CHEMISTRY

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

ONLINE QUESTION PAPER

Chemistry

1. Calculate the number of protons, neutrons and electrons respectively in $^{14}_{7}N^{3-}$

A. 7, 10, 7

B. 7, 7, 10

C. 10, 7, 7

D. 7, 7, 7

Answer: B

2. The order of filing of electrons in orbitals I Ti is

A. 1s, 2s, 2p, 3s, 3p,3 d and 4s

B. 1s, 2s, 2p, 3s, 3p, 4s and 3 d

C. 1s, 2s, 2p, 3s, 4s, 3p and 3 d

D. 1s, 2s, 2p, 3s, 3 d, 3p and 4s

Answer: B

3. The symbol of an element is Une. Its atomic number is

A. 110

B. 109

C. 101

D. 108

Answer: B

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4. Statement

$Na_2O < MgO < ZnO < P_4O_6 - $ Acidic Property $F > C1 > $ Br-

Electron gain enthalpy $M^{2-} > M^- > M^+ > M^{2+} - $ ionic size The

second ionisation enthalpy of Cu is more than second ionisation enthalpy

of K. Which of the following if the correct representation of True (T)/False

(F) for the given statement ?

A.

i	ii	iii	iv
T	T	F	F

B.

i	ii	iii	iv
F	T	F	T

C.

i	ii	iii	iv
F	F	F	T

D.

i	ii	iii	iv
T	F	T	F

Answer: D

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5. Group the molecules/ ions according to bond order.

A. $\left(O_2^{2-}, Li_2, O_2^{2+}\right)\left(F_2, N_2, He_2^{2+}\right)$

B. $\left(F_{2^1}O_2^{2+}, N_2\right)\left(O_2^{2-}, He_2^{2+}, Li_2\right)$

C. $\left(O_2^-, Li_2, F_2, He_2^{2+}\right)\left(N_2, O_2^{2+}\right)$

D. $\left(Li_2, F_2, O_2^{2+}\right)\left(N_2, O_2^{2-}, He_2^{2+}\right)$
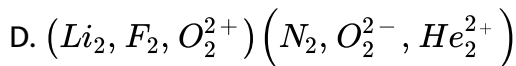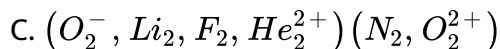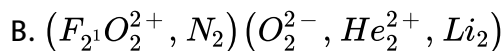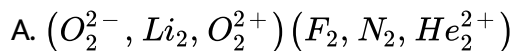
Answer: C

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6. Match the bond order for the following molecules.

	List I		List II
A.	Li_2	i.	3
B.	N_2	ii.	1.5
C.	Be_2	iii.	1.0
D.	O_2	iv.	0
		v.	2

The correct answer is

A.
A	B	C	D
II	III	I	V

B.
A	B	C	D
III	I	IV	V

C.
A	B	C	D
IV	I	V	III

D.
A	B	C	D
III	II	V	I

Answer: B

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7. Helium molecule is two times heavier than hydrogen molecule at 298 K. According to kinetic theory, the average kinetic energy of helium at 298 K is

A. two times higher than a hydrogen molecule

B. four times highher than a hydrogen molecule

C. same as that of a hydrogen molecule

D. half of a hydrogen molecule

Answer: C

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8. The ratio between the most probable speed of N_2 at 400 K and CO at 800 K is (molar mass of $N_2 = 28$ g mol^{-1}, molar mass of $CO = 28$ g mol^{-1})

A. 0.75

B. 0.25

C. 0.707

D. 1.414

Answer: C

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9. Relative abundance (in percentage) of ^{14}C isotope is

A. 1.1

B. 2×10^{-10}

C. 2×10^{-4}

D. 2×10^{-5}

Answer: B

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10. Calculate the moality of 1 L solution of 93%

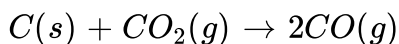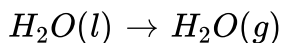2×10^{-5} by w/V $[d_{H_2SO_4} = 1.84g/c]$

A. 3.71

B. 8.5

C. 12.4

D. 1.042

Answer: D

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11. Amongst the chemical reaction given below, the reaction with increasing entropy are

$H_2O(l) \rightarrow H_2O(g)$

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

$2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$

$N_2(g) + O_2(g) \rightarrow$ Mixture of N_2 and O_2
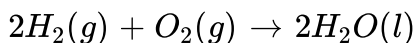
A. (i), (ii), (iii), (iv)

B. (i), (ii), (iii)

C. (i), (ii), (iv)

D. (ii), (iii), (iv)

Answer: C

12. For the formation of NH_3 from N_2 and H_2 at 500 K, the concentration of N_2, H_2 and NH_3 at equilibrium are 1.5×10^{-2} M and $1.2 \times 10^{-2} M$, respectively. The equilibrium constant for the reverse reaction is

A. 3.56×10^2

B. 2.81×10^{-3}

C. 3.56×10^{-2}

D. 2.81×10^3

Answer: B

13. Estimate the approximate PK_a of $0.5 M CH_3COOH.$ Degree of dissociation (ionization) is 0.15.

$(\log 1.32 = 0.12)$

A. 2

B. 1.5

C. 1.88

D. 0.15

Answer: C

14. The natural abundance of isotopes of hydrogen is

A. $^1_1H = 99.985\,\%$, $^2_1D = 0.015\,\%$

B. $^1_1H = 99.985\,\%$, $^2_1D = 0.015\,\%$, $^3_1T = 10^{-16}\,\%$
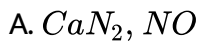
C. $^1_1H = 99.100\,\%$, $^2_1D = 0.900\,\%$

D. $^1_1H = 99.900\,\%$, $^2_1D = 0.010\,\%$, $^3_1T = 10^{-15}\,\%$

Answer: B

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15. Calcium on heating in N_2 yields an ionic compound A, which reacts

with water to give
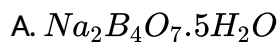
$Ca(OH)_2$ and a gas B. Identify A and B

A. CaN_2, NO

B. Ca_3N_2, NH_3

C. CaN_2, NH_3

D. Ca_3N_2, NO
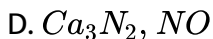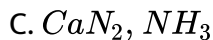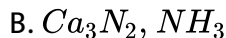
Answer: B

16. The formula of borax is

A. $Na_2B_4O_7.5H_2O$

B. $Na_2B_4O_7.7H_2O$

C. $Na_2B_4O_7.10H_2O$

D. $Na_2B_4O_7.2H_2O$
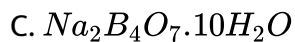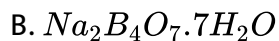
Answer: C

17. In which allotrop of carbon does each atom form four bonds with other carbon atoms?

A. SO_2

B. O_3

C. NO_2

D. NO

Answer: C

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18. Which of the following chemicals is NOT involved in photochemical smog formation
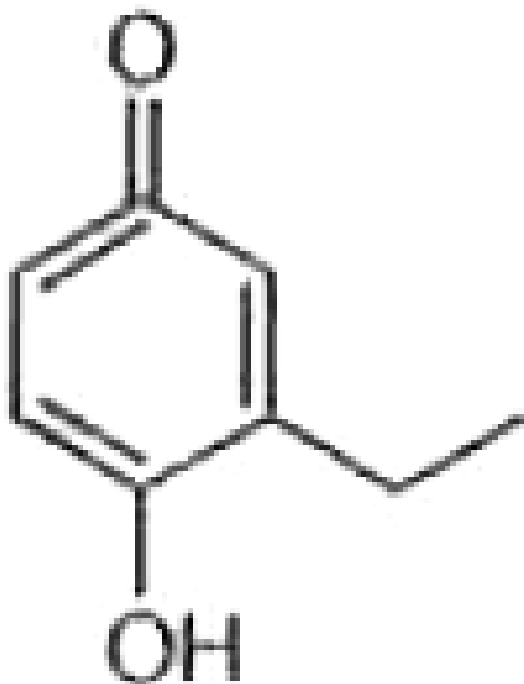
A. SO_2

B. O_3

C. NO_2

D. NO

Answer: A

19. The IUPAC name of the following compound is

A. 2-hydroxy-5-oxoethylcyclohexane

B. 2-ethyl-4-oxocyclohexanol

C. 3-ethyl-4-hydroxycyclohexanone

D. 6-hydroxy-3-oxoethylcyclohexane

Answer: C

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20. Number of possible constitutional isomers of alkane with formula C_6H_{14} is

A. 3

B. 5

C. 2

D. 10

Answer: B

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21. In the process of formation of nitronium ion, nitric acid acts as

A. a base

B. an acid

C. a catalyst

D. a solvent

Answer: A

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22. NaCl is heated in an atmosphere of sodium vapour. The resultant yellow colour is due to the formation of

A. Frenkel defect

B. Schottky defect

C. F-centers

D. impurity defects

Answer: C

23. Calculate the approximate ΔT_b (in K) for 0.001 molal KCl solution, if its van' t-Hoff factor is 1.98 $\left[K_b \text{ of water is } -0.52 \text{ K kg mol}^{-1} \right]$

A. 1.03

B. 1.03×10^{-3}

C. 1.03×10^{-5}

D. 1.03×10^{-1}

Answer: B

24. Henry' s law constant for CO_2 in water is 1.67 K bar at $25°C$. The quantity of CO_2 in 1000 mL of soda water when packed under 5 bar CO_2 pressure at $23°C$ is

A. 0.084

B. 0.167 mol

C. 0.252 mol

D. 0.336 mol

Answer: B

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25. Which of the following correctly represents Nernst equation?

[P = products : R = reactants]

A. $\Delta G = \Delta G^\circ + 2.303RT \log \dfrac{[P]}{[R]}$

B. $\Delta G = \Delta G^\circ - 2.303RT \log \dfrac{[P]}{[R]}$

C. $\Delta G^\circ = \Delta G + 2.303RT \log \dfrac{[R]}{[P]}$

D. $\Delta G^\circ = \Delta G^\circ - 2.303RT \log \dfrac{[R]}{[P]}$

Answer: A::C

26. For a particular reaction, the rate constant becomes double on increasing temperature from $27°C$ to $37°C$. Calculate the approximate activation energy (in kcal $mol^1 R = 2 calmol^{-1}K^{-1}$)

A. 1289

B. 12.89

C. 1.28

D. 53.41

Answer: B

27. Identify the correct statement from the foolowing.

(i) In the oxidation of oxalic acid with $KMnO_4$ in acid medium, Mn^{2+} acts as auto catalyst.

(ii) CdS colloidal solution can be precipited by the addition of Cl^- ions.

(iii) The gold number of three protective colloids (A, B, C) is 0.03,25 and 0.25 respectively. Their protective power follows the order $A > C$ gt B.

(iv) Physisorption is an irreversible process.

A. (i), (iv)

B. (ii), (iii)

C. (i), (iii)

D. (i), (ii), (iii)

Answer: C

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28. The oxidising and reducing agents respectively for the cyanide extraction of silver from argentite ore are

A. O_2, CO

B. HN_3, CO

C. O_2, Zn dust

D. HN_3, Zn dust

Answer: C

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29. Aqueous ammonia readily dissolves $AgCI$ because

A. NH_3 molecules readily solvate Ag^+ and Cl^- ions

B. NH_3 molecules abstract chloride from AgCl to from NH_4Cl

C. a soluble complex $Ag(NH_3)_6^+$ is formed

D. a soluble complex $Ag(NH_3)_2^+$ is formed

Answer: D

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30. What is the final chemical form of Gold (Au) when it is dissolved in aqua regia?

