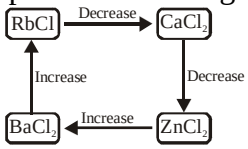
Chemistry

Q.1 Which of the following statement is correct about fructose?
(1) It is dextrorotatory compound.
(2) It exists in the two cyclic forms which is obtained by the addition of OH at C-5 to the group.
(3) It exists as six membered ring.
(4) It is named as furanose as it contain one oxygen and six carbon atom.

Q.2 The number of atoms in 4.25 g of NH_3 is approximately :-
(1) 1×10^{23} (2) 1.5×10^{23}
(3) 2×10^{23} (4) 6×10^{23}

Q.3 Which one of the following about an electron occupying the 1s orbital in a hydrogen atom is incorrect ? (The Bohr radius is represented by a_0)
(1) The electron can be found at a distance $2a_0$ from the nucleus.
(2) The probability density of finding the electron is maximum at the nucleus.
(3) The magnitude of potential energy is double that of its kinetic energy on an average.
(4) The total energy of the electron is maximum when it is at a distance a_0 from the nucleus.

Q.4 Which of the following diagram show correct change in the ionic character of given compounds according to Fajans rule ?

(1)


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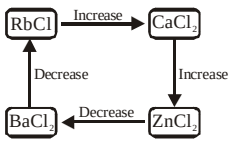

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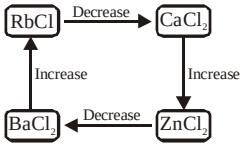

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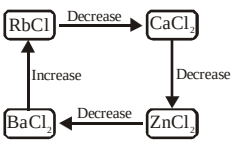


Q.5 The size of the iso-electronic species Cl^-, Ar and Ca^{2+} is affected by -
(1) Principal quantum number of valence shell.
(2) Nuclear charge.
(3) Azimuthal quantum number of valence shell.
(4) Electron-electron interaction in the outer orbitals

Q.6 During change of O_2 to O_2^- ion, the electron adds on which one of the following orbitals ?
(1) σ^* orbital (2) σ orbital
(3) π^* orbital (4) π orbital

Q.7 The ion that has sp^3d^2 hybridization for the central atom, is :
(1) $[ICl_2]^-$ (2) $[IF_6]^-$
(3) $[ICl_4]^-$ (4) $[BrF_2]^-$

Q.8 Among the following molecules / ions, $C_2^{2-}, N_2^{2-}, O_2^{2-}, O_2$, which one is diamagnetic and has the shortest bond length?
(1) C_2^{2-} (2) N_2^{2-}
(3) O_2 (4) O_2^{2-}

Q.9 The correct order of Cl–O bond order is :
(1) $ClO_3^- < ClO_4^- < ClO_2^- < ClO^-$
(2) $ClO^- < ClO_4^- < ClO_3^- < ClO_2^-$
(3) $ClO^- < ClO_2^- < ClO_3^- < ClO_4^-$
(4) $ClO_4^- < ClO_3^- < ClO_2^- < ClO^-$

Q.10 The correct statement about ICl_5 and ICl_4^- is
(1) ICl_5 is trigonal bipyramidal and ICl_4^- is tetrahedral.
(2) ICl_5 is square pyramidal and ICl_4^- is tetrahedral.
(3) ICl_5 is square pyramidal and ICl_4^- is square planar.
(4) Both are isostructural.

Q.11 If p is the momentum of the fastest electron ejected from a metal surface after the irradiation of light having wavelength λ, then for 1.5 p momentum of the photoelectron, the wavelength of the light should be: (Assume kinetic energy of ejected photoelectron to be very high in comparison to work function)
(1) $(1/2)\lambda$ (2) $(3/4)\lambda$
(3) $(2/3)\lambda$ (4) $(4/9)\lambda$

Q.12 What would be the molality of 20% (mass/mass) aqueous solution of KI?
(Molar mass of KI = 166 g mol^{-1})
(1) 1.08 (2) 1.48
(3) 1.51 (4) 1.35

Q.13 At 300 K and 1 atmospheric pressure, 10 mL of a hydrocarbon required 55 mL of O_2 for complete combustion and 40 mL of CO_2 is formed. The formula of the hydrocarbon is :
(1) C_4H_8 (2) C_4H_7Cl
(3) C_4H_{10} (4) C_4H_6

Q.14 The isoelectronic set of ions is :
(1) N^{3-}, Li^{+}, Mg^{2+} and O^{2-}
(2) Li^{+}, Na^{+}, O^{2-} and F^{-}
(3) F^{-}, Li^{+}, Na^{+} and Mg^{2+}
(4) N^{3-}, O^{2-}, F^{-} and Na^{+}

Q.15 Which of the following contain maximum number of carbon atoms?
(1) 15 gm ethane, C_2H_6
(2) 40.2 gm sodium oxalate, $Na_2C_2O_4$
(3) 72 gm glucose, $C_6H_{12}O_6$
(4) 35 gm pentene, C_5H_{10}

Q.16 5 moles of AB_2 weigh 125×10^{-3} kg and 10 moles of A_2B_2 weigh 300×10^{-3} kg. The molar mass of A (M_A) and molar mass of B (M_B) in kg mol^{-1} are
(1) $M_A = 50 \times 10^{-3}$ and $M_B = 25 \times 10^{-3}$
(2) $M_A = 25 \times 10^{-3}$ and $M_B = 50 \times 10^{-3}$
(3) $M_A = 5 \times 10^{-3}$ and $M_B = 10 \times 10^{-3}$
(4) $M_A = 10 \times 10^{-3}$ and $M_B = 5 \times 10^{-3}$

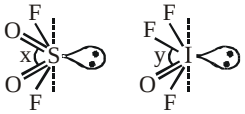
Q.17 How many electrons in an atom can have n = 3, ℓ = 1, m = –1 and s = +½
(1) 1 (2) 2
(3) 4 (4) 6

Q.18 NH_2^{-}, NH_3 and NH_4^{+} do not show similarity in the following :-
(1) Hybridisation state of nitrogen
(2) No. of lone pair of electrons
(3) Atomic no. of N
(4) Type of overlapping in N–H bond.

Q.19 If ionisation potential of hydrogen atom is 13.6 eV, then ionisation potential of He^{+} will be
(1) 54.4 eV (2) 6.8 eV
(3) 13.6 eV (4) 24.5 eV

Q.20 The correct order of bond angle
(1) $PF_3 < PCl_3 < PBr_3 > PI_3$
(2) $PF_3 < PCl_3 < PBr_3 < PI_3$
(3) $PF_3 > PCl_3 > PBr_3 > PI_3$
(4) $PF_3 > PCl_3 < PBr_3 > PI_3$

Q.21



Compare x and y bond angles for the above given molecules :-
(1) y > x (2) x > y
(3) x = y (4) None of these

Q.22 During compression of a spring the work done is 10 kJ and 2 kJ escaped to the surroundings as heat. The change in internal energy, ΔU (in kJ) is:
(1) 8 (2) 12
(3) –12 (4) –8

Q.23 If solubility product of $Zr_3(PO_4)_4$ is denoted by K_{sp} and its molar solubility is denoted by S, then which of the following relation between S and K_{sp} is correct

(1) $S = \left(\frac{K_{sp}}{929}\right)^{1/9}$ (2) $S = \left(\frac{K_{sp}}{216}\right)^{1/7}$

(3) $S = \left(\frac{K_{sp}}{144}\right)^{1/6}$ (4) $S = \left(\frac{K_{sp}}{6912}\right)^{1/7}$

Q.24 Which one of the following equations does not correctly represent the first law of thermodynamics for the given processes involving an ideal gas ? (Assume non-expansion work is zero)
(1) Cyclic process : q = – w
(2) Isothermal process : q = – w
(3) Adiabatic process : ΔU = – w
(4) Isochoric process : ΔU = q

Q.25 Calculate the heat produced in kJ when 280 g CaO is completely converted to $CaCO_3$ by reaction with CO_2 at 27°C and at constant volume :-
(Given) $\Delta H_f°(CaCO_3,s) = -1207$ kJ/mol
$\Delta H_f°(CaO,s) = -635$ kJ/mol
$\Delta H_f°\ (CO_2.g) = -394$ kJ/mol
(1) 800 J/mol (2) 877.55 kJ/mol
(3) 500 kJ/mol (4) 730 kJ/mol

Q.26 Equilibrium constant (K_c) of
$2HI\ (g) \rightleftharpoons H_2\ (g) + I_2\ (g)$ is 5×10^3. What is the equilibrium concentration of HI, if equilibrium concentrations of H_2 (g) and I_2 (g) respectively are 2.2×10^{-2} M and 2.2×10^{-4} M ?
(1) 1.11×10^{-5} M (2) 2.22×10^{-5} M
(3) 3.11×10^{-5} M (4) 6.66×10^{-5} M

Q.27 For the following reactions, equilibrium constants are given :
$S(s) + O_2(g) \rightleftharpoons SO_2(g)$; $K_1 = 10^{52}$
$2S(s) + 3O_2(g) \rightleftharpoons 2SO_3(g)$; $K_2 = 10^{129}$
The equilibrium constant for the reaction,
$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$ is :
(1) 10^{181} (2) 10^{154}
(3) 10^{25} (4) 10^{77}

Q.28 One mole of an ideal gas at 25°C expands its volume from 1L to 4L at constant temperature. What work (in J) is done if gas expands against vacuum ($P_{ext} = 0$)?

(1) -4×10^2 (2) -3×10^2
(3) -1×10^2 (4) Zero

Q.29 Which of the following cannot act as a reducing agent :

(1) SO_2 (2) Cl_2O_3
(3) NO_2 (4) CO_2

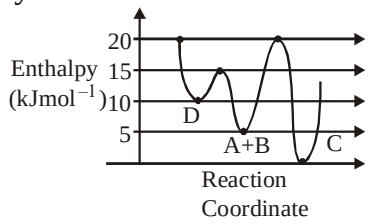
Q.30 Among the following, the set of parameters that represents path function, is :

(a) q + w (b) q
(c) w (d) H – TS
(1) (a) and (d) (2) (b), (c) and (d)
(3) (b) and (c) (4) (a), (b) and (c)

Q.31 Consider the given plot of enthalpy of the following reaction between A and B.

$A + B \rightarrow C + D$

Identify the **INCORRECT** statement.



(1) C is the thermodynamically stable product.
(2) Formation of A and B from C has highest enthalpy of activation.
(3) D is kinetically stable product.
(4) Activation enthalpy to form C is 5kJ mol^{-1} less than that to form D.

Q.32 Which of the following change will shift the reaction towards the product :-

$I_2(g) \rightleftharpoons 2I(g)$; $\Delta H_r°(298\ K) = +150$ kJ

(1) increase in concentration of I
(2) decrease in concentration of I_2
(3) increase in temperature
(4) increase in total pressure

Q.33 A process will be spontaneous at all temperatures if :

(1) $\Delta H > 0$ and $\Delta S < 0$
(2) $\Delta H < 0$ and $\Delta S > 0$
(3) $\Delta H > 0$ and $\Delta S > 0$
(4) $\Delta H < 0$ and $\Delta S < 0$

Q.34 The difference between ΔH and ΔU ($\Delta H - \Delta U$), when the combustion of one mole of heptane (1) is carried out at a temperature T, is equal to:

(1) 3RT (2) –3RT
(3) – 4RT (4) 4RT

Q.35 For the reaction ; $2A(g) + B(g) \rightleftharpoons 3C(g) + D(g)$ two moles each of A and B were taken into one litre flask. The following must always be true when the system attains equilibrium:-

(1) [A] = [B] (2) [A] < [B]
(3) [B] = [C] (4) [A] > [B]

Q.36 For the reaction,

$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$,

$\Delta H = -57.2$kJ mol^{-1} and $K_c = 1.7 \times 10^{16}$.

Which of the following statement is INCORRECT?

(1) The equilibrium constant is large suggestive of reaction going to completion and so no catalyst is required.
(2) The equilibrium will shift in forward direction as the pressure increase.
(3) The equilibrium constant decreases as the temperature increases.
(4) The addition of inert gas at constant volume will not affect the equilibrium constant.

Q.37 The value of ΔS for freezing of 10g of H_2O (ℓ) (enthalpy of fusion is 80 cal/g) at 0°C and 1 atm pressure is :-

(1) 12.25 J/K (2) –0.244 J/K
(3) –2.93 J/K (4) –12.25 J/K

Q.38 Which of the following is not correctly matched:

(1) CrO_5 ; oxidation number of Cr = +10
(2) Fe_3O_4 ; oxidation state of Fe = –8/3
(3) Na-Hg ; oxidation number of Na is = +1
(4) All of the above

Q.39 What is the final temperature of 0.10 mole monoatomic ideal gas that performs 75 cal of work adiabatically if the initial temp is 227°C? (Use R = 2 cal/K-mol) :-

(1) 250 K
(2) 300 K
(3) 350 K
(4) 750 K

Q.40 The solubility product of lead bromide is 8×10^{-5}. If the salt is 80% dissociated in saturated solution, find the solubility of the salt:-

(1) 1.7×10^{-4} M
(2) 2.3×10^{-6} M
(3) 1.8×10^{-4} M
(4) 3.4×10^{-2} M

Q.41 Calculate ΔH (kJ/mole) for the reaction :-
$2FeO(s) + ½ O_2(g) \rightarrow Fe_2O_3(s)$
Given ΔH
(i) $Fe_2O_3(s)+3C(graphite) \rightarrow 2Fe(s) + 3CO(g)$
492 kJ/mol
(ii) $FeO(s) + C(graphite) \rightarrow Fe(s)+CO(g)$
156 kJ/mol
(iii) $C(graphite) + O_2(g) \rightarrow CO_2(g)$
–393 kJ/mol
(iv) $CO(g) + (1/2) O_2(g) \rightarrow CO_2(g)$
–283 kJ/mol
(1) 290 (2) –290
(3) 580 (4) –580

Q.42 In general, the properties that decrease and increase down a group in the periodic table, respectively, are
(1) electronegativity and electron gain enthalpy.
(2) electronegativity and atomic radius.
(3) atomic radius and electronegativity.
(4) electron gain enthalpy and electronegativity.

Q.43 The isotopes of hydrogen are :
(1) Tritium and protium only.
(2) Deuterium and tritium only.
(3) Protium and deuterum only.
(4) Protium, deuterium and tritium.

Q.44 Aluminium is usually found in +3 oxidation state. In contrast, thallium exists in +1 and +3 oxidation states. This is due to :
(1) lanthanoid contraction
(2) lattice effect
(3) diagonal relationship
(4) inert pair effect

Q.45 Largest difference in radii is found in case of the pair –
(1) Li, Na (2) Na, K
(3) K, Rb (4) Rb, Cs

Q.46 The first ionisation enthalpy of Na, Mg and Si are 496, 737, 776 kJ/mol respectively. What will be the first ionisation enthalpy potential of Al in kJ/mol
(1) > 766 kJ/mol
(2) > 496 and < 737 kJ
(3) > 737 and < 766 kJ/mol
(4) > 496 kJ/mol

Q.47 Which is correct regarding size of atom?
(1) N < 0
(2) B < Ne
(3) V > Ti
(4) Na > K

Q.48 An element (X) belongs to fourth period and fifteenth group of the periodic table. Which one of the following is true regarding the outer electronic configuration of (X)? It has –
(1) partially filled d orbitals and completely filled s orbital.
(2) completely filled s orbital and completely filled p orbitals.
(3) completely filled s orbital and half-filled p orbitals.
(4) half-filled d orbitals and completely filled s orbital.

Q.49 Which of the following is not sp^2 hybridised?
(1) Graphite (2) Graphene
(3) Fullerene (4) Dry ice

Q.50 There are many elements in the periodic table which exhibit variable valency. This is a particular characteristic of –
(1) representative elements
(2) transition elements
(3) noble gases
(4) non-metals.

Q.51 Which of the following is not an actinoid?
(1) Curium (Z = 96)
(2) Californium (Z = 98)
(3) Uranium (Z = 92)
(4) Terbium (Z = 65)

Q.52 Which of the following is arranged in order of increasing metallic character?
(1) P < Si < Na < Be < Mg
(2) Be < Mg < P < Na < Si
(3) Si < Be > Mg < Na < P
(4) P < Si < Be < Mg < Na

Q.53 The bond dissociation energies of H–H, C–C and C–H bonds respectively are 104.2, 83.1 and 98.8 kcal mol^{-1}. The electronegativity of carbon is –
(1) 2.53 (2) 2.51
(3) 2.50 (4) 2.52

Q.54 Electronegativity is inversely related to the ____ of elements.
(1) non-metallic properties
(2) metalloid properties
(3) ionic properties
(4) metallic properties

Q.55 If the atomic number of an element is 58, it will be placed in the periodic table in the :-
(1) III B group and 6th period
(2) IV B group and 6th period
(3) V B group and 7th period
(4) none of these

Q.56 Which of the following electronic configuration represent representative elements

(1) $ns^{1,2}\ np^{1-5}$ (2) $ns^{1,2}\ np^{0-5}$

(3) $ns^{1,2}\ np^{0-6}$ (4) $ns^{1,2}\ np^{1-6}$

Q.57 What is the atomic number of the element with the maximum number of unpaired 4p electrons

(1) 33 (2) 26

(3) 23 (4) 15

Q.58 From the ground state electronic configuration of the elements given below, pick up the one with highest value of second ionisation energy.

(1) $1s^2\ 2s^2\ 2p^6\ 3s^2$ (2) $1s^2\ 2s^2\ 2p^6\ 3s^1$

(3) $1s^2\ 2s^2\ 2p^6$ (4) $1s^2\ 2s^2\ 2p^5$

Q.59 Which of the following is decreasing order of $I.P_2$?

(1) Cr > Mn > V > Ti (2) Mn > Cr > V > Ti

(3) Ti > V < Cr > Mn (4) V > Ti > G > Mn

Q.60 Group 13 elements show +1 and +3 oxidation states. Relative stability of +3 oxidation state may be given as

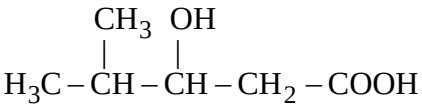
(1) $Tl^{3+} > In^{3+} > Ga^{3+} > Al^{3+} > B^{3+}$

(2) $B^{3+} > Al^{3+} > Ga^{3+} > In^{3+} > Tl^{3+}$

(3) $Al^{3+} > Ga^{3+} > Tl^{3+} > In^{3+} > B^{3+}$

(4) $Al^{3+} > B^{3+} > Ga^{3+} > Tl^{3+} > In^{3+}$

Q.61 The IUPAC name of the following compound is:



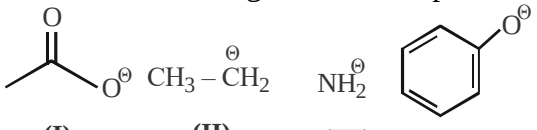
(1) 2-Methyl-3Hydroxypentan-5-oic acid

(2) 4,4-Dimethyl-3-hydroxy butanoic acid

(3) 3-Hydroxy-4 -methylpentanoic acid

(4) 4-Methyl-3-hydroxypentanoic acid

Q.62 Order of base strength of the compounds :-

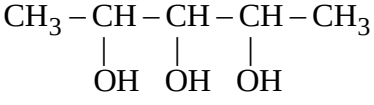


(I) **(II)** **(III)** **(IV)**

(1) IV > II > I > III (2) III > II > IV > I

(3) II > III > IV > I (4) II > III > I > IV

Q.63 The number of meso form of the given compound is



(1) 2 (2) 3

(3) 4 (4) 8

Q.64 The effect that makes 2,3–dimethyl-2-butene more stable than 2-butene is :-

(1) Resonance (2) Hyperconjugation

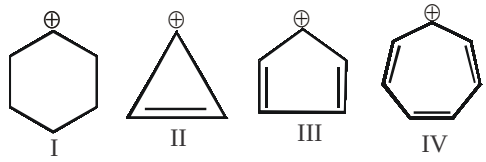
(3) Steric effect (4) Inductive effect

Q.65 Glycerol is purified by :-

(1) Steam distillation (2) Vacum distillation

(3) Sublimation (4) Simple distillation

Q.66 The stability of the following carbocation decreases in the order :



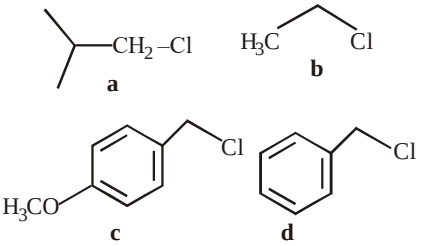
(1) IV > III > II > I

(2) IV > II > III > I

(3) IV > II > I > III

(4) IV > I > II > III

Q.67 Increasing order of reactivity of the following compounds for S_N1 substitution is:



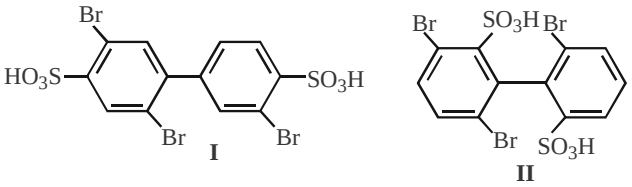
(1) b < c < d < a

(2) a < b < d < c

(3) b < a < d < c

(4) b < c < a < d

Q.68 Mention the correct relationship between I and II



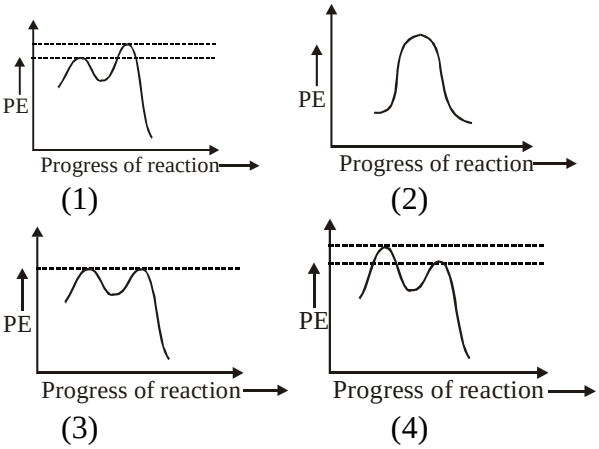
(1) Chain isomer

(2) Position isomer

(3) Identical

(4) Stereoisomer

Q.69 Which of the following potential energy (PE) diagrams represents the S_N1 reaction?

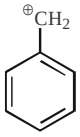


Q.70 Which of the following would exhibit cis-trans isomerism ?

(1) $CH_3CH_2CH=CH_2$ (2) ClCH = CHCl

(3) $ClCH=CCl_2$ (4) CH_2 = CH–COOH

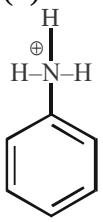
Q.71 Which of the following compounds +ve charge is not show resonance ?



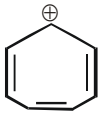
(1)

$CH_2 = CH - CH = CH - \overset{\oplus}{C}H_2$

(2)



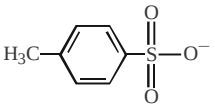
(3)



(4)

Q.72 The decreasing order of nucleophilicity among the nucleophiles is :

(I) $CH_3 - \underset{\underset{O}{\|}}{C} - O^-$ (II) CH_3O^-

(III) $C_6H_5O^-$ (IV) 

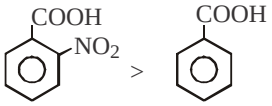
(1) I, II, III, IV

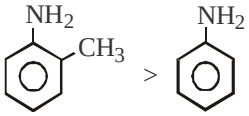
(2) IV, III, II, I

(3) II, III, I, IV

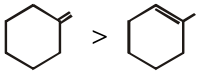
(4) III, II, I, IV

Q.73 Incorrect order is :

(1)  (Acidic strength)

(2)  (Basic strength)

(3) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - O^{\Theta} > CH_3 - \overset{\Theta}{C}H_2$ (Stability)

(4)  (Heat of Hydrogenation)

Q.74 Keto-enol tautomerism is not observed in :

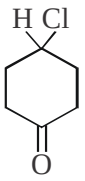
(1) $C_6H_5COC_6H_5$

(2) $C_6H_5COCH_3$

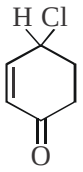
(3) $C_6H_5COCH_2COCH_3$

(4) $CH_3COCH_2COCH_3$

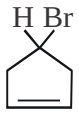
Q.75 Which of the following compounds is chiral ?



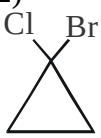
(1)



(2)



(3)



(4)

Q.76 The correct match between items-I and II is :

Item-I (Mixture)	**Item-II (Separation method)**
(a) H_2O : Sugar	(P) Sublimation
(b) H_2O : Aniline	(Q) Recrystallization
(c) H_2O : Toluene	(R) Steam distillation
	(S) Differential extraction

(1) a-Q, b-R, c-S (2) a-R, b-P, c-S

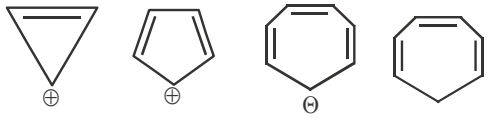
(3) a-S, b-R, c-P (4) a-Q, b-R, c-P

Q.77 An organic compound is estimated through Duma method and was found to evolve 6 moles of CO_2. 4 moles of H_2O and 1 mole of nitrogen gas. The formula of the compound is :

(1) $C_{12}H_8N$ (2) $C_{12}H_8N_2$

(3) C_6H_8N (4) $C_6H_8N_2$

Q.78 Which compound(s) out of the following is/are not aromatic ?

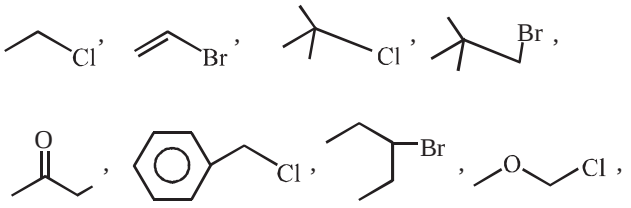


(A) (B) (C) (D)

(1) C and D (2) B, C and D

(3) A and C (4) B

Q.79 How many in following compounds give good yield of S_N2 reaction.



(1) 1 (2) 2

(3) 3 (4) 5

Q.80 Number of isomers of C_5H_6

(1) 2

(2) 3

(3) 4

(4) 5

Q.81 pK_a increases in benzoic acid when substituent "x" is bonded at para-position, then "x" is

(1) $-COOH$

(2) $-NO_2$

(3) $-CN$

(4) $-OCH_3$

Q.82 The purity of an organic compound is determined by –

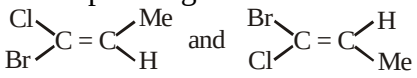
(1) chromatography

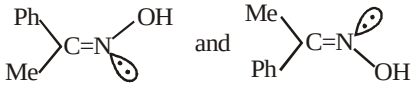
(2) crystallisation

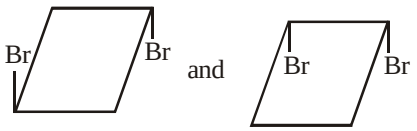
(3) melting or boiling point

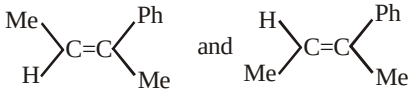
(4) both (1) and (3)

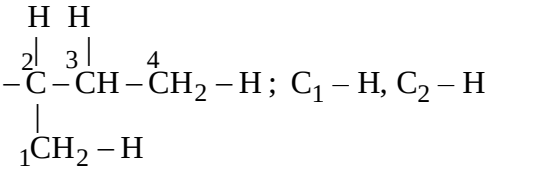
Q.83 Which is a pair of geometrical isomers

(1) 

(2) 

(3) 

(4) 

Q.84 

C_4–H the homolytic bond dissociation energy is in the order :

(1) $C_2–H > C_3–H > C_4–H > C_1–H$

(2) $C_1–H > C_4–H > C_2–H > C_3–H$

(3) $C_2–H > C_3–H > C_1–H > C_4–H$

(4) $C_1–H > C_4–H > C_3–H > C_2–H$

Q.85 The number of different substitution products possible when bromine and ethane are allowed to react, is :-

(1) 6

(2) 8

(3) 7

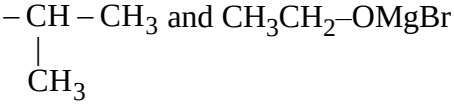
(4) 9

Q.86 Isobutyl magnesium bromide with dry ether and absolute alcohol gives :-

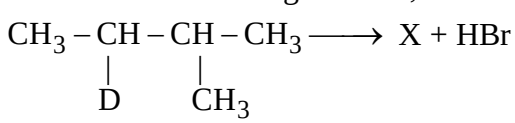
(1) $(CH_3)_2CH–CH_2OH$ and CH_3CH_2MgBr

(2) $(CH_3)_2CH–CH_2CH_2CH_3$ and $Mg(OH)Br$

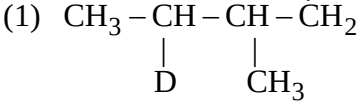
(3) $(CH_3)_2CH–CH=CH_2$ and $Mg(OH)Br$

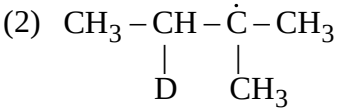
(4)  and $CH_3CH_2–OMgBr$

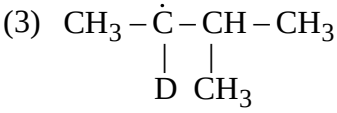
Q.87 Consider the following reaction,

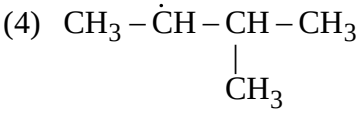


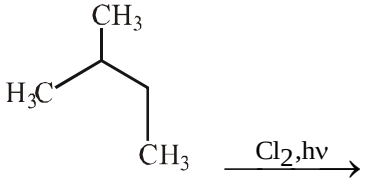
Identify the structure of major product X :-

(1) 

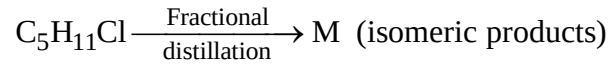
(2) 

(3) 

(4) 

Q.88 

N (isomeric products),



Given the number of N and M :-

(1) 6, 6 (2) 6, 4

(3) 4, 4 (4) 3, 3

Q.89 Arrange the following according to the increasing order of stability :-

Propene (I), cis-but-2-ene (II), trans-but-2-ene(III), 2,3-dimethylbut-2-ene(IV), ethene(V)

(1) V < IV < III < II < I

(2) V < I < II < III < IV

(3) V < IV < III < I < II

(4) IV < III < II < I < V

Q.90 The reaction of propene with HOCl proceeds via the addition of :-

(1) H^+ in the first step

(2) Cl^+ in the first step

(3) OH^- in the first step

(4) Cl^+ and OH^- in the single step

Q.91 Ozonolysis products of an olefin are OHC–CHO and $OHC–CH_2–CH_2–CHO$, the olefin is:

(1)  (2) 

(3)  (4) 

Q.92 On mixing a certain alkane with chlorine and irradiating it with ultraviolet light, it forms only one monochloroalkane. This alkane could be –
(1) Isopentane
(2) Neopentane
(3) Propane
(4) Pentane

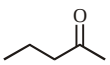
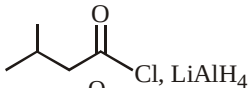
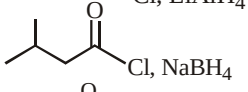
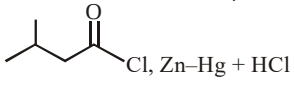
Q.93 Which of the following reactions will yield 2, 2-dibromopropane?
(1) $CH_3 - C \equiv CH + 2HBr \rightarrow$
(2) $CH_3CH = CHBr + HBr \rightarrow$
(3) $CH \equiv CH + 2HBr \rightarrow$
(4) $CH_3 - CH = CH_2 + HBr \rightarrow$

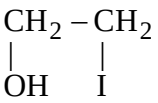
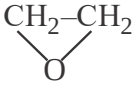
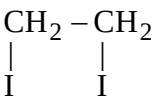
Q.94 Acetylene does not react with -
(1) $NaNH_2$
(2) NaOH
(3) Na metal
(4) Ammonical $AgNO_3$

Q.95 Benzene reacts with CH_3Cl in the presence of anhydrous $AlCl_3$ to form:
(1) Chlorobenzene
(2) Benzylchloride
(3) Xylene
(4) Toluene

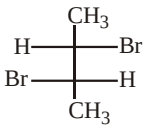
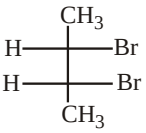
Q.96 Liquid hydrocarbons can be converted to a mixture of gaseous hydrocarbons by –
(1) Oxidation
(2) Cracking
(3) Distillation under reduced pressure
(4) Hydrolysis

Q.97 Among the following compounds the one that is most reactive towards electrophilic nitration is :
(1) Benzoic Acid
(2) Nitrobenzene
(3) Toluene
(4) Benzene

Q.98 Benzene $\xrightarrow{a}$ $\xrightarrow{b}$
a and b respectively are –
(1) Zn - Hg + HCl, 
(2) 
(3) 
(4) 

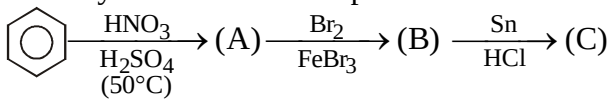
Q.99 $CH_2=CH_2 \xrightarrow{PhCