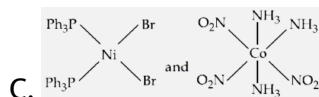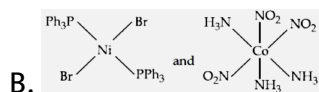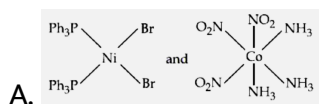
Answer: D

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2. The chemical that is added to reduce the melting points of the reaction mixture during the extraction of aluminium is :

A. Kaolite

B. Cryolite

C. Bauxite

D. Calamine

3. Compound with molecular formula C_3H_6O can show :

A. Both positional isomerism and metamerism

B. Positional isomerism

C. Metamerism

D. Functional group isomerism

4. Match List - I with List - II

	List - I		List - II
(a)	Chlorophyll	(i)	Ruthenium
(b)	Vitamin - B_{12}	(ii)	Platinum
(c)	Anticancer drug	(iii)	Cobalt
(d)	Grubbs catalyst	(iv)	Magnesium

Choose the most appropriate answer from the options given below :

A. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

B. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

C. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

D. (a)-(iii), (b)-(ii), (C)-(iv), (d)-(i)

5. Match List - I with List - II

List - I (Process)		List - II (Catalyst)	
(a)	Deacon's process	(i)	ZSM-5
(b)	Contact process	(ii)	$CuCl_2$
(c)	Cracking of hydrocarbons	(iii)	Particles 'Ni'
(d)	Hydrogenation of vegetable oils	(iv)	V_2O_5

Choose the most appopriate answer from the options given below :

A. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

B. (a)-(i), (b)-(iii), (c)-(ii), (d)-(iv)

C. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

D. (a)-(iv), (b)-(ii), (C)-(i), (d)-(iii)

6. The ionic radius of Na^+ ion is 1.02Å. The ionic (in A) of Mg^2 and Al^{3+}, respectively, are :

    A. 0.68 and 0.72

    B. 0.72 and 0.54

    C. 1.05 and 0.99

    D. 0.85 and 0.99

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7. In a binary compound, atoms of element A form a hcp structure and those of element Moccupy 2/3 of the tetrahedral voids of hcp structure. The formula of the binary compound is :

    A. M_4A_3

    B. M_4A

C. MA_3

D. M_2A_3

8. Reaction of Grignard reagent, C_2H_5MgBr with C_8H_8O followed by hydrolysis gives compound "A" which reacts instantly with lucas reagent to give compound B, $C_{10}H_{13}Cl$. The Compound B is :

A.

B.

C.

D.
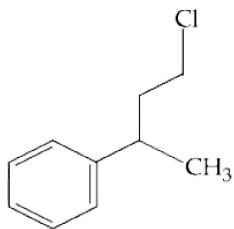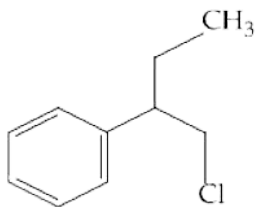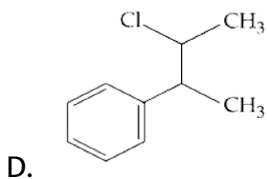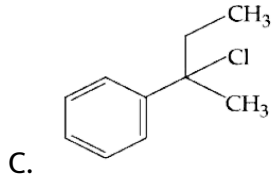
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9. Given below are two Statements : One is labelled as Assertion A and the other is labelled as

Reason R :

Assertion A: During the boiling of water having temporary hardness, $Mg\left(HCO_3\right)_2$ is converted to $MgCO_3$.

Reason R: The solubility product of $Mg(OH)_2$, is greater than that of $MgCO_3$. In the light of the above statements, choose the most appropriate answer from the options

A. Both A and R are true but R is NOT the correct explanation of A

B. A is true but R is false

C. Both A and R are true and R is the correct explanation of A

D. A is false but R is true

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10.

NH$_2$ → NaNO$_2$, HCl, 273 K - 278 K → "X" (Major Product) → H$_3$C–N–CH$_3$ → "Y" (Major Product)
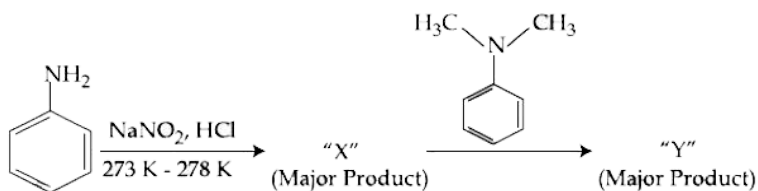
Considering the above reation, X and Y respectively are :

A.

B.

C.

D.

11.
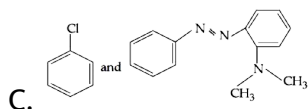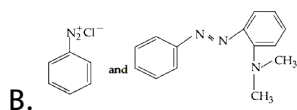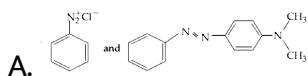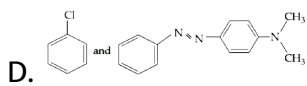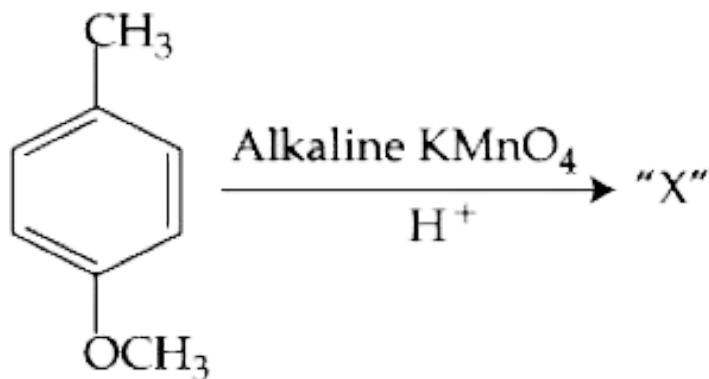
Considering the above reation, identify the product "X" :

A.

X -

COOH

X -

B. OCH₃

CH₃

X -

C. OH

CH₂OH

X -

D. OCH₃
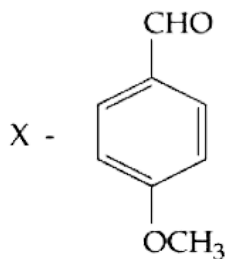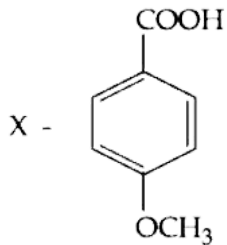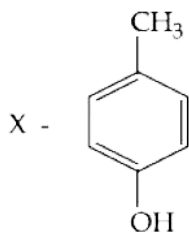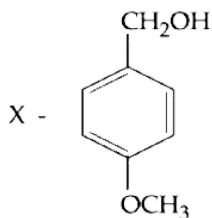
Answer: D

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12. Reagent, 1-naphthylamine and sulphanilic acid in acetic is used for the detection of :

A. NO_3^-

B. NO

C. N_2O

D. NO_2^-

13.
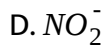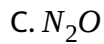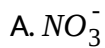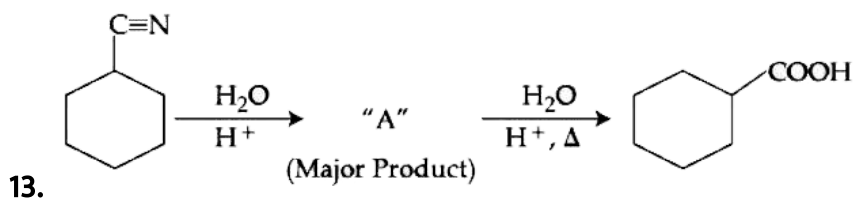
Consider the above chemical reaction and identify product "A" :

A.

B.

C.

CH_2NH_2

D.

CH_2NO_2
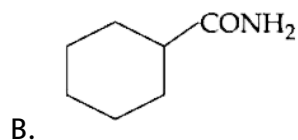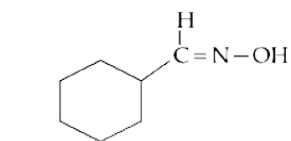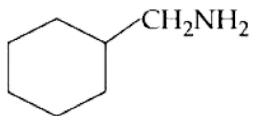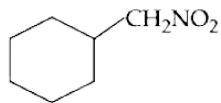
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14. The statements that are TRUE :

(A) methane leads to both global warming and photochemical smog

(B) methane is generated from paddy fields

(C) methane is a stronger global warming gas than CO_2

(D) methane is a part of reducing smog.

Choose the most appropriate answer from the options given below:

A. (A) and (B) only

B. (A), (B), (D) only

C. (A), (B), (C) only

D. (B), (C), (D) only

15. The number of ionisable hydrogens present in the product obtained from a reaction of phosphorus trichloride and phosphonic acid is :

A. 1

B. 3

C. 0

D. 2

16. A cetain orbital has no angular nodes and two radial nodes. The orbital is :

A. 3s

B. 2s

C. 2p

D. 3p

17. Match List - I with List - II

	List - I		List - II
(a)	$Ca(OCl)_2$	(i)	Antacid
(b)	$CaSO_4 \cdot \frac{1}{2}H_2O$	(ii)	Cement
(c)	CaO	(iii)	Bleach
(d)	$CaCO_3$	(iv)	Plaster of Paris

Choose the most appopriate answer from the options given below :

A. (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

B. (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

C. (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

D. (a)-(i), (b)-(iv), (C)-(iii), (d)-(ii)

18. A non-reducing sugar "A" hydrolyses to give two reducing mono sachharides. Sugar A is :

A. Fructose

B. Sucrose

C. Glucose

D. Galactose

19. Match List - I with List - II

	List - I (Class of Drug)		List - II (Example)
(a)	Antacid	(i)	Novestrol
(b)	Artificial Sweetener	(ii)	Cimetidine
(c)	Antifertility	(iii)	Valium
(d)	Tranquilizers	(iv)	Alitame

Choose the most appopriate match :

A. (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

B. (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)

C. (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

D. (a)-(ii), (b)-(iv), (C)-(i), (d)-(iii)

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20. Match List - I with List - II

	List - I (Chemicals)		List - II (Use/Preparation/Constituent)
(a)	Alcoholic potassium hydroxide	(i)	electrodes in batteries
(b)	$Pd/BaSO_4$	(ii)	obtained by addition reaction
(c)	BHC (Benzene hexachloride)	(iii)	used for β-elimination reaction
(d)	Polyacetylene	(iv)	Lindlar's Catalyst

Choose the most appropriate match :

A. (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

B. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

C. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

D. (a)-(ii), (b)-(i), (C)-(iv), (d)-(iii)

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21. Which of the following reduction reaction CANNOT be carried out with coke?

A. $Fe_2O_3 \rightarrow Fe$

B. $Cu_2O \rightarrow Cu$

C. $ZnO \rightarrow Zn$

D. $Al_2O_3 \rightarrow Al$
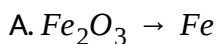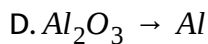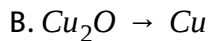
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22. Which of the following is least basic ?

A. $\left(C_2H_5\right)_2 \overset{*}{N}H$

B. $\left(CH_3CO\right)\overset{..}{N}HC_2H_5$

C. $\left(C_2H_5\right)_3 \overset{..}{N}H$

D. $\left(CH_3CO\right)_2 \overset{..}{N}H$
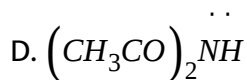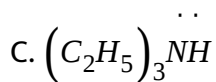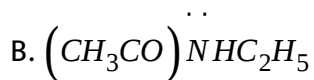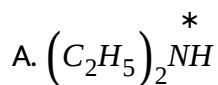
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23. The secondary structure of protein is stabilised by :

A. glycosidic bond

B. van der Waals forces

C. Peptide bond

D. Hydrogen bonding

24. The correct statements about H_2O_2 are :

(A) used in the treatment of effluents.

(B) used as both oxidising and reducing agents.

(C) the two hydroxyl groups lie in the same plane.

(D) miscible with water. Choose the correct answer from the options given below:

A. (B), (C) and (D) only

B. (A), (B) and (D) only

C. (A), (C) and (D) only

D. (A), (B), (C) and (D)

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25. Complete the following reaction
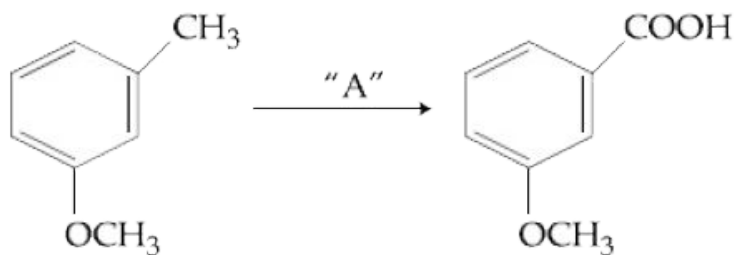
A. $NaBH_4$, H_3O^+

B. Alkaline $KMnO_4$, H^+

C. $LiAlH_4$

D. HCI, Zn - Hg

26. Fex_2 and Fey_3 are known when x and y are :

    A. x=Cl, Br, I and y=F, CI, Br, I

    B. x=F, CI, Br and y=F, CI, Br, I

    C. x=F, CI, Br, I and y=F, a, Br

    D. x=F, CI, Br, I and y=F, CI, Br, I

27. The INCORRECT statements below regarding colloidal solutions is :

    A. A colloidal solution shows Brownian motion of colloidal particles

    B. colloidal solution shows colligative properties.

C. An ordinary filter paper can stop the flow of colloidal particles.

D. The flocculating power of Al^{3+} is more than that of Na^+

28. Match the following columns

	List-I Test/Reagents/Observation(s)		List-II Species detected
(a)	Lassaigne's Test	(i)	Carbon
(b)	Cu(II) oxide	(ii)	Sulphur
(c)	Silver nitrate	(iii)	N, S, P, and halogen
(d)	The sodium fusion extract gives black precipitate with acetic acid and lead acetate	(iv)	Halogen Specifically

A. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

B. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

C. (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)

D. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

29. Statement I: Sodium hydride can be used as an oxidising agent.

Statement II: The lone pair of electrons on nitrogen in pyridine makes it basic. Choose the CORRECT answer from the options given below:

A. Statement I is false but statement II is true

B. Statement I is true but statement II is false

C. Both statement I and statement II are false

D. Both statement I and statement II are true

30. Ammonolysis of Alkyl halides followed by the treatment with NaOH solution can be used to prepare primary, secondary and tertiary amines. The purpose of NaOH in the reaction is :

A. to increase the reactivity of alkyl halide

B. to remove acidic impurities

C. to remove basic impurities

D. to activate NH_3 used in the reaction

31. The characteristics of elements X, Y and Z with atomic numbers, respectively, 33, 53 and 83 are:

A. X, Y and Z are metals

B. X and Y are metalloids and Z is a metal.

C. X is a metalloid, Y is a non-metal and Z is a metal.

D. X and Z are non-metals and Y is a metalloid.

32. An unsaturated hydrocarbon X on ozonolysis gives A. Compound A when warmed with ammonical silver nitrate forms a bright silver mirror along the sides of the test tube. The unsaturated hydrocarbon X is :

A. $CH_3 - C|H_3 = C|CH_3 - CH_3$

B.

C. $HC \equiv C - CH_2 - CH_3$

D. $CH_3 - C \equiv C - CH_3$
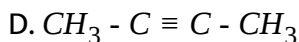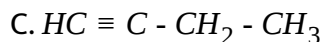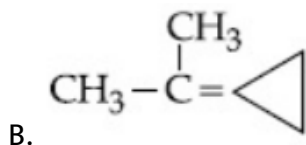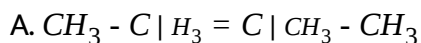
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33. The INCORRECT statement regarding the structure of C_{60} is :

A. The five-membered rings are fused only to six-membered rings

B. Each carbon atom forms three sigma bonds.

C. It contains 12 six-membered rings and 24 five-membered rings.

D. The six-membered rings are fused to both six and five-membered rings.

34. The exact volumes of 1 M NaOH solution required to neutralise 50 mL of $1MH_3PO_3$ solution and 100 mL of $2MH_3PO_2$ solution, respectively, are :

A. 50 mL and 50 mL

B. 100 mL and 100 mL

C. 100 mL and 50 mL

D. 100 mL and 200 mL

35. Arrange the following metal complex/compounds in the increasing order of spin only magnetic moment. Presume all the three, high spin system. (Atomic numbers Ce=58, Gd=64 and Eu=63.)

(a) $\left(NH_4\right)_2\left[Ce\left(NO_3\right)_6\right]$ (b)$Gd\left(NO_3\right)_3$ and (c)$Eu\left(NO_3\right)_3$
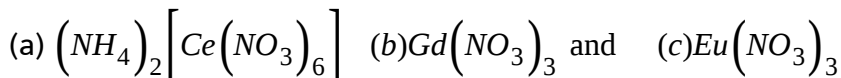
A. $(c) < (a) < (b)$

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

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

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

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36. The green house gas/es is (are):

(A) Carbon dioxide

(B) Oxygen

(C) Water vapour

(D) Methane Choose the most appropriate answer from the options given below:

A. (A), (C) and (D) only

B. (A) and (C) only)

C. (A) only

D. (A) and (B) only

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37. Which of the following polymer is used in the manufacture of wood laminates ?

A. cis-poly isoprene

B. Melamine formaldehyde resin

C. Urea formaldehyde resin

D. Phenol and formaldehyde resin
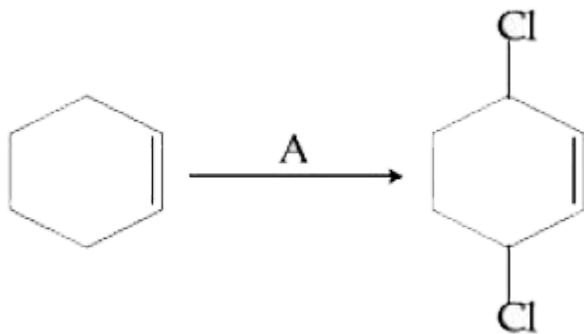
38.

Identify the reagent (s) 'A' and condition (s) for the reaction

    A. $A = Cl_2$, UV light

    B. A=HCl, Anhydrous $AlCl_3$

    C. $A = HCl, ZnCl_2$

    D. $A = Cl_2$, dark Anyhydrouns $AlCl_3$
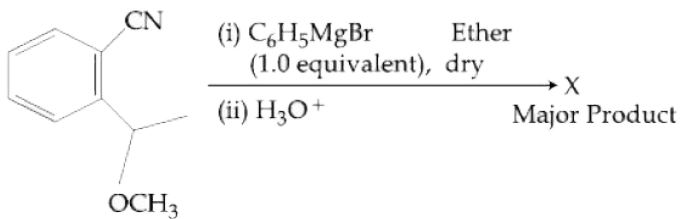
39.

The Structure of X is :

A.

B.

C.

D.
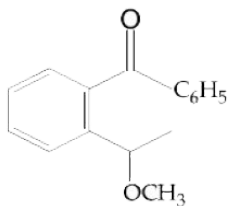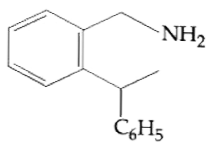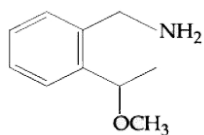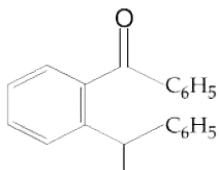
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40. Identify the elements X and Y using the ionisation energy values given below :

Ionization energy (kJ/mol)

	1st	2nd
X	495	4563
Y	731	350

A. X=Na , Y=Mg

B. X=Mg , Y=Na

C. X=Mg, Y=F

D. X=F, Y=Mg

41. During which of the following processes, does entropy decrease ?

(A)Freezing of water to ice at $0°C$

(B) Freezing of water to ice at $-10°C$

(C) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

(D) Adsorption of CO(g) on lead surface.

(E) Dissolution of NaCl in water

Choose the correct answer from the options given below:

A. (B) and (C) only

B. (A) and (E) only

C. (A), (B), (C) and (D) only

D. (A), (C) and (E) only

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42.

$$C_7H_7N_2OCl + C_2H_5OH \longrightarrow$$ $$+ N_2 + "X" + "Y"$$
(A)
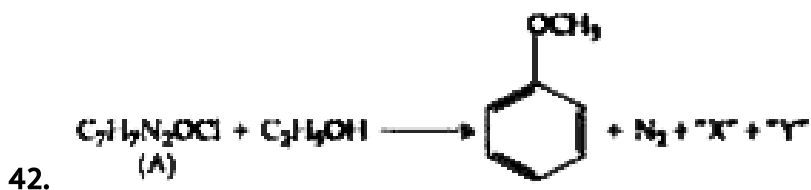
In the above reaction, the structural formula of (A), "X" and "Y" respectively are :

A.

 $N_2^+ \ OCH_3$ ... $CH_3-\overset{O}{\overset{\|}{C}}-H$, H_2O

B.

 $N_2^+ \ Cl^-$, OCH_3 ... $CH_3-\overset{O}{\overset{\|}{C}}-H$, HCl

C.

 $N_2^+ \ OCH_3$ ... H , HCl

D.

 $N_2^+ \ Cl^-$, OCH_3 ... H , H_2O
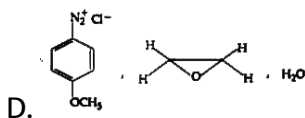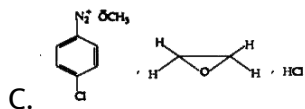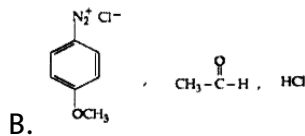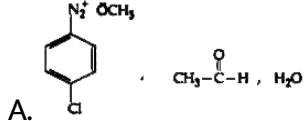
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43. Primary, secondary and tertiary amines can be separated using :

A. Benzene sulphonic acid

B. Acetyl amide

C. Chloroform and KOH

D. para-Toluene sulphonyl chloride

44. The correct pair(s) of the ambident nucleophiles is (are) :

(A) AgCN/KCN

(B) RCOOAg/RCOOK

(C) $AgNO_2/KNO_2$

(D) AgI/KI

    A. (A) only

    B. (B) only

    C. (A) and (C) only

    D. (B) and (C) only

45. The common positive oxidation states for an element with atomic number 24, are :

    A. $+2$ to $+6$

    B. $+1$ to $+6$

    C. $+1$ and $+3$ to $+6$

    D. $+1$ and $+3$

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46. Fructose is an example of :

    A. Heptose

    B. Aldohexose

    C. Ketohexose

    D. Pyranose

47. The set of elements that differ in relationship from those of the other

sets is :

A. Li - Mg

B. Be - Al

C. B - Si

D. Li - Na

48. Match List-I with List-II:

List - I		List - II	
(a)	$[Co(NH_3)_6][Cr(CN)_6]$	(i)	Linkage isomerism
(b)	$[Co(NH_3)_3(NO_2)_3]$	(ii)	Solvate isomerism
(c)	$[Cr(H_2O)_6]Cl_3$	(iii)	Co-ordination isomerism
(d)	cis-$[CrCl_2(ox)_2]^{3-}$	(iv)	Optical isomerism

Choose the correct answer from the options given below:

A. (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)

B. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

C. (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i)

D. (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

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49. Given below are two statements :

Statement I: 2-methylbutane on oxidation with $KMnO_4$ gives 2-methylbutan-2-ol.

Statement II: n-alkanes can be easily oxidised to corresponding alcohols with $KMnO_4$.

Choose the correct option:

A. Both statement I and statement II are incorrect

B. Statement is incorrect but statement II is correct

C. Statement I is correct but statement II is incorrect

D. Both statement I and statement II are correct

50. Choose the correct statement regarding the formation of carbocations A and B given.

$$CH_3-CH_2-CH_2-\overset{+}{C}H_2 + Br^-$$
"A"

$$CH_3-CH_2-CH=CH_2 + HBr$$

$$CH_3-CH_2-\overset{+}{C}H-CH_3 + Br^-$$
"B"
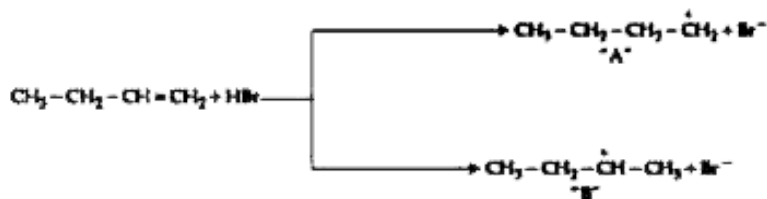
A. Carbocation B is more stable and formed relatively at slow rate

B. Carbocation A is more stable and formed relatively at faster rate

C. Carbocation A is more stable and formed relatively at slow rate

D. Carbocation B is more stable and formed relatively at faster rate

51. For the coagulation of a negative sol, the species below, that has the highest flocculating power is :

A. Ba^{2+}

B. Na^+

C. PO_4^{3-}

D. SO_4^{2-}

52.

$C_{12}H_{22}O_{11}$ + H_2OSucrose $\rightarrow$ $C_6H_{12}O_6$Glucose + $C_6H_{12}O_6$Fructose

Enzyme B

$C_6H_{12}O_6$Glucose $\rightarrow$ $2C_2H_5OH$ + $2CO_2$
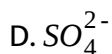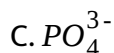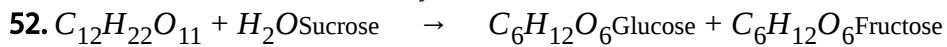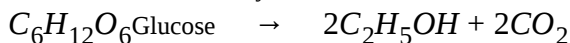
In the above reactions, the enzyme A and enzyme B respectively are :

A. Invertase and Amylase

B. Zymase and Invertase

C. Invertase and Zymase

D. Amylase and Invertase

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53. Amongst the following, the linear species is :

A. NO_2

B. O_3

C. N_3^-

D. Cl_2O

54. Which of the following statement(s) is (are) incorrect reason for eutrophication ?

(A) excess usage of fertilisers

(B) excess usage of detergents

(C) dense plant population in water bodies

(D) lack of nutrients in water bodies that prevent plant growth

Choose the most appropriate answer from the options given below:

A. (D) only

B. (C) only

C. (A) only

D. (B) and (D) only

55. Match List - I with List - II :

	List - I		List - II
(a)	Haematite	(i)	$Al_2O_3 \cdot xH_2O$
(b)	Bauxite	(ii)	Fe_2O_3
(c)	Magnetite	(iii)	$CuCO_3 \cdot Cu(OH)_2$
(d)	Malachite	(iv)	Fe_3O_4

Choose the correct answer from the options given below :

A. (a)-(i), (b)-(iii), (C)-(ii), (d)-(iv)

B. (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

C. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

D. (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

56. One of the by-products formed during the recovery of NH_3 from Solvay process is :

A. $Ca(OH)_2$

B. $CaCl_2$

C. $NaHCO_3$

D. NH_4Cl
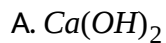
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57. Match List-I with List - II

	List - I		List - II
	Chemical Compound		**Used as**
(a)	Sucralose	(i)	Synthetic detergent
(b)	Glyceryl ester of stearic acid	(ii)	Artificial sweetener
(c)	Sodium benzoate	(iii)	Antiseptic
(d)	Bithionol	(iv)	Food preservative

Choose the correct match:

A. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

B. (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

C. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)

D. (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

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58. The functional groups that are responsible for the ion-exchange property of cation and anion exchange resins, respectively, are:

A. $-NH_2$ and $-SO_3H$

B. $-NH_2$ and $-COOH$

C. $-SO_3H$ and $-NH_2$

D. $-SO_3H$ and $-COOH$

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59. The set that represents the pair of neutral oxides of nitrogen is :

A. NO and NO_2

B. N_2O and N_2O_3

C. N_2O and NO_2

D. NO and N_2O

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60. Nitrogen can be estimated by Kjeldahl's method for which of the following compound ?

A.

B.
CH_2-NH_2

C.
NO_2

D.
$N\equiv\overset{+}{N}\ Cl^-$

CHEMISTRY SECTION B

1. $2NO(g) + Cl_2(g) = 2NOCl(s)$
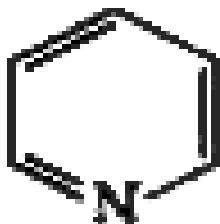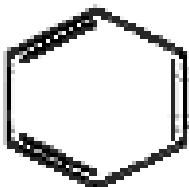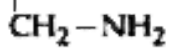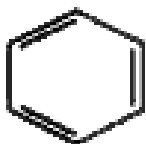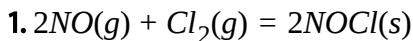
This reaction was studied at $-10\,^{\circ}C$ and the following data was obtained

run	$[NO]_0$	$\left[Cl_2\right]_0$	r_0
1	0.10	0.10	0.18
2	0.10	0.20	0.35
3	0.20	0.20	1.40

$[NO]_0$ and $\left[Cl_2\right]_0$ are the initial concentrations and r_0 is the initial reaction rate The overall order of the reaction is _____ . (Round off to the Nearest Integer).

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2. For the reaction

$2Fe^{3+}(aq) + 2I^-(aq) \rightarrow 2Fe^{2+}(aq) + I_2(s)$
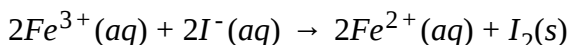
the magnitude of the standard molar free energy change,

$\Delta_r G_m^{\circ} = -$ _____ kJ (Round off to the Nearest Integer).

$$\begin{bmatrix} E_{Fe^{2+}/Fe(s)} = -0440V & E_{Fe^{3+}/Fe(s)} = -0.036V \\ E_{I_2/2I^-}^{\circ} = 0.539V & F = 96500C \end{bmatrix}$$

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3. 2 molal solution of a weak acid HA has a freezing point of 3.885 $°C$. The degree of dissociation of this acid is _____ $\times 10^{-3}$.(Round off to the Nearest Integer).

[Given : Molal depressing constant of water =1.85 K kg mol^{-1} Freezing point of pure water =0 $°C$]

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4. The total number of unpaired electrons present in the complex $k_3\left[Cr(\text{ oxalate })_3\right]$ is _____.

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5. AX is a covalent diatomic molecule where A and X are second row elements of periodic table. Based on Molecular orbital theory, the bond order of AX is 2.5. The total number of electrons in AX is ___ (Round off to the Nearest Integer).

6. In order to prepare a buffer solution of pH 5.74, sodium acetate is added to acetic acid. If the concentration of acetic acid in the buffer is _____ M, the concentration of sodium acetate in the buffer is M. (Round off to the Nearest Integer).

[Given : p^{Ka} (acetic acid) = 4.74]

7. Complete combustion of 3 g of ethane gives$x \times 10^{22}$ molecules of water. The value of x is _____ . (Round off to the Nearest Integer).

[Use : N_A = 6.023 × 10^{23} , Atomic masses in u : C : 12.0 , O : 16.0 , H : 1.0]

8. For the reaction

$$C_2H_6 \rightarrow C_2H_4 + H_2$$
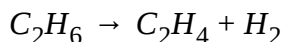
the reaction enthalpy $\Delta_r H =$ _____ $kJmol^{-1}$.(Round off to the Nearest Integer).

[Given : Bond enthalpies in kJ mol^{-1}: C - C: 347, $C = C$: 611, C - H: 414, H - H: 436]

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9. A reaction of 0.1 mole of Benzylamine with bromomethane gave 23 g Benzyl trimethyl ammonium bromide. The number of moles of bromomethane consumed in this reaction are $n \times 10^{-1}$, when n= _____ . (Round off to the Nearest Integer).

[Given : Atomic : C 12.0 u, H: 1.0 u, N:14.0u, Br :80.0 u]

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10. _____ grams of 3-Hydroxy propanal (MW=74) must be dehydrated to produce 7.8 g of acrolein (MW=56) $\left(C_3H_4O\right)$ if the percentage yield is 64.

(Round off to the Nearest Integer).

[Given : Atomic masses : C:12.0u, H : 1.0 u, O: 16.0 u]

11. Sulphurous acid $\left(H_2SO\right)$ has $Ka_1 = 1.7 \times 10^{-2}$ and $Ka_2 = 6.4 \times 10^{-8}$. The pH of 0.588 M H_2SO_3 is _____ _ (Round off to the Nearest Integer).

12. A5.0 m mol dm^{-3} aqueous solution of KCl has a conductance of 0.55 ms when measured in a cell of cell constant $1.3cm^{-1}$ The molar conductivity of this solution is mSm^2mol^{-1}. (Round off to the Nearest Integer)

13. At 363 K, the vapour pressure of A is 21 kPa and that of B is 18 kPa. One mole of A and 2 moles of B are mixed. Assuming that this solution is ideal, the vapour pressure of the mixture is ____kPa. (Round off to the Nearest Integer).

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14. A and B decompose via first order kinetics with half-lives 54.0 min and 18.0 min respectively. Starting from an equimolar non reactive mixture of A and B, the time taken for the concentration of A to become 16 times that of B is_____min. (Round off to the Nearest Integer).

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15. When 35 mL of 0.15 M lead nitrate solution is mixed with 20 mL of 0.12 M chromic sulphate solution, ... $\times 10^{-5}$ moles of lead sulphate precipitate out. (Round off to the Nearest Integer).

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16. At $25\,^\circ C$, 50 g of iron reacts with HCl to form $FeCl_2$. The evolved hydrogen gas expands against a constant pressure of 1 bar. The work done by the gas during this expansion is

(Round off to the Nearest Integer).

[Given : $R = 8.314 Jmol^{-1}K^{-1}$. Assume, hydrogen is an ideal gas]

[Atomic mass of Fe is 55.85 u]

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17. Ga (atomic mass 70 u) crystallizes in a hexagonal dose packed structure. The total number of voids in 0.581 g of Ga is __ $\times 10^{23}$. (Round off to the Nearest Integer). [Given : $N_A = 6.023 \times 10^{23}$]

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18. The number of orbitals with $n = 5, m_1 = +2$ is ___ (Round off to the Nearest Integer).

19. In Duma's method of estimation of nitrogen, 0.1840 g of an organic compound gave 30 mL of nitrogen collected at 287 K and 758 mm of Hg pressure. The percentage composition of nitrogen in the compound is .... (Round off to the Nearest Integer).

[Given : Aqueous tension at 287 K=14 mm of Hg]

20. $\left[Ti\left(H_2O\right)_6\right]^{3+}$ absorbs light of wavelength 498 nm during a d-d transition. The octahedral splitting energy for the above complex is _ _ _ $10^{-19}J$.   (Round   off   to   the   Nearest   Integer).

$h = 6.626 \times 10^{-34} Js$. $c = 3 \times 10^8 ms^{-1}$

21. The reaction $2A + B_2 \rightarrow 2AB$ is an elementary reaction.

For a certain quantity of reactants, if the volume of the reaction vessel is reduced by a factor of 3, the rate of the reaction increases by a factor of _____ . (Round off to the Nearest Integer).

22. In the ground state of atomic Fe(Z=26), the spin-only magnetic moment is _____ $\times 10^{-1}$BM. (Round off to the Nearest Integer).

[Given : $\sqrt{3} = 1.73$, $\sqrt{2} = 1.41$]

23.
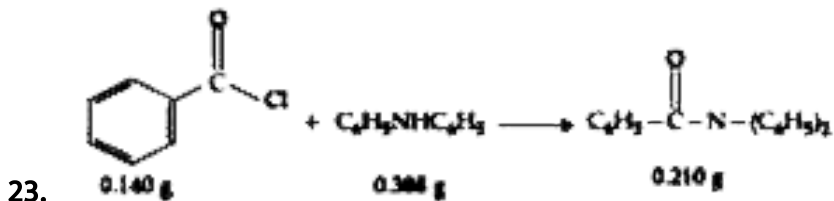
Consider the above reaction. The percentage yield of amide product is

_____. (Round off to the Nearest Integer).

(Given : Atomic mass : C : 120 u, H : 10 u, N : 14.0 u, O : 16.0 u, Cl : 35.5 u)

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24. KBr is doped with 10^{-5} mole percent of $SrBr_2$. The number of cationic

vacancies in 1 g of KBr crystal is _____ 10^{14}. (Round off to the Nearest

Integer).

[Atomic Mass : K : 39.1 u, Br : 79.9 u N_A = 6.023 × 10^{23}]

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25. Consider the reaction $N_2O_4(g) \Leftrightarrow 2NO_2(g)$. The temperature at which

K_C = 20.4 and K_P = 600.1, is _____ K. (Round off to the Nearest Integer).

[Assume all gases are ideal and R = 0.0331 L bar $K^{-1}mol^{-1}$]

26. A 1 molal $K_4Fe(CN)_6$ solution has a degree of dissociation of 0.4. Its boiling point is equal to that of another solution which contains 18.1 weight percent of a non electrolytic solute A. The molar mass of A is ____u. (Round off to the Nearest Integer).

[Density of water $= 1.0g\ cm^{-3}$]

27. A KCl solution of conductivity 0.14 S m^{-1} shows a resistance of 4.19 Ω in a conductivity cell. If the same cell is filled with an HCl solution, the resistance drops to 1.03 Ω. The conductivity of the HCl solution is _____ $\times 10^{-2} \times Sm^{-1}$. (Round off to the Nearest Integer).

28. The number of chlorine atoms in 20 mL of chlorinc gas at STP is

_____ 10^{21}. (Round off to the Nearest Integer).

[Assume chlorine is an ideal gas at STP R=0.083 L bar

$\text{mol}^{-1}K^{-1}N_A = 6.023 \times 10^{23}$]

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29. On complete reaction of $FeCl_3$ with oxalic acid in aqueous solution

containing KOH, resulted in the formation of product A. The secondary

valency of Fe in the product A is _____.

(Round off to the Nearest Integer).

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30. The total number of C-C sigma bond/s in mesityl oxide $\left(C_6H_{10}O\right)$

is_____.(Round off to the Nearest Integer).

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1. Match List -I with List-II :

List - I		List - II	
	(Class of Chemicals)		(Example)
(a)	Antifertility drug	(i)	Meprobamate
(b)	Antibiotic	(ii)	Alitame
(c)	Tranquilizer	(iii)	Norethindrone
(d)	Artificial Sweetener	(iv)	Salvarsan

Choose the most appropriate match:

A. a-iv, b-iii, c-ii, d-i

B. a-iii, b-iv, c-i, d-ii

C. a-ii, b-iii, c-iv, d-i

D. a-ii, b-iv, c-i, d-iii

Answer: B

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2. An organic compound "A" on treatment with benzene sulphonyl chloride gives compound B. B is soluble in dil. NaOH solution. Compound A is

A. $C_6H_5 - NHCH_2CH_3$

B. $C_6H_5 - CH | CH_3 - NH_2$

C. $C_6H_5 - CH_2NHCH_3$

D. $C_6H_5 - N - (CH_3)_2$
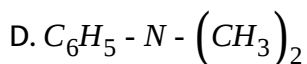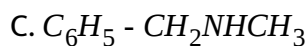
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3. The oxidation states of nitrogen in NO, NO_2, N_2O and NO_3^- are in the order of:

A. $N_2O > NO_2 > NO > NO_3^-$

B. $NO_3^- \overset{>}{} NO_2 > NO > N_2O$

C. $NO_2 > NO_3^- > NO > N_2O$

D. $NO > NO_2 > N_2O > NO_3^-$
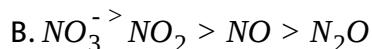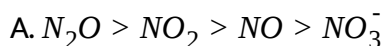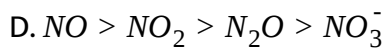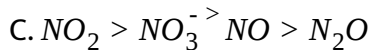
4. In a basic medium H_2O_2 exhibits which of the following reactions?

A. $Mn^{2+} \rightarrow Mn^{4+}$

(B) $I_2 \rightarrow I^-$

(C) $PbS \rightarrow PbSO_4$
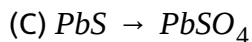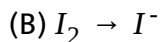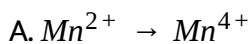
Choose the most appropriate answer from the options given below:

A. A,C only

B. B only

C. A,B only

D. A only

5. The first ionization energy of magnesium is smaller as compare to that of elements X and Y, but higher than that of Z. The elements X,Y and Z respectively are:

A. chlorine, lithium and sodium

B. argon, lithium and sodium

C. neon, sodium and chlorine

D. argon, chlorine and sodium

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6. The oxide that shows magnetic property is :

A. MgO

B. Mn_3O_4

C. SiO_2

D. Na_2O

7. The secondary valency and the number of hydrogen bonded water molecule(s) in $CuSO_4 \cdot 5H_2O$ respectively are

A. 6 and 4

B. 6 and 5

C. 5 and 1

D. 4 and 1

8. A hard substance melts at high temperature and is an insultor in both solid and in molten state, The solid is most likely to be a/an:

    A. Ionic solid

    B. Metallic solid

    C. Molecular solid

    D. Covalent solid

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9. Give below are two statements:

Statement I : Non- biodegradable wastes are generated by the thermal power plants.

Statement II : Bio-degradable detergents leads to eutrophication.

In the light of the above statements, choose the most appropriate answer from hte options given below

A. Both statement I and statement II are false.

B. Statement I is true but statement II is false.

C. Both statement I and statement II are true.

D. Statement I is false but statement II is true.

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10. In the reaction of hypobromite with amide, the carbonyl carbon is lost

as:

A. HCO_3^-

B. CO_2

C. CO_3^{2-}

D. CO

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11. Match List -I with List-II :

	List - I		List - II
(a)	Be	(i)	treatment of cancer
(b)	Mg	(ii)	extraction of metals
(c)	Ca	(iii)	incendiary bombs and signals
(d)	Ra	(iv)	windows of X-ray tubes
		(v)	bearings for motor engines.

Choose the most appropriate answer from the option given below:

12. Main products formed during a reaction of 1-methoxy naphthalene with hydroiodic acid are:

A.

 and CH_3I

B.

 and CH_3I

C.

OH

and CH_3OH

D.

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$\xrightarrow{\text{dil NaOH}}$ "X" $\xrightarrow{H^+, \text{Heat}}$ "Y"

13.
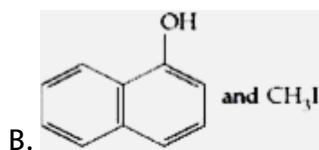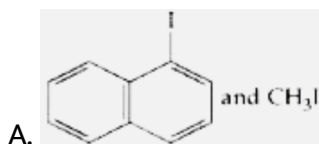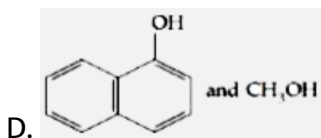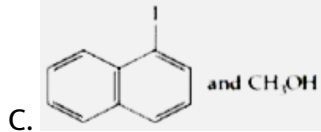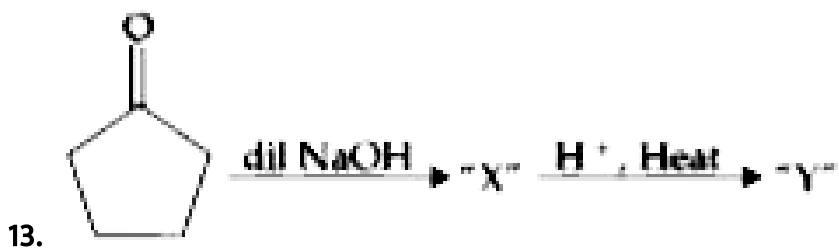
Consider the above reaction, the product 'X' and 'Y' respectively are:

A.

B.

C.

D.
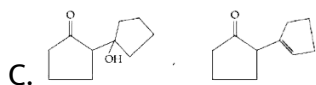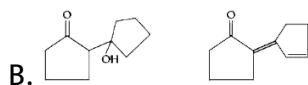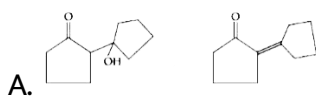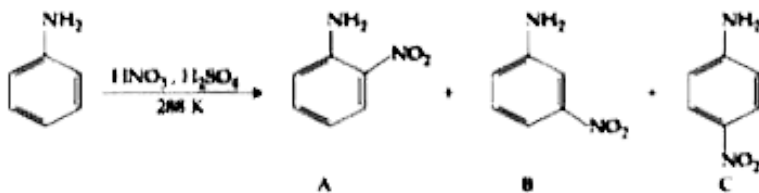
14.

Consider the above reaction, percentage yield of :

A. $C > B > A$

B. $C > A > B$

C. $B > C > A$

D. $A > C > B$

15. In the following molecule,
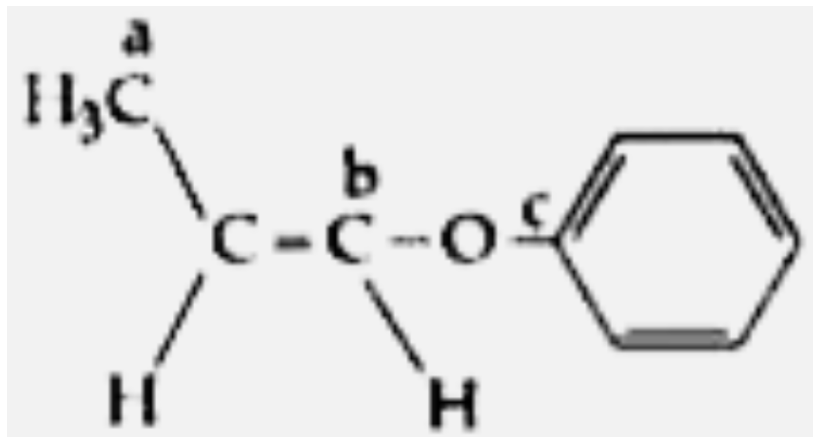
Hybridisation of Carbon a,b and c respectively are:

A. sp^3, sp^2, sp^2

B. sp^3, sp, sp^2

C. sp^3, sp^2, sp

D. sp^3, sp, sp

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16. Give below are two statements:

Statement I : Bohr's theory accounts for the stability and line segment of Li^+ ion.

Statement II : Bohr's theory was unable to explain the splitting of spectral lines in the presence of a magnetic field.

In the light of the above statements, choose the most appropriate answer from hte options given below

    A. Both statement I and statement II are false.

    B. Statement I is true but statement II is false.

    C. Both statement I and statement II are true.

    D. Statement I is false but statement II is true.

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17. Deficiency of vitamin K causes:

A. Increase in fragility of RBC's

B. Decrease in blood clotting time

C. Cheilosis

D. Increase in blood clotting time

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18. The charges on the colloidal CdS sol and TiO_2 sol are, respectively

A. negative and negative

B. negative and positive

C. positive and positive

D. positive and negative

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19. Give below are two statements:

Statement I : C_2H_5OH and AgCN both can generate nucleophile.

Statement II : KCN and AgCN both will generate nitrile nucleophile with all reaction conditions.

Choose the most appropriate option.

    A. Statement I is true but Statement II is false

    B. Statement I is false but Statement II is true.

    C. Both statement I and statement II are true.

    D. Both Statement I and Statement II are false

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20. Match List -I with List -II :

	List - I		List - II
(a)	Mercury	(i)	Vapour phase refining
(b)	Copper	(ii)	Distillation Refining
(c)	Silicon	(iii)	Electrolytic Refining
(d)	Nickel	(iv)	Zone Refining

Choose the most appropriate answer from the option given below:

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1. A xenon compound 'A' upon partial hydrolysis gives XeO_2F_2. The number of lone pair of electrons present in compound A is .... (Round of to the nearest integer)

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2. A solute A dimerizes in water. The boiling point of a 2 molal solution of A is 100. 52 $^\circ C$. The percentage association of A is .... (Round off to the Nearest Integer).

$\left[\text{Use } K_b \text{ for water } = 0.52\text{K kg mol}^{-1} \text{ Boiling point of water } = 100\,^\circ C\right]$

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3. A reaction has a half life of 1min. The time required for 99.9% completion of the reaction is ....min. (Round off to the Nearest Integer).

[Use : ln =2 0.69, ln 10=2.3]

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4. The solubility of $CdSO_4$ in water is $8.0 \times 10^{-4} mol L^{-1}$. Its solubility in 0.01 M H_2SO_4 solution is .... $Xx10^{-6}$ mol L^{-1}. (Round off to the Nearest Integer). (Assume that solubility is much less than 0.01M).

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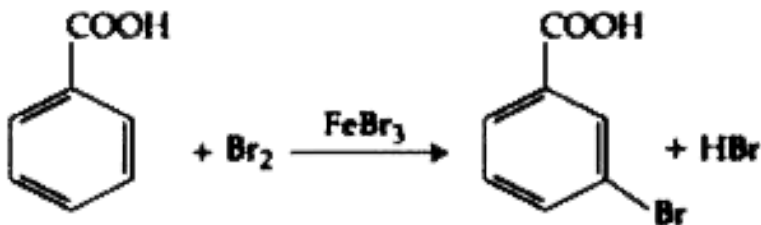
5.

Consider the above reaction where 6.1 g of Benzoic acid is used to get 7.8 g of m-broo benzoic acid. The percentage yeild of the product is .... (Round off to the Nearest Integer). [Give : Atomic masses : $C: 12.0u, H = 1.0u, O = 16.0, u, Br = 80.0u$]

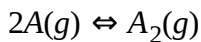▶ Watch Video Solution

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6. The number of species below that have two lone pairs of electrons in their central atoms is.......... (Round off to the Nearest Integer).

$SF_4, BF_4^-, ClF_3, AsF_3, BrF_5, XeF_4, SF_6$

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7. The gas phase raction

$$2A(g) \Leftrightarrow A_2(g)$$

at 400 K has $\triangle G° = + 25.5 Kjmol^{-1}$. The equilibrium constant K_C for this reaction is .... $\times 10^{-2}$. (Round off to the Nearest Integer).

$$\left[\text{Use } R = 8.3 Jmol^{-1}K^{-1}, \ln 10 = 2.3 \log_{10} 2 = 0.30, 1 atm = 1 bar\right]$$

[antilog $(-0.3) = 0.501$]

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8. The molar conductivities at infinite dilution of barium chloride, sulphuric acid and hydrochloric acid are 280, 860 and $426 Scm^2 mol^{-1}$ respectively. The molar conductivity at infinite dilution of barium sulphate is .... $Scm^2 mol^{-1}$. (Round off to the Nearest Integer).

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9. 10.0mL of Na_2CO_3 solution is titrated against 0.2M HCl solution. The following titre values were obtained in 5 readings :

4.8mL, 4.9mL, 5.0mL, 5.0mL, and 5.0mL

Based on these readings, and convention of titrametric estimation the concentration of Na_2CO_3 solution is.........nM. (Round off to the Nearest Integer).

10. In Tollen,s test for aldehyde, the overall number of electron(s) transferred to the Tollen's reagent formula $\left[Ag\left(NH_{3_2}\right)\right]^+$ per aldehyde group to form silver mirror is........ (Round off to the Nearest Integer).