    A. Au

    B. AuCl

    C. $AuCl_2$

    D. $[AuCl_4]^-$

Answer: D

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31. Identify the correct actinide series from the following

    A. Nd, Np, No

    B. Pr, Pa, Pu

    C. Pa, Lr, Pu

D. Lu, Lr, Th

Answer: C

32. Consider the complexs.

(i) $\left[Pd(NH_3)_2ClBr\right]$

$\left[Pd(NH_3)_2Cl_2\right]$

$\left[Pd(en)Cl_2\right]$

$\left[Pd(en)ClBr\right]$

$\left[Pd(en)_2\right]Cl_2$ $(en = \text{ethylenediamine})$
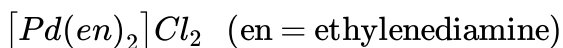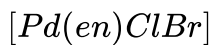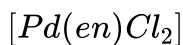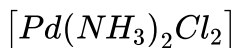
The total number of geometrical isomers of (a) is same as the total number of geometrical isomers of

A. (ii)

B. (iii)

C. (iv)

D. (v)

Answer: A

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33. Identify the monomers used in the manufacture of glyptal (X), dacron (Y) and nylon 2-nylon 6 (Z).

A.

B.

C.

D.
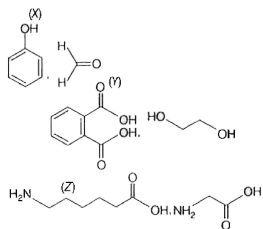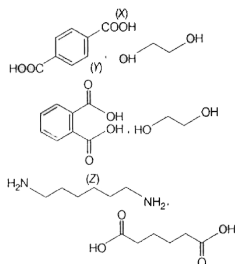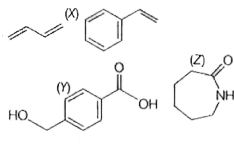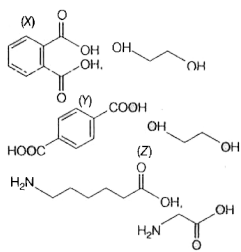
Answer: C

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34. Which of the following is present in RNA only ?

A.

B.

C.

D.
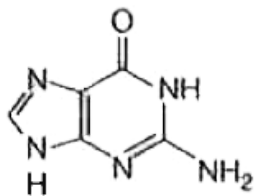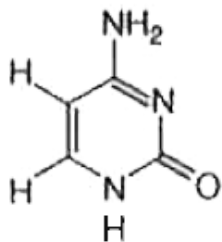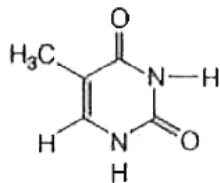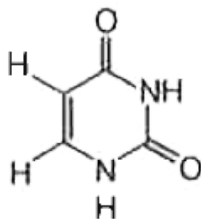
Answer: C

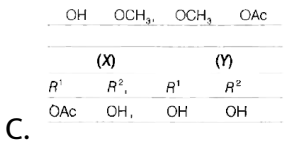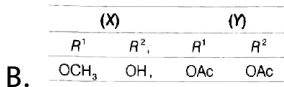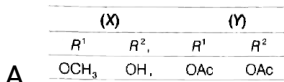▶ Watch Video Solution

35. Opiates have the following general structure.
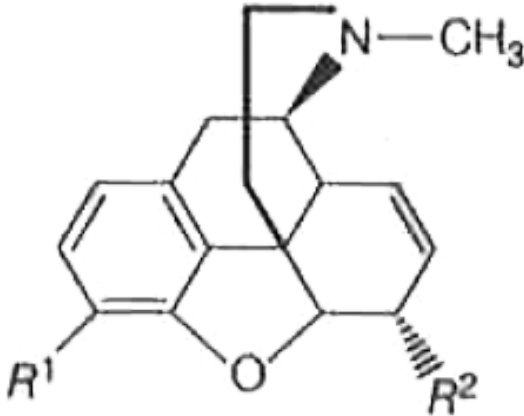
The correct representation of R^1 and R^2 forn codeine (X) and heroin (Y) is

A.

(X)		(Y)	
R^1	R^2,	R^1	R^2
OCH_3	OH,	OAc	OAc

B.

(X)		(Y)	
R^1	R^2,	R^1	R^2
OCH_3	OH,	OAc	OAc

C.

OH	OCH_3,	OCH_3	OAc

(X)		(Y)	
R^1	R^2,	R^1	R^2
OAc	OH,	OH	OH

D.

(X)		(Y)	
R^1	R^2,	R^1	R^2
OH	OH,	OCH_3	OH
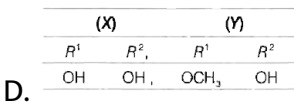
Answer: A

36. Match the following.

|	List I		List II
A.	The reaction of 1, 6-dibromo hexane with Zn.	i.	$H_3C-C \equiv CH$
B.	Reaction of ethanol with concentrated H_2SO_4 at 443 K.	ii.	$H_2C = CH_2$
C.	Major product in the reaction of propene with HBr in the presence of benzoyl peroxide.	iii.	~~~~~Br
D.	The reaction of 1, 1-dibromopropane with $NaNH_2$ at 433 K.	iv.	⬡

The correct answer is

A.
A	B	C	D
iv	ii	iii	i

B.
A	B	C	D
iii	i	ii	iv

C.
A	B	C	D
ii	iii	i	iv

D.
A	B	C	D
i	ii	iv	iii

Answer: A

37. The major product of the following reaction is

$$\xrightarrow[\text{CHCl}_3]{\text{NaOH/H}_2\text{O}} ?$$

A.

B.

C.

D.
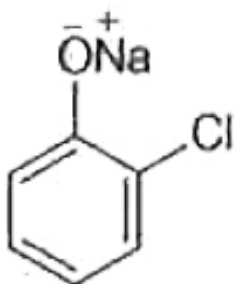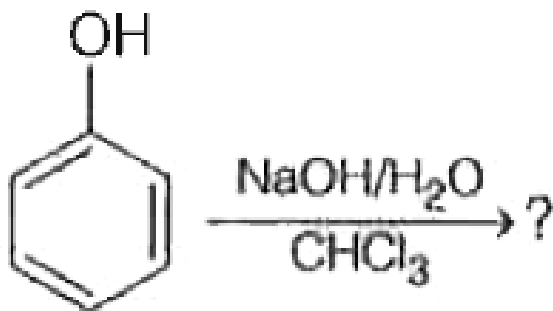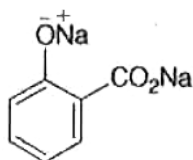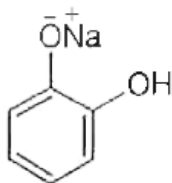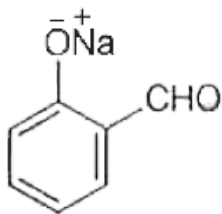
Answer: C

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38. Which of the following reaction leads to the formation of bezonitrile?

A. Reaction of bromobenzene with KCN

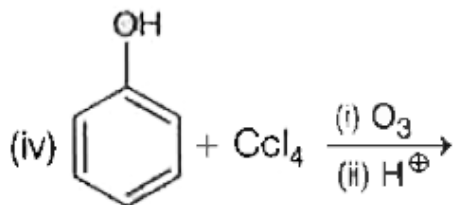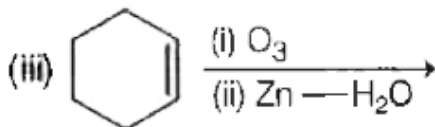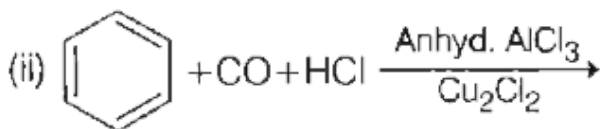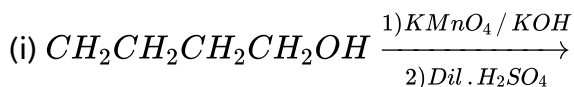B. Reaction of anline with $NaNO_2$ and HCl at 273K followed by the

reaction with CuCN

C. Reaction of bromobenzene with $NaNO_2$ and HCl at 273 K followed

by the reaction with CuCN

D. Reaction of aniline with KCN

Answer: B

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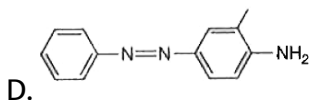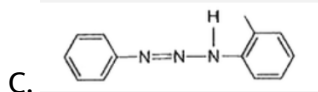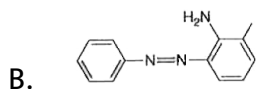**39.** From the following reaction, identify the reactions that give carboxylic acids as products.

(i) $CH_2CH_2CH_2CH_2OH \xrightarrow[\quad 2)Dil.H_2SO_4 \quad]{\quad 1)KMnO_4/KOH \quad}$

(ii) $+CO+HCl \xrightarrow[\quad Cu_2Cl_2 \quad]{\quad Anhyd.\ AlCl_3 \quad}$

(iii) $\xrightarrow[\quad (ii)\ Zn-H_2O \quad]{\quad (i)\ O_3 \quad}$

(iv) $+\ CCl_4 \xrightarrow[\quad (ii)\ H^{\oplus} \quad]{\quad (i)\ O_3 \quad}$
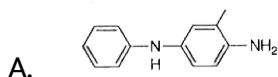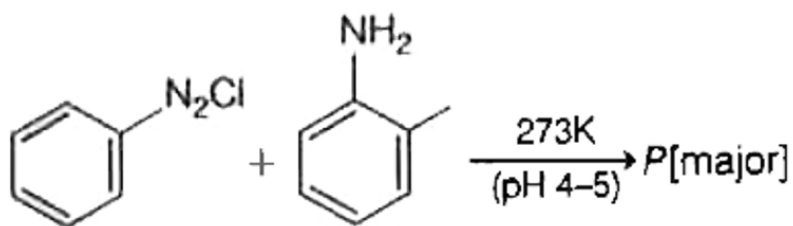
A. (i), (ii)

B. (i), (iv)

C. (ii), (iii)

D. (ii), (iv)

Answer: B

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40. In the following reaction, the major product (P)formed is

A.

B.

C.

D.

Answer: D

---

41. When uncertainty in position and momentum are equal, then the uncertainly in velocity is

A. $\sqrt{\dfrac{h}{\pi}}$

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

C. $\dfrac{1}{2m}\sqrt{\dfrac{h}{\pi}}$

D. $2m\sqrt{\dfrac{h}{\pi}}$

Answer: C

---

42. Which of the following are correct ?

(1) Electron density in XY plane for $d_{x^2-y^2}$ orbital is zero.

(2) The energy of 3p-orbital is higher than the energy of 2p-orbital.

(3) $3p_z$ orbital has one angular node.

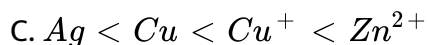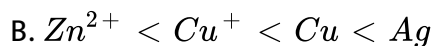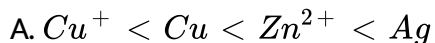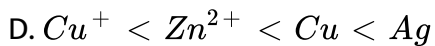(4) 4f-orbital has no radial node.

A. 1, 2, 3, 4

B. 2, 3,1

C. 2, 3,4

D. 3, 4, 1

Answer: C

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43. What is the correct order of atomic/ionic size ?

A. $Cu^+ < Cu < Zn^{2+} < Ag$

B. $Zn^{2+} < Cu^+ < Cu < Ag$

C. $Ag < Cu < Cu^+ < Zn^{2+}$

D. $Cu^+ < Zn^{2+} < Cu < Ag$

Answer: B

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44. Identify the correct statements from the following.

(1) The dipole moment of CO_2 and BF_3 is zero

(2) The dipole moment of NF_3 is higher than the diople moment of NH_3

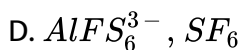(3) The dipole moment of HI is lower than the dipole moment of HCl
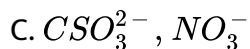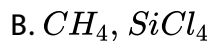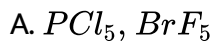
A. 1, 3

B. 1, 2

C. 2, 3

D. 1, 2,3

Answer: A

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45. Identify the pair that is not isostructural

A. PCl_5, BrF_5

B. CH_4, $SiCl_4$

C. CSO_3^{2-}, NO_3^-

D. $AlFS_6^{3-}$, SF_6

Answer: A

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46. Find the odd-electron molecules from the following.

$$\underset{(i)}{C_2H_2}\ \underset{(ii)}{SCl_2}\ \underset{(iii)}{NO}\ \underset{(iv)}{N_2}\ \underset{(v)}{NO_2}$$
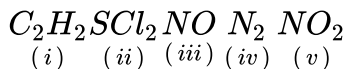
A. i,iii, iv

B. ii,iii

C. i, iv

D. iii,v

Answer: D

47. The ratio between the RMS velocity of N_2 at 200K and that of CO at 800 K is (molecular mass of $N_1 = 28 gmol^{-1}$, molecular mass of $CO = 28 gmol^{-1}$)

A. 1.00

B. 0.75

C. 0.25

D. 0.5
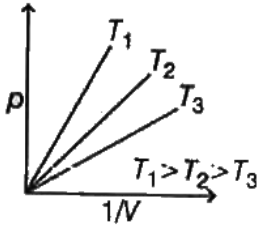
Answer: D

48. For a fixed mass of an ideal gas the correct representation is

A. $T_1 > T_2 > T_3$, axes P vs $1/V$

B. $P_3 > P_2 > P_1$, axes V vs $T/(K)$

C. $V_1 > V_2 > V_3$, axes P vs $T/(K)$

D. $T_3 > T_2 > T_1$, axes V vs P
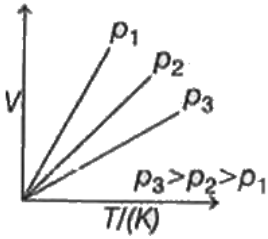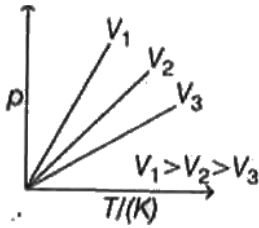
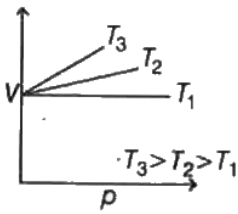**Answer: A::B**

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49. The amount of iron (Fe) in g which can be produced from 600g of magnetite ore is [Atomic mass of Fe : 55.8]

A. 450

B. 379

C. 434

D. 210

Answer: C

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50. If stoichiometric quantities of $KMnO_4$ and $K_2Cr_2O_7$ mixture is added for the oxidation of Fe^{2+} to Fe^{3+} in acidic medium, then Fe^{2+} will be oxidised

A. equally by $KMnO_4$ and $K_2Cr_2O_7$

B. more by $KMnO_4$

C. more by $K_2Cr_2O_7$

D. no reaction

Answer: B

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51. A sample of argon of 1 atm pressure and 300K expands reversibly and adiabatically from $1.25dm^3$ to $2.5dm^3$. Calculate the approximate enthalpy (in J) change

(i) C_V for argon is $12.48JK^{-1}$

(ii) Assume argon to be an ideal gas

(iii) $\Delta T = 111.5K$

A. 20.9

B. 117

C. 234

D. 58.5

Answer: B

---

52. If equilibrium constant of a process is 3.8×10^{-3} at $25°C$, standard free energy change of the process is

$R = 8.314 Jmol^{-1}K^{-1}, \log 0.0038 = -2.42)$

A. $5.7 kJmol^{-1}$

B. $9.9 kJmol^{-1}$

C. $13.8 kJmol^{-1}$

D. $15.6 kJmol^{-1}$

Answer: C

53. Which of the following compound give basic solution on hydrolysis ?

(1) NH_4Cl (2) K_2CO_3

(3) $Na_2B_4O_7.\ 10H_2O$ (4) NaCl

A. 1, 2, 3

B. 2, 3

C. 2, 3,4

D. 3,4

Answer: B

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54. Hardness of water is 200 ppm. Calculate the molarity and normality of

$CaCO_3$ of the water

A. $4 \times 10^{-3}M, 2 \times 10^{-3}N$

B. $2 \times 10^{-6}M, 4 \times 10^{-3}N$

C. $2 \times 10^{-3} M, 4 \times 10^{-3} N$

D. $1 \times 10^{-3} M, 4 \times 10^{-3} N$

Answer: C

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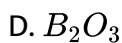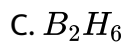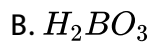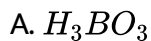55. Which pair of elements on combustion in air give superoxides ?

A. Li, Cs

B. K, Rb

C. Li, Rb

D. K, Li

Answer: B

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56. When borax is dissolved in water, the product formed is

A. H_3BO_3

B. H_2BO_3

C. B_2H_6

D. B_2O_3

Answer: A

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57. SiO_2 reacts with

A. H_2SO_4, HF

B. $HF, NaOH$

C. $Na_2CO_3, NaOH$

D. Na_2CO_3, H_2SO_4
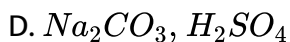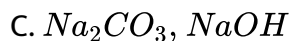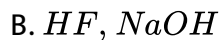
Answer: B

58. Pure water would have a BOD value of

    A. about 1 ppm

    B. 5-10 ppm

    C. $10 - 15$ppm

    D. 15-20ppm

Answer: A

59. Tropolone is

    A. benzenoid and aromatic

B. non-benzenoid and not aromatic

C. non-benzenoid and aromatic

D. non-benzenoid and anti-aromatic

Answer: C

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60. Newman projection of staggered conformation of ethane is
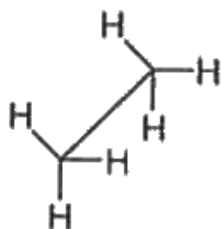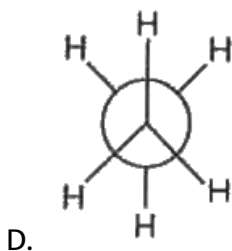

A.

B.

C.

D.
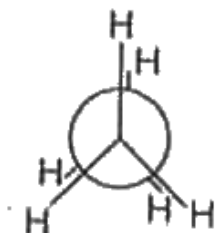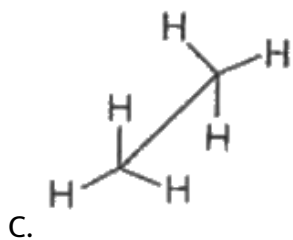
Answer: B

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61. 2-pentyne on reaction with sodium in liquid ammonia produced compound A. what is A?

A. n-pentane

B. 1-pentyne

C. cis-2-pentene

D. trans-2-pentene

Answer: D

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62. A solid has hcp lattice. Atoms of Z (anions) form hcp lattice. Atoms of X (cations) occupy all the octahedral voids in the lattice. Atoms of Y(cations) occupy half of the tetrahedral voids. What is the molecular formula of the solid ?

A. $X_{2/3}Y_{1/3}Z$

B. XYZ

C. $X_{1/3}Y_{2/3}Z$

D. XYZ_2
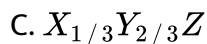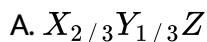
Answer: B

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63. In an experiment to estimate the molecular weight of benzoic acid by elevation in boiling point method, the experimental value of molecular weight was double the actual value. Calculate the degree of association of dimer, If the elevation in B.P is $2°C$.

A. 1.0

B. 0.5

C. 0.9

D. 2.0

Answer: A

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64. 2.0g of a non-electrolyte dissolved in 100g of benzene lowers the freezing point of benzene by 1.2K. The freezing pont depression constant of benzene is 5.12 K kg mol^{-1}. The molar mass of the solute is

A. $55 gmol^{-1}$

B. $85 gmol^{-1}$

C. $120 gmol^{-1}$

D. $155 gmol^{-1}$

Answer: B

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65. The potential of hydrogen electrode of pH = 10 with respect to standard hydrogen electrode is

A. $-0.0591V$

B. $-0.591V$

C. 0.2V

D. 0

Answer: B

66. Which of the following graphs represent a first order reaction (a=initial concentration of reactant, x=concentration of reactant consumed, t=time)
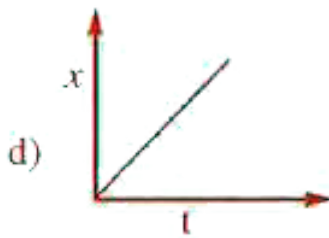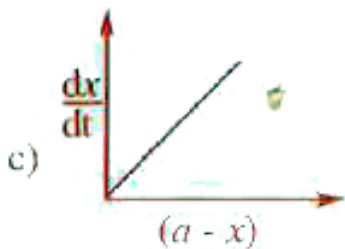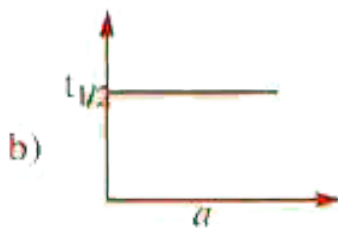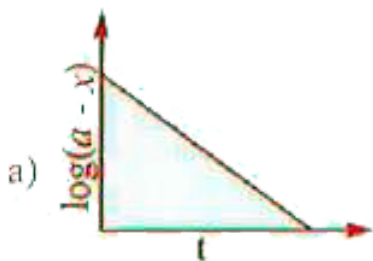
A. i,iii, iv

B. i,iii

C. ii,iii,iv

D. i,iv

Answer: B

---

67. Fog is a dispersion of

   A. liquid in liquid

   B. solid in gas

   C. gas in solid

   D. liquid in gas

Answer: D

---

68. Which of the following reactions is used for Mond's process of metal refining ?

A. $Ni + 4CO \xrightarrow{360K} Ni(CO)_4$

B. $2[Au(CN)_2]^-(aq) + Zn(s) \rightarrow 2Au(s) + [Zn(CN)_4]^{2-}(aw)$

C. $ZnO + C \xrightarrow{1673K} Zn + CO$

D. $Fe_2O_3 + CO \rightarrow 2FeO + CO_2$
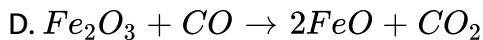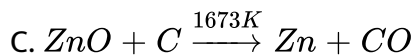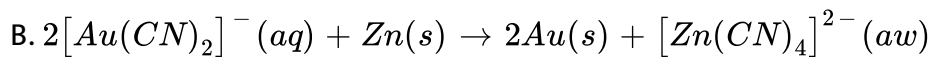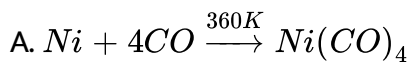
Answer: A

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69. The most acidic among the following compounds is

A. NO_2

B. N_2O_4

C. N_2O_5

D. N_2O_3
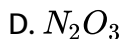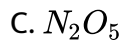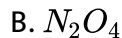
Answer: C

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70. Oxidation states of S in $H_2S_2O_7$ are

A. IV, IV

B. VI, VI

C. II, VI

D. I, VII

Answer: B

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71. Identify the number of complexes that are optically active

$[Co(\text{en})_3]^{3+}$, $[Co(NH_3)_4Cl_2]^+$

$[CoCl_2(\text{en})_2]$, $[Co(NH_3)_3(NO_2)_3]$
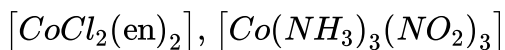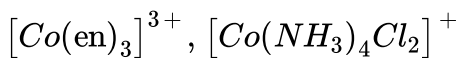
A. 0

B. 1

C. 2

D. 3

Answer: C

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72. Statement (I) Co^{2+} has higher magnetic moment than Cr^{3+}

Statement (II) Ionisation enthalpies of Ce, Pr and Nd are higher than Th, Pa, U

Which of the following is correct ?

A. Both (I) and (II) are not correct

B. Both (I) and (II) are correct

C. (I) is correct but (II) is not correct

D. (I) is not correct but (II) is correct

Answer: D

73. The schematic illustrations of macromolecules given below represent
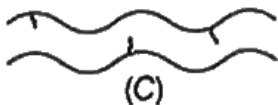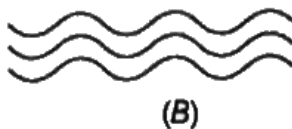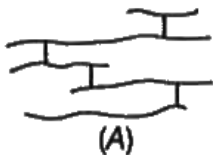
	A	B	C
A.	$HDPE$	$LDPE$	Bakelite
B.	Bakelite	$HDPE$	$LDPE$
C.	$HDPE$	Bakelite	$LDPE$
D.	$LDPE$	Bakelite	$HDPE$

Answer: B

74. Which one of the following structures represent amylose?

A.

B.

C.

D.
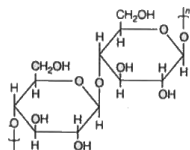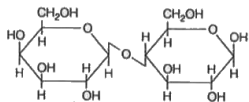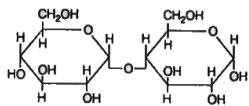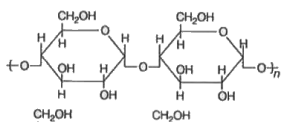
Answer: A

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75. The structure of ranitidine is

A.

B.

C.

D.
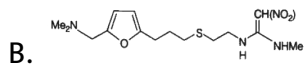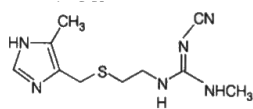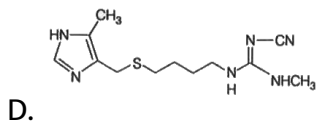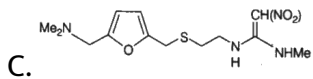
Answer: C

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76. Arrange the following bromides in the order of reactivity in undergoing $S_N I$ reaction
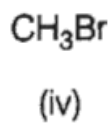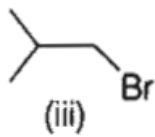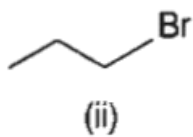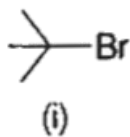
(i) (ii) (iii) (iv)

A. $i > iii > ii > iv$

B. $iv > ii > iii > i$

C. $i > ii > iii > iv$

D. $ii > iv > iii > i$

Answer: A

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77. From the following identify the reactions that give alcohol as the product.

(i)
(i) B_2H_6
(ii) H_2O_2/Aqueous NaOH

(ii)
(i) H_2/Catalyst

(iii)
$\dfrac{NaBH_4}{MeOH}$

(iv)
$\dfrac{H_2O}{NaOH}$
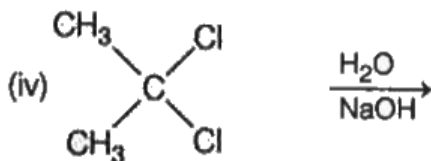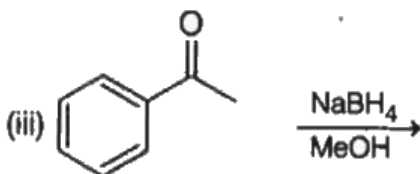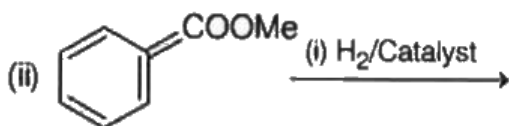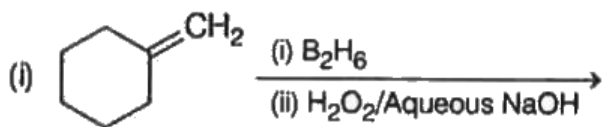
A. i,iii,iv

B. i,ii,iv

C. i,ii,iii

D. ii,iii,iv

Answer: C

78. What is the possible product (P) in the following reaction?

A.

B.

C.

D.
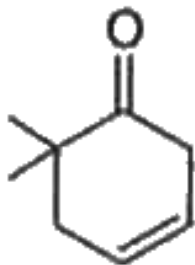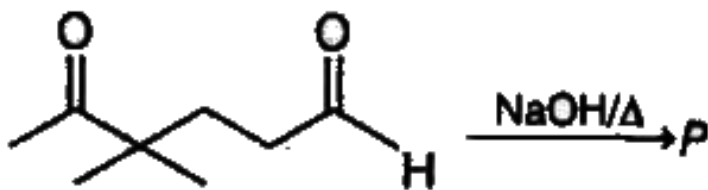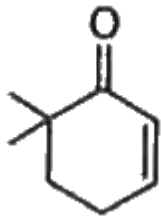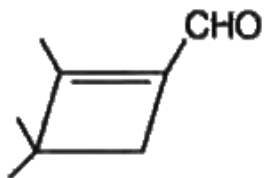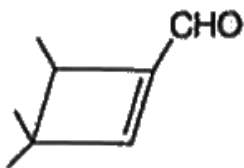
Answer: B

79. What are the products B and C in the following reaction sequence ?

reaction sequence?

$$\text{(cyclohexane-}CO_2H) \xrightarrow{NaOH} B \xrightarrow[\Delta]{NaOH \text{ and } CaO} C$$

A.
(B) ⬡—CO_2Na (C) ⬡

B.
(B) ⬡—CO_2Na (C) ⬡—OH

C.
(B) ⬡—Na   (C) ⬡—OH

D.
(d) (B) ⬡—CO_2Na (C) ⬡—Na
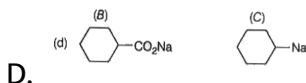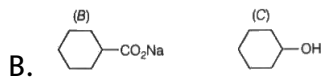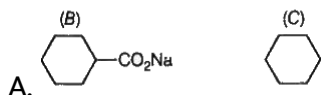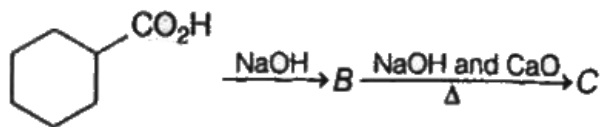
Answer: A

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80. Which of the options correctly represent the basicity for these compounds?
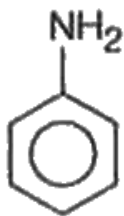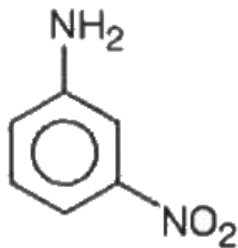
(i) (ii) (iii)

A. $i > iii > ii$

B. $i > ii > iii$

C. $iii > ii > i$

D. $iii > i > ii$

Answer: B

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81. If the radius of electron orbit in the excited state of hydrogen atom is

476.1 pm, the energy of electron in that excited state in J is Radius and

energy of electron in the first orbit of hydrogen atom are 52.9 pm and $-218 \times 10^{-18} J$ respectively)

A. -2.42×10^{-18}

B. 19.62×10^{-18}

C. -2.42×10^{19}

D. -6.05×10^{-19}

Answer: C

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82. A light of frequency 1.6×10^{16} Hz when falls on a metal plate emits electrons that have double the kinetic energy compared to the kinetic energy of emitted electrons when frequency of 1.0×10^{16} Hz falls on the same plate. The threshold frequency (λ_0) of the metal in Hz is

A. 1×10^{15}

B. 4×10^{15}

C. 3×10^{15}

D. 4×10^{13}

Answer: B

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83. Two which group and period does the element belong if the electronic configuration of an element in its -2 oxidation state is $1s^2 2s^2 2p^6 3s^2 3p^6$?

A. period 3, group 16

B. period 3, group 17

C. period 4, group 16

D. period 4, group 17

Answer: A

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84. Which set of the following molecules has only one lone pair of electrons on their respective central atoms ?

(i) SO_2 (ii) XeF_4

$PbCl_2$ (iv) SF_4

(v) CIF_3

A. (i),(iii),(iv)

B. (ii),(iii),(iv)

C. (i),(ii),(v)

D. (i),(iii),(iv)

Answer: A

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85. XeF_4 is square planar where as CCl_4 is tetrahedral because

A. in XeF_4, 'xe' is sp^3 hybridised and in CCl_4, 'C' is sp^3 hybridised

B. in both XeF_4 and CCl_4 the central atom is sp^3 hybridised

C. in XeF_4, Xe is sp^3d^2 hybridised but due to the presence of 2 lone pairs of electrons shape is square planar whereas in CCl_4 'C' is sp^3 hybridised

D. Xe is noble gas, whereas C is a non-metal

Answer: C

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86. 16 g each of H_2, He and O_2 are present in a container exerting 10 atm pressure at T(K). The pressure in atm exerted by 16 g each of He and O_2 in the second container of same volume and temperature is

A. 1.8

B. 6.4

C. 3.8

D. 5.4

Answer: C

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87. On litre of $0.15 M Na_2SO_3$ aqueons solution is mixed with 500 mL of $0.2 M K_2Cr_2O_7$ aqueous solution in acid medium. What is the number of moles of $K_2Cr_2O_7$ remaining in the solution after the reaction ?

A. 0.1

B. 0.0125

C. 0.025

D. 0.05

Answer: D

88. From the following data

$$CH_3OH(l) + \frac{3}{2}O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$$

$$\Delta_r H^\circ = -726kJmol^{-1}$$

$$H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l), \Delta_r H^\circ = -286kJmol^{-1}$$
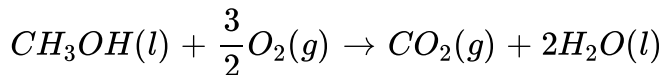
$$C(\text{graphite}) + O_2(g) \rightarrow CO_2(g), \Delta_r H^\circ = -393kJmol^{-1}$$
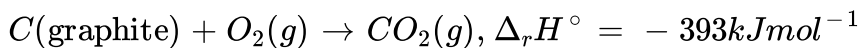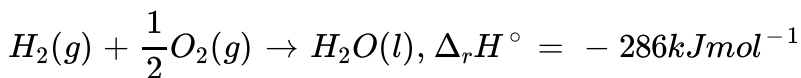
The standard enthalpy of formation of $CH_3OH(l)$ in $kJmol^{-1}$ is

A. -239

B. 239

C. 547

D. -905

Answer: A

89. At 1000 K, the equilibrium constant, K_c for the reaction $2NOCl(g) \Leftrightarrow 2NO(g) + Cl_2(g)$ is $4.0 \times 10^{-6} mol L^{-1}$. The K_p (in bar) at the same temperature is $\left(R = 0.083 \ \text{L bar K}^{-1}mol^{-4}\right)$

A. 3.32×10^{-6}

B. 3.32×10^4

C. 3.32×10^{-4}

D. 3.32×10^{-3}

Answer: C

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90. If the pK_a of acetic acid and pK_a of dimethyalmanie are 4.76 and 3.26 respectively, the pH of dimethyl ammonium acetate solution is

A. 7.75

B. 6.75

C. 7.0

D. 8.5

Answer: A

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91. Which of the following statements are correct ?

(i) NaH (s) reacts violently with water to form $NaOH$ and H_2

(ii) An example for electron rich hydride is NH_3

(iii) Nickel forms saline hydride

A. (i),(iii)

B. (ii),(iii)

C. (i),(ii),(iii)

D. (i),(ii)

Answer: D

92. Which of the following nitrates on heating does not give its oxide ?

A. $LiNO_3$

B. $NaNO_3$

C. $Ba(NO_3)_2$

D. $Be(NO_3)_2$
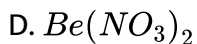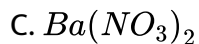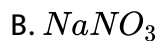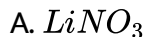
Answer: B

93. BF_3 reacts with NaH at 450 K to form NaF and X. When X reacts with LiH in diethyl ether, Y is formed. What is Y?

A. $LiBO_2$

B. $Li_2B_4O_2$

C. $LiBH_4$

D. $B_2H_6 \cdot LiH$
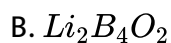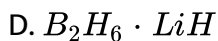
Answer: C

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94. Assertion (A) $[SiF_6]^2$ is formed but $[SiCl_6]^{2-}$ is not

Reason (R) Electronegativity (EN) of F is higher than EN of Cl

    A. Both A and R are correct and R is the correct explanation of A

    B. Both A and R are correct but R is not the correct explanation of A

    C. A is correct but R is not correct

    D. A is not correct but R is correct

Answer: B

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95. The environmental friendly chemical now-a-days used for bleaching the paper in the presence of a suitable catalyst is

    A. chlorine

    B. sulphur dioxide

    C. hydrogen peroxide

    D. bleaching powder

Answer: C

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96. The IUPAC name of the following compound is

    A. 5-cyanopentain-2-one

    B. 5-oxohexanentrile

    C. 4-oxopentanenitrile

D. 2-oxopentanenitrile

Answer: B

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97. Identify the correct statements from the following

(i) Petrol and CNG operated automobiles cause less poliution

(ii) Alkanes having tertiary hydrogen can be oxidised to alcohols by $KMnO_4$

(iii) Methane can be prepared by Kolbe's electrolytic method.

(iv) Alkyl chloride on reduction with zinc and dilute hydrochloric acid gives alkane

A. (i),(iii),(iv)

B. (i),(ii)

C. (i),(ii),(iv)

D. (iii),(iv)

Answer: C

98. What are X and Y in the following reaction ?

Pent -2-ene $\xrightarrow[\text{(ii)} Zn / H_2O]{\text{(i)} O_3}$ $X + Y$
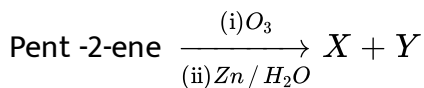
99. The total number of body centred lattices possible among the 14 bravais lattices is

A. 2

B. 1

C. 4

D. 3

Answer: D

---

100. The measured osmotic pressure of a soultion prepared by dissolving 17.4 mg of K_2SO_4 in 2L of water at $27°C$ is 3.735×10^{-3} bar. The van't Hoff factor is ($R = 0.083L$ bar $K^{-1}mol^{-1}$, atomic weights k=39, S=32, O=16)

A. 2.84

B. 3.0

C. 2.0

D. 2.32`

Answer: B

101. Dissolving 120 g of a compound (mol. Wt =60) in 1000 g of water gave a solution of density $1.12 gmL^{-1}$. The molarity of solution is

A. 1.0 M

B. 2.0 M

C. 2.5 M

D. 4.0 M

Answer: B

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102. When an aqueous solution of $CuCl_2$ is electrolysed using Pt inert electrodes, the reaction at cathode and anode respectively are

A.

$$4H_2O(l) \xrightarrow{+4e} 2H_2(g) + 4OH_2(aq), 2H_2O(l) \xrightarrow{-4e^-} O_2(g) + 4H^+(aq)$$

B. $2Cu^{2+}(aq) \xrightarrow{+4e^-} 2Cu(s), 2H_2O(l) \xrightarrow{-4e^-} O_2(g) + 4H^+(aq)$

C. $Cu^{2+}(aq) \xrightarrow{+2e^-} Cu(s), 2Cl^-(aq) \xrightarrow{-2e^-} Cl_2(g)$

D. $2H_2O(l) \xrightarrow{+2e^-} H_2(g) + 2OH(aq), 2Cl^-(aq) \xrightarrow{-2e^-} Cl_2(g)$
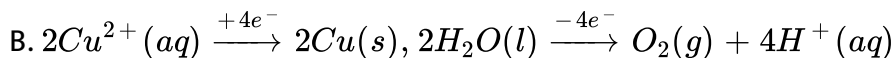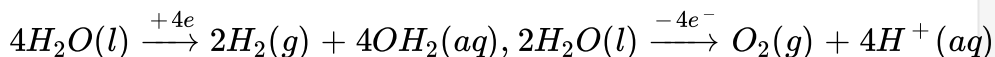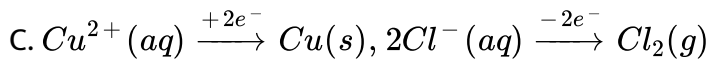
Answer: C

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103. Thermal decomposition of HCOOH is a first order reaction and the rate constant at T(K) is $4.606 \times 10^{-1}s^{-1}$. The time required to decompose 90% of initial quantity of HCOOH at T(K) in second is

A. 100

B. 500

C. 1000

D. 50

Answer: B

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104. Which one of the following statement is not correct ?

    A. A mixture of dinitrogen and dioxygen at room temperature is an

       example for aerosol

    B. Lyophilic sois are more stable compared to lyophobic soils

    C. Formation of micelles is possible only above Kraft temperature

    D. An example for a soap is sodium stearate and an example for

       detergent is sodium lauryl sulphate

Answer: A

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105. In Ellingham diagram, the plot is drawn between

    A. temperature, ΔH°

    B. temperature, ΔG°

C. pressure, ΔS°

D. temperature, ΔE°

Answer: B

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106. Identify the reaction which does not liberate N_2

A. $NaN_3 \xrightarrow{\Delta} ?$

B. $(NH_4)_2Cr_2O_7 \xrightarrow{\Delta} ?$

C. $NH_4Cl + Ca(OH)_2 \rightarrow ?$

D. $Ba(N_3)_2 \xrightarrow{\Delta} ?$
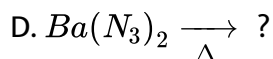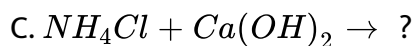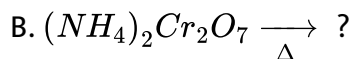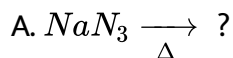
Answer: C

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107. Identify the molecules which contains lone pair of electrons on the sulphur atom

    A. H_2SO_5

    B. $H_2S_2O_8$

    C. $H_2S_2O_7$

    D. H_2SO_3
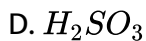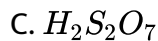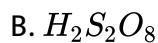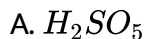
Answer: D

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108. Which statement about noble gases is not correct ?

    A. Xe' forms XeF_6 under suitable conditions

    B. Ar' is used in electric bulbs

    C. The number of lone pair of electrons present on Xe in XeF_2 is 3.

D. He' has the highest boiling point among all the noble gases

Answer: D

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109. Crystal field splitting energies for octahedral (Δ_0) and tetrahedral (Δ_t) geometries caused by the same ligands are related through the expression

A. $\Delta_0 = \Delta_t$

B. $4\Delta_0 = 9\Delta_t$

C. $9\Delta_0 = 4\Delta_t$

D. $\Delta_0 = 2\Delta_t$

Answer: B

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110. Name a member of the lanthanoid senes which is well known to exhibit +4 oxidation state.

A. Lu

B. Ce

C. Pm

D. Nd

Answer: B

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111. In anionic polymerisation, the compound which acts as effective chain initiator is

A. BF_3

B. $(CH_3CO)_2O_2$

C. $SnCl_2$

D. R-Li

Answer: D

---

112. Which one of the following is the structure of lactose ?

A.

B.

C.

D.
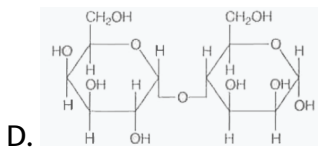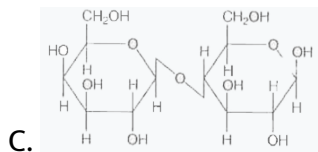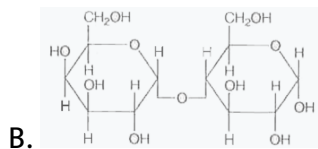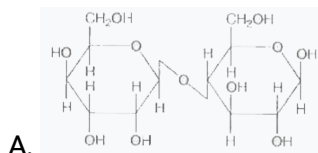
Answer: C

113. Which of the following statements are correct ?

(i) Drugs that mimic natural messenger by switching on the receptor are called agonists.

(ii) Shape of the receptor does not change after attachment of chemical messenger.

(iii) A cationic detergent is formed when stearic acid reacts with polyethylene glycol.

(iv) Seldane is an antihistamine

A. (ii),(iii)

B. (i),(iii),(iv)

C. (i),(iv)

D. (i),(ii),(iii)

Answer: C

114. Identify the major products X and Y in the following reactions

A.

B.

C.

D.

Answer: C

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115. Identify A and B is the following reactions

A.

B.

C.

D.

Answer: B

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116. Identify A, B and C in the following reactions.

Isopropyl chloride $\xrightarrow{NaOH} A \xrightarrow{Cu/573K} B \xrightarrow{NaOl} C +$ Iodoform
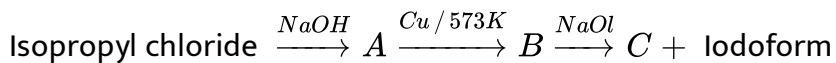
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117. Match the following

A.
A	B	C	D
III	IV	II	I

B.
A	B	C	D
III	IV	I	II

C.
A	B	C	D
IV	II	III	V

Answer: A

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118. Identify the structure of Z in the following reaction sequence

Phthalic acid $+ NH_3 \Leftrightarrow X \xrightarrow{\Delta} Y \xrightarrow[\text{heating}]{\text{strong}} Z$

A.

B.

C.

D.
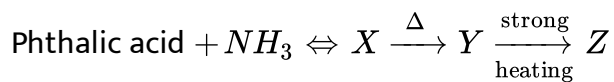
Answer: D

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119. What are A and B in the following reaction sequence ?

Propionitrile $+ A \rightarrow B \xrightarrow{H_3O}$ propioophenone

120. $C_2H_5Cl \xrightarrow{KCN} X \xrightarrow{H_2/\text{Catalyst}} Y \xrightarrow[alc,KOH]{CHCl_3} Z$
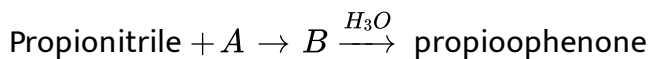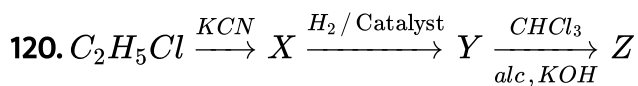
What is 'Z' in the above sequence of reactions ?

A.

B.

C.

D.
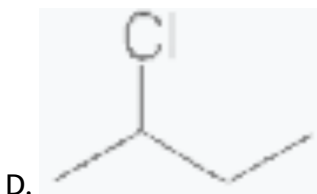
Answer: A

121. The wavelength correspoding to electronic transition between to orbit of hydrogen atom is 912 Å. The wavelength (in Å) for the same electronic transition in Li^{2+} is

A. 101.3

B. 202.6

C. 303.9

D. 50.65

Answer: A

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122. The ratio of lowest energy in ierms of wave number of balmer and lyman series of lines of atomic specturm of hydrogen is

A. $5:27$

B. $27:5$

C. $20:27$

D. $27:2$

Answer: A

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123. which is the following represent the correct order of ionic radii?

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

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

C. $Mg^{2+} > Al^{3+} > O^{2-} > F^- > Na^+$

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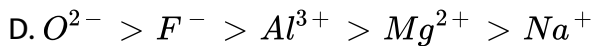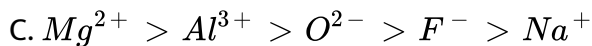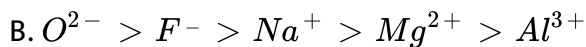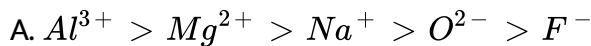
Answer: B

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124. The species ,which has the bond order same as that of F_2 molecule is

A. O_2^+

B. O_2^{2-}

C. O_2

D. N_2^+
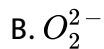
Answer: B

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125. The hybridisation of atom X with atomic number 27 in $[XF_6]^{3-}$ is

A. dsp^2

B. d^2sp^3

C. sp^3d^2

D. sp^3

Answer: C

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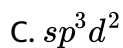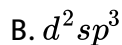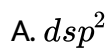
126. Calculate the temperature of 4.0 mol of a gas occupying $5dm^3$ at 3.32 bar.

$(R = 0.083 bar dm^3 K^{-1} mol^{-1}).$

A. 25K

B. 50K

C. 75K

D. 100K

Answer: B

127. To 50ml of 0.1 N $Na-(2)CO_3$ solution 150ml of water is added .

What is the molarity of result solution ?

A. $\dfrac{M}{40}$

B. $\dfrac{M}{20}$

C. $\dfrac{M}{80}$

D. $\dfrac{M}{30}$

Answer: C

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128. Matc the following

List I	List II
A. At constant volume the change in internal energy of a system	I. $W = -2.303nRT \log \frac{V_f}{V_i}$
B. Isothermal irreversible change	II. $W_{adiabatic} = \Delta U$
C. Isothermal reversible change	III. $q_v = \Delta U$
D. Adiabatic change	IV. $W = -P_{ss}(V_f - V_i)$
	V. $\Delta U = \Delta H - \Delta nRT$

A.
A	B	C	D
V	III	IV	I

B.
A	B	C	D
IV	I	III	IV

C.
A	B	C	D
III	IV	I	II

D.
A	B	C	D
III	V	I	II

Answer: C

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129. The pH of a buffer solution formed by mixing 30ml of 0.1 M NH_4 OH and 30ml os 1M NH_4 Cl solution is 8.6. The pK_b of $NH - (4)$ OH is

A. 5.4

B. 4.4

C. 5.6

D. 4.2

Answer: B

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130. The solubility products of three sparingly soluble salts AB , $A - (2)B$ and AB are respectively 4.0×10^{-20}, 32×10^{-11} amd 2.7×10^{-31} The increasing order of their solublity is

A. $AB < AB_3 < A_2B$

B. $AB_3 < AB < A_2B$

C. $A_2 < AB_3 < AB$

D. $A_2 < AB < AB_3$

Answer: A

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131. Identify the correct statements from the following .

(i) Zn reacts with due dilute HCl and aqueous NaOH solution seperately and liberates hyrogen .

(ii)Ti and Zr from intesitial hydrides .

The viscosite of H_2O is more than the viscosite of D_2O .

A. (i),(ii),(iii)

B. (i),(ii)

C. (i),(ii)

D. (ii),(iii)

Answer: C

---

132. What are X,Y and Z in the following reactions ?

$$CaCO_3 \overset{\Delta}{\Longleftrightarrow} CO_2 + X$$
$$X + H_2O \rightarrow Y$$
$$Y + Cl_2 \rightarrow Z$$

A.
X	Y	Z
CaO	$Ca(OH)_2$	$CaOCl_2 . H_2O$

B.
X	Y	Z
CaO	$Ca(OCl)_2$	$Ca(OH)_2$

C.
X	Y	Z
$Ca(OCl)_2$	$Ca(OH)_2$	CaO

D.
X	Y	Z
$Ca(OH)_2$	CaO	$Ca(OCl)_2$
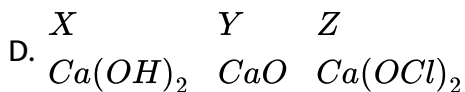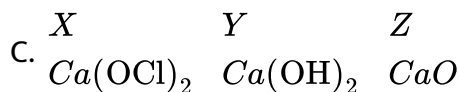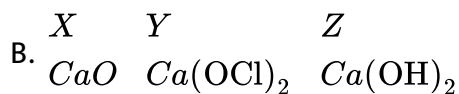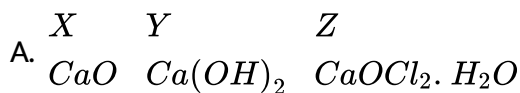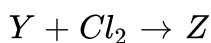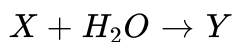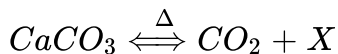
Answer: A

133. Identify the correct set of 13 th group elements which do not from amphoteric oxiddes?

A. B,In ,Ti

B. B,Al, Ga

C. Al, Ga ,Tl

D. Al ,Tl,In.

Answer: A

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134. identify X, Y,and Z in the following reaction $2CH_3Cl + X \xrightarrow[570k]{Y} Z$

A.
X	Y	Z
C	Ni	$(CH_3)_2Si(OH)_2$

B.
X	Y	Z
Si	Zn	$(CH_3)_2SiCl_2$

C.
X	Y	Z
Si	Cu	$(CH_3)_2SiCl_2$

D.

X	Y	Z
H_2O	Si	$(CH_3)_2Si(OH)_2$
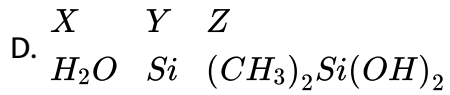
Answer: C

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135. Which of the following is not a greenhouse gas?

A. CO_2

B. O_3

C. CH_4

D. N_2
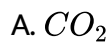
Answer: D

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136. T he order of priority of the following functional group iin IUPAG method of naming organic compound is

$$>C=O$$

(ii) $-NH_2$

(iii) $-CN$

(iv) $-COOR$

    A. (ii),(i),(iv),(iii)

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

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

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

Answer: C

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137. What are X,Yand Z in the following reactios

$$CH_3 - CH_3 - CO\overset{\ominus}{O}\overset{\oplus}{N}a \xrightarrow{X} Y \xleftarrow{\text{Kolbe's Electrolysis}} Z + H_2O$$

	X	Y	Z
A.	$NaOH + CaO/\Delta$	$CH_3CH_2CH_2CH_3$	$CH_3CH_2CO\overset{\theta}{O}\overset{\oplus}{O}Na$
B.	MO_2O_3	C_2H_6	$CH_3CH_2CO\overset{\theta}{O}\overset{\oplus}{O}Na$
C.	$NaOH + CaO/\Delta$	C_2H_6	$CH_3CO\overset{\theta}{O}\overset{\oplus}{O}Na$
D.	$(CH_3COO)_2Mn/\Delta$	C_3H_8	$CH_3CH_2CO\overset{\theta}{O}\overset{\oplus}{O}Na$

Answer: C

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138. Which one of the following comppunds will not show geomtricalisomerism?

A. Pro -2-enoic acid

B. 2- butene

C. 2-methyl-2-butenoic acid

D. 3-methyl -2-pentenoic acid

Answer: A

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139. A compound is formed by X and Y elements .atoms of Y (anions)from hep lattice .Atoms of X (cation) are in some octahedral holes .The formula of the copounds is XY,.What is the function of octahedral holes unoccupied by X?

A. $1/2$

B. $2/3$

C. $3/4$

D. $1/5$

Answer: B

140. The vapour pressure of pure benzene at a certain temperature is 0.850 bar. A non-volatile, non-electrolyte solid weighing 0.5g when added to 39.0 g of benzene (molar mass 78 g mol^{-1}), vapour pressure of the solution, then, is 0.845 bar. What is the molar mass of the solid substance ?

A. 180

B. 270

C. 160

D. 169

Answer: D

141. 0.1m solution each of sodium sulphet urea and sodium chloride are taken .The correct ratio of elevation of bolling point of these solution is

A. $1:1:1$

B. $3:1:2$

C. $1:2:3$

D. $2:3:1$

Answer: B

142. Using the standard electrode potentials given below identify the correct statement from the following .

$Fe^2 + 2e^- \rightarrow Fe, E^\circ = -0.44V$

$Cu^{2+} + 2e^- \rightarrow Cu, E^\circ = -0.34V$

$Ag^+ e^- \rightarrow Ag, E^\circ = -0.80V$
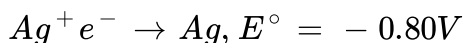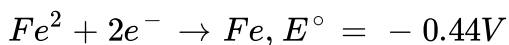
(i) Copper can displace iron from $FeSO_4$ solution .

(ii) Iron c an displace copper from $CuSO_4$ solution .

(iv) Iron can displace silver from $AgNO_3$ solution.

A. (i),(ii),

B. (ii),(iii)

C. (ii),(iv)

D. (i),(iv)

Answer: C

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143. At T(K) if the rate constant for a zero order reaction is $2.5 \times 10^{-3} ms^{-1}$ the time required for the intial concentration of reactant ,R to fall from 0.10 M to 0..75 M at the same temperature in seconds is

A. 25

B. 5

C. 10

D. 20

Answer: C

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144. The temperature above which ,formation of micelles take place is called

A. Boyles tempertature

B. Kraft temperature

C. critical temperature

D. inversion teperature

Answer: B

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145. The method used for producing semiconductor grade metals of high purity is

A. poling

B. eletrolysis

C. zone reflining

D. vapour phase reflining

Answer: C

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146. The element X on reaction with conc.HNO_3Forms two acidic oxides A and B of different shapes .element Z on reaction with conc .H_2SO_4 Forms two acidic oxides A and D of different shapes .What are X and Z?

A. c,c

B. S,Cu

C. C,S

D. C,Cu

Answer: A

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147. Identify the correct statement from t he following .

A. O_3, SO_2 molecules have different shapes

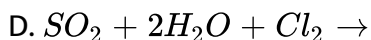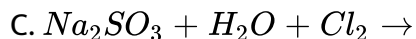B. The molecules formula of pyrosulphuric acid is $H_2S_2O_0$

C. In the presence of moisture ,SO_2 acts as an oxidising agent

D. V_2O_5 acts as catalyst in constant process

Answer: D

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148. Identify the reaction which monobsic and dilbasic acidic are formed.

A. $FeSO_4 + H_2OS_4 + Cl_2 \rightarrow$

B. $Na_2S_2O_3 + Cl_2 + H_2O \rightarrow$

C. $Na_2SO_3 + H_2O + Cl_2 \rightarrow$

D. $SO_2 + 2H_2O + Cl_2 \rightarrow$
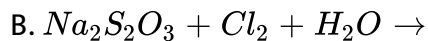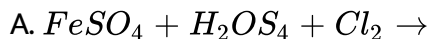
Answer: D

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149. Catalyst used in the manufacture of high density polythene is

A. MnO_2

B. V_2O_5

C. $TiCl_4$ and $(C_2H_5)_3AL$

D. $PdCl_2$
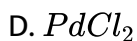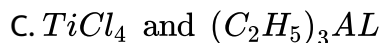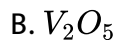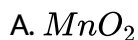
Answer: C

150. Identify the correct statement from the following .

(i) Eu^{2+} and Yb_{2+} are reducing agents .

(ii)The electronic configuration of Pr^{3+} is $[Xe]4\int^3$

(iii) Aqueous solution of $LaCl_3$ is colourless.

   A. (i),(ii),(iii)

   B. (i),(iii)

   C. (i),(ii)

   D. (ii),(iii)

Answer: B

151. The polydispersity index of a polymer containing 10 molecules with moleculer mass 1.0×10^4 and 10 molecules with moleculer mass 1.0×10^5 is approximately .

A. 1.67

B. 0.59

C. 1.55

D. 0.83

Answer: A

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152. Draw the structure of $\beta - D - (-)$ fructfuranose is

A.

B.

C.

D.
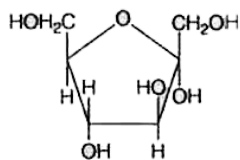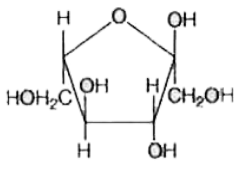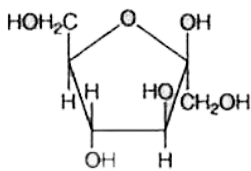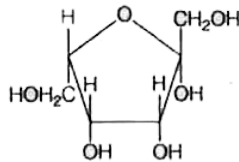
Answer: C

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153. Assertion (A) Shape of the receptor changes after attachment of chemical massenger.

Reason (R) Receptor does not regain original shape after removal of chemical messenger.

A. (A) and (R) are correct and (R) is the correct explanation of (A)

B. (A) and (R) are correct but (R) is not the correct explanation of (A)

C. (A) is correct but (R) is not correct

D. (A) is not correct but (R) is correct.

Answer: C

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154. Identify chiral molecules from the following
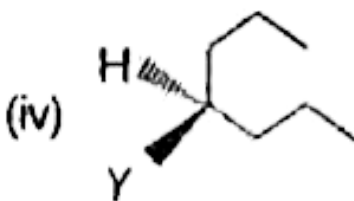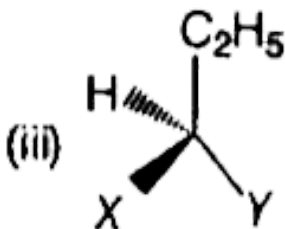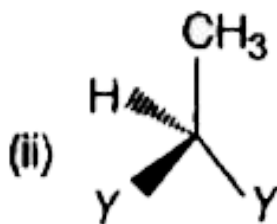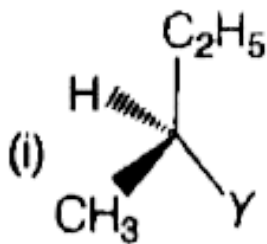
A. (i),(iii)

B. (ii),(iii),(iv)

C. (ii),(iii)

D. (ii),(iv)

Answer: A

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155. Isopropyl benzene on aerial oxidation followed by acid hydrolysis of the resulting compounds yields.

A. $(CH_3)_2CO, C_6H_5\_\_\_\_C_6H_5$

B. $(CH_3)_2CO, C_6H_5CH_3$

C. $(CH_3)_2CO, C_6H_5OH$

D. $(CH_3)_2CHOH, C_6H_5CH_3$

Answer: C

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156. Reimer -Tiemann reaction involves the formation of X from phenol through the intermediate Y.What are Xand Y?

A.

B.

C.

D.
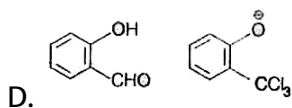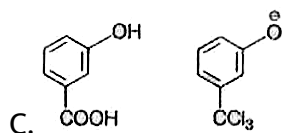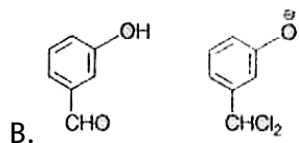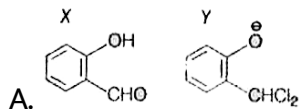
Answer: A

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157. What are Xand Y =in the following reaction sequence?

$$\text{Propene} \xrightarrow{HBr} A \xrightarrow[\text{Dry ether}]{Mg} B \xrightarrow[2.\,H_3O^+]{1.\,x}$$

A.

B.

C.

D.
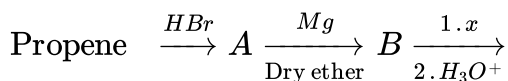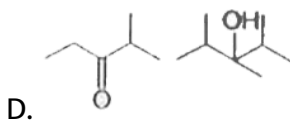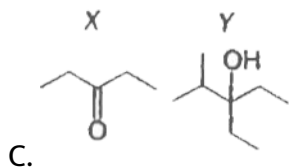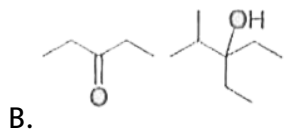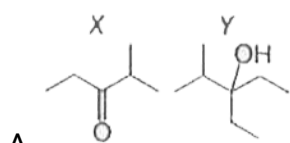
Answer: C

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158. The hydrogen atom bonded to the carbon desigenated by which number in

$$\overset{4}{C}H_3 - \overset{3}{C}H_2 - \overset{2}{C}H_2 - \overset{1}{C}HO \text{ is most acidic.}$$

A. $C - 4$

B. $C - 2$

C. $C - 3$

D. $C - 1$

Answer: B

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159. The order of strengths of the following carboxylic acidic is

(i) $CH_3 - CH_2 - COOH$

(ii) $CH_3 - COOH$

(iii) $C_6H_5 - COOH$

(iv) $C_6H_5 - CH_2COOH$
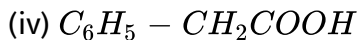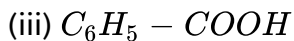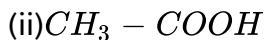
A. $(iii) > (iv) > (ii) > (i)$

B. $(iv) > (ii) > (iii) > (i)$

C. $(iii) > (ii) > (iv) > (i)$

D. $(i) > (iv) > (ii) > (iii)$

Answer: A

160. What are A,B and C in the following reaction ? Arene diazonium fluoroborate

$$\xrightarrow[\Delta]{NaNO_2 \, / \, Cu} A + B + C$$

A.
A	B	C
$ArN = Nar$	N_2	$NaBF_4$

B.
A	B	C
$ArNO_2$	N_2	$NaBF_4$

C.
A	B	C
$ArNO$	N_2	$NaBF_4$
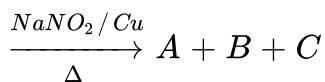
D.
A	B	C
ArF	NaN_3	BF_3

Answer: B

161. When a metal surface is exposed to certain frequency of electromagnetic radiation. The kinetic energy of electron ejected from metal surface is 0.20 eV. If its work function (W_0) is 4.80 eV, the approximate frequency of radiation falling on the metal surface in Hz is

A. 1.98×10^{15}

B. 1.21×10^{16}

C. 1.21×10^{15}

D. 1.98×10^{16}

Answer: C

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162. If the ratio of energies of electron in the excited states of H and Li^{2+} is 1 : 9, the radius ratio of electron in the same excited states of H and Li^{2+} is

A. $9:1$

B. $3:1$

C. $1:9$

D. $1:3$

Answer: B

---

163. Identify the correct statements from the following.

(i) In the periodic table, about 78% of elements are metals.

(ii) In a group, the metallic character decreases from top to battom and in a period the non-metallic character decreases from left to right.

(iii) The element Ho belongs to f-block.

A. i, ii, iii

B. ii, iii

C. i, iii

D. i, ii

Answer: C

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164. The correct order of dipole moments of NH_3. H_2O and NF_3 is

A. $H_2O > NH_3 > NF_3$

B. $H_2O > NF_3 > NH_3$

C. $NF_3 > NH_3 > H_2O$

D. $NH_3 > NF_3 > H_2O$

Answer: A

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165. The number of electrons present in bonding and antibonding orbitals in O_2^{2-} is respectively

A. 10, 6

B. 12, 6

C. 11, 7

D. 10, 8

Answer: D

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166. If r_1, r_2 and r_3 represent the most probable speeds of three different gases at the same temperature as shown in figure with molar masses M_1, M_2 and M_3 respectively. The correct order of molar masses

of these gases is
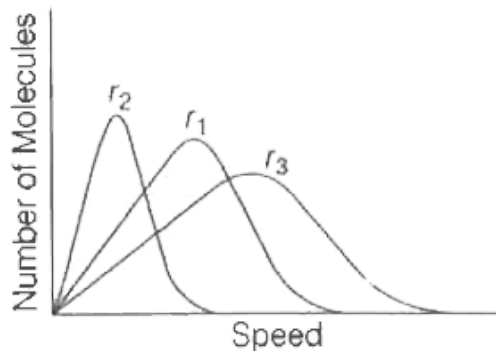
A. $M_1 > M_3 > M_2$

B. $M_3 > M_2 > M_1$

C. $M_2 > M_1 > M_3$

D. $M_2 > M_3 > M_1$

Answer: C

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167. The volume of 0.1 M HCl required in mL to neutralise 20 mL of a solution containing 0.106 g of Na_2CO_3 is

A. 10

B. 5

C. 20

D. 40

Answer: C

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168. If enthalpy of combustion of carbon to CO_2(g) is -394.0kJmol^{-1}, the enthalpy change for the formation of 17.6 g of CO_2 from carbon and dioxygen at the same temperature in kJ is

A. -157.6

B. 315.2

C. 157.6

D. -315.2

Answer: A

169. At 1000 K, if the equilibrium constant K_p for the reaction.

$$2NOCl(g) \Leftrightarrow 2NO(g) + Cl_2(g)$$
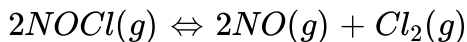
is 4.157×10^{-4} bar, the K_c (in molL^{-1}) is (R = 0.083 L bar $K^{-1}mol^{-1}$)

A. 4.16×10^{-7}

B. 4.16×10^{-4}

C. 5.0×10^{-4}

D. 5.0×10^{-6}

Answer: D

170. If the ionization constant of hypochlorous acid (HOCl) is 2.5×10^{-5}, the pH of 1.0 M of its solution is $(\log 5 = 0.7)$

A. 3.3

B. 2.3

C. 4.3

D. 3.0

Answer: B

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171. In which of the following reactions, oxygen is not liberated?

A. Reaction of HOCl with H_2O_2

B. Reaction of acidified $KMnO_4$ with H_2O_2

C. Reaction of iodine with H_2O_2 in basic medium

D. Reaction of lead sulphide with H_2O_2

Answer: D

172. A compound (M_2O_2) of group I element (M) hydrolyses to form M^+, OH^- and X. Another compound $(M'O_2)$ of group I element (M') hydrolyses to form $(M')^+$, OH^-, X and Y. What are X and Y respectively ?

A. H_2O_2, O_2

B. H_2O_2, O_3

C. O_2, H_2

D. H_2, H_2O_2

Answer: A

173. Identify the correct statements from the following

(i) The atomic radius of Al is lower than the atomic radius of Ga.

(ii) Boron exists in many allotropic forms.

(iii) The melting point of Ga is lowest among the group 13 elements.

A. i, ii, iii

B. ii, iii

C. I, ii

D. I, iii

Answer: B

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174. Which of the following is not correct corresponding to chemistry of group 14 elements ?

A. Lead has no reaction with water due to formation of protective oxide layer

B. GeX_2 is more stable than GeX_4

C. PbX_2 is more stable than PbX_4

D. Tin on reaction with steam liberates hydrogen.

Answer: B

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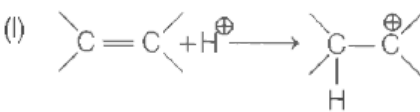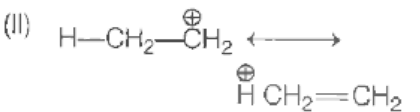
175. The chemical substance of photochemical smog responsible for eye irritation is

A. $CH_2 = CH - CHO$

B. $CH_3 - \overset{\overset{O}{\|}}{C} - O - O - NO_2$

C. $CH_2 = CH_2$

D. CH_4
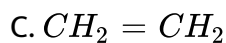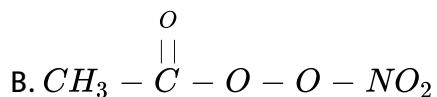
Answer: B

176. Match the following.

	List-I		List-II
(A)	Resonance	(I)	$C=C+H^{\oplus} \longrightarrow C-C$ with H
(B)	Inductive effect	(II)	$H-CH_2-\overset{\oplus}{C}H_2 \longleftrightarrow \overset{\oplus}{H}CH_2=CH_2$
(C)	Electromeric effect	(III)	C_6H_6
(D)	Hyperconjugation	(IV)	$\overset{\ominus}{CH_3}-Z \longrightarrow \overset{\oplus}{CH_3} + \overset{\oplus}{Z}$
		(V)	$CH_3-CH_2-CH_2Cl$

The correct answer is

A.
A	B	C	D
II	I	IV	III

B.
A	B	C	D
III	V	I	II

C.
A	B	C	D
I	III	II	V

D.
A	B	C	D
III	II	I	IV

Answer: B

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177. The rate of dehydrohalogenation of which one among the following

is less ?

A. $CH_3CH_2CH_2Br$

B. $CH_3CH_2CH_2Cl$

C. $CH_3CH_2CH_2I$

D. $CH_3 - CH - CH_2I$
$$\underset{CH_3}{|}$$
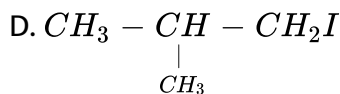
Answer: B

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178. Propyne reacts with HBr to form Z. The compound Z is

A. $CH_2(Br)CH_2CH_2Br$

B. $CH_3CH_2CHBr_2$

C. $CH_3CH(Br)CH_2Br$

D. $CH_3CBr_2CH_3$
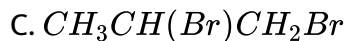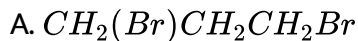
Answer: D

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179. A metal oxide crystallises in a hexagonal close-packed array of oxide ions with two out of every three octahedral holes occupied by metal ions. The formula of metal oxide is

A. MO

B. M_3O_4

C. M_2O_6
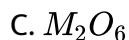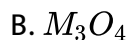
D. M_2O_3

Answer: D

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180. The quantity of CO_2 in 500 mL of soda water when packed under 3.34 bar CO_2 pressure at 298 K in g is

A. 2.442

B. 1.221

C. 4.884

D. 3.663

Answer: A

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181. 300 mL of an aqueous solution of a protein contains 2.52 g of the protein. If osmotic pressure of such a solution at 300 K is 5.04×10^{-3} bar, the molar mass of the protein in g mol^{-1} is

A. 83.0×10^3

B. 20.8×10^3

C. 41.5×10^3

D. 41.5×10^4

Answer: C

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182. The conductivity of 0.01 M aqueous acetic acid measured with a conductivity cell of cell constant of $0.5cm^{-1}$ at 298 K is 3.12×10^{-4} S. If the limiting conductivities of H^+ and CH_3COO^- at the same temperature are 349, and 41 S cm^2mol^{-1} respectively, the dissociation constant of acetic acid is

A. 1.67×10^{-4}

B. 1.67×10^{-5}

C. 1.67×10^{-3}

D. 1.67×10^{-6}

Answer: B

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183. At T(K), the following data were obtained for a general reaction, A + B + C $\rightarrow$ products

Expt.	Initial [A]	Initial [B]	Initial [C]	Initial rate
1.	0.02 M	0.1 M	0.03 M	$2.4 \times 10^{-6} \, ms^{-1}$
2.	0.02 M	0.2 M	0.03 M	$4.8 \times 10^{-6} \, ms^{-1}$
3.	0.02 M	0.2 M	0.06 M	$9.6 \times 10^{-6} \, ms^{-1}$
4.	0.04 M	0.2 M	0.06 M	$9.6 \times 10^{-6} ms^{-1}$

`The rate constant for the above reaction is

A. $8.0 \times 10^{-4} s^{-1}$

B. $8.0 \times 10^{-4} Lmol^{-1}s^{-1}$

C. $8.0 \times 10^{4} Lmol^{-1}s^{-1}$

D. $8.0 \times 10^{-4} L^{2}mol^{-2}s^{-1}$

Answer: B

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184. In which one of the following processes the reactants and catalyst exist in three different states ?

A. Haber's process

B. Ostwald's process

C. Hydrogenation of vegetable oil

D. Contact process

Answer: C

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185. What is the slag formed in the extraction of iron?

A. CaO

B. $CaSiO_3$

C. $MgSiO_3$

D. SiO_2

Answer: B

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186. Calcium phosphide reacts with water to form $Ca(OH)_2$ and X. When X is placed into $CuSO_4$ solution. Y and H_2SO_4 are formed. What is Y?

A. $\left[Cu(PH_3)_4\right]^{2+}$

B. $\left[Cu(PH_3)_6\right]^{2+}$

C. Cu_3P_2

D. $CuHPO_4$

Answer: C

187. Identify the satements which are not correct ?

(i) ZnO, PbO, Sb_2O_3 are neutral oxides.

(ii) CO and NO are amphoteric oxides.

(iii) CrO_3, Mn_2O_7, V_2O_5 are basic oxides.

A. i, ii

B. i, iii

C. ii, iii

D. i, ii, iii

Answer: D

188. Which one of the following liberates oxygen immediately when passed into water ?

A. F_2

B. Cl_2

C. Br_2

D. I_2

Answer: A

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189. Assertion (A) CuI_2 cannot be prepared by the reaction of Cu^{2+} (aq) with I^- (aq)

Reason (R) Aqueous Cu^{2+} solution is blue in colour
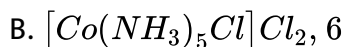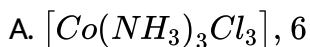
The correct answer is

A. Both (A) and (R) are correct and (R) is the correct explanation of

(A)

B. Both (A) and (R) are correct but (R) is not correct explanation of

(A)

C. (A) is correct but (R) is not correct

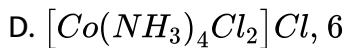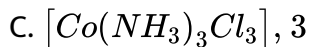D. (A) is not correct but (R) is correct

Answer: B

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190. A coordination compound is made of Co^{3+}, NH_3 and Cl^-, $0.1M$ solution of this complex when treated with excess silver nitrate gaye no precipitate. The formula of the complex and secondary valency of metal are respectively.

A. $\left[Co(NH_3)_3Cl_3\right]$, 6

B. $\left[Co(NH_3)_5Cl\right]Cl_2$, 6

C. $\left[Co(NH_3)_3Cl_3\right]$, 3

D. $\left[Co(NH_3)_4Cl_2\right]Cl$, 6

Answer: A

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191. Nylon 6, 6 is a condensation polymer of two monomers X and Y. The number of $-CH_2-$ groups in X and Y are respectively

A. 6, 4

B. 6, 6

C. 5, 6

D. 6, 2

Answer: A

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192. Reducing saccharides among the following are

Sucrose	Ribose	Maltose	Lactose	Cellulose
1	2	3	4	5

A. 2, 4, 5

B. 1, 3, 4

C. 2, 3, 5

D. 2, 3, 4

Answer: D
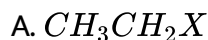
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193. Examples of antihistamine (X) and cationic detergent (Y) are

	X	Y
(a)	Dimethane	Cetyl trimethyl ammonium bromide
(b)	Nardil	Cetyl trimethyl ammonium bromide
(c)	Dimethane	Sodium lauryl sulphate
(d).	Nardil	Sodium lauryl sulphate

194. S_N 2 reaction involving inversion of configuration takes place with an optically active compound Z. The compound Z is

A. CH_3CH_2X
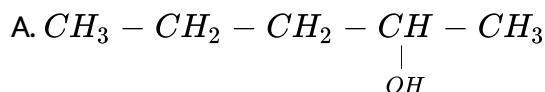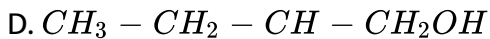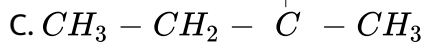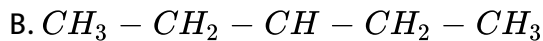
B. $(CH_3)_2CHX$

C. $CH_3CH_2CH(CH_3)X$

D. $(CH_3)_3CX$
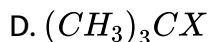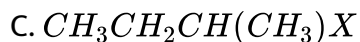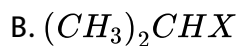
Answer: C

195. Ethyl magnesium bromide reacts with acetone to give X. On hydrolysis X forms

A. $CH_3 - CH_2 - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3$

B. $CH_3 - CH_2 - CH - CH_2 - CH_3$
$$\overset{|}{OH}$$

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

D. $CH_3 - CH_2 - \overset{}{\underset{\underset{CH_3}{|}}{CH}} - CH_2OH$

Answer: C

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196. Identify the correct set from the following

A.
Compound	pK_a
m-nitrophenol	10.2

B.
Compound	pK_a
o-nitrophenol	10.2

C.
Compound	pK_a
m-nitrophenol	7.2

D.
Compound	pK_a
o-nitrophenol	7.2

Answer: D

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197. What are X and Y in the following reactions ?

$$R - CH_2OH \xrightarrow{Cu / 573K} X$$

$$CH_3 - \overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{C}} - OH \xrightarrow{Cu / 573K} Y$$

A.

B.

C.

D.
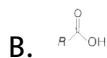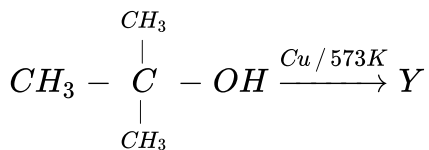
Answer: C

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198. X and Y in the following reaction sequence are

$$RMgX \xrightarrow{CdCl_2} X \xrightarrow{Y} R - \overset{\overset{\displaystyle O}{||}}{C} - R'$$
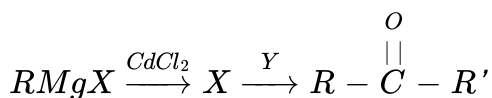
	X	Y
(a)	RCdCl	R′COCl
(b)	R_2Cd	$(R′CO)_2$
(c)	R_3Cd	R′COCl
(d)	$R_2MgCdCl_2$	RCOOR′

199. Order of acidity of benzoic acid (I), 4-methoxybenzoic acid (II), acetic acid (III) and 4-nitrobenzoic acid (IV) is

A. $IV > I > II > III$
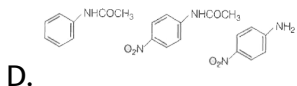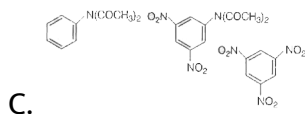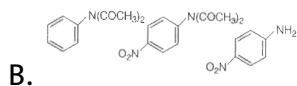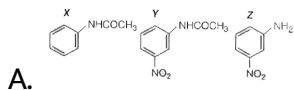
B. $I > II > IV > III$
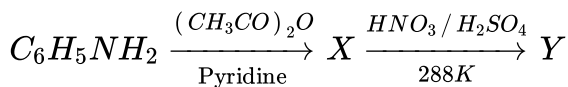
C. $III > I > II > IV$

D. $II > I > IV > III$

Answer: A

200. What are the structures of X, Y and Z in the following reaction sequence ?

$$C_6H_5NH_2 \xrightarrow[\text{Pyridine}]{(CH_3CO)_2O} X \xrightarrow[288K]{HNO_3/H_2SO_4} Y$$

A.

B.

C.

D.

Answer: D

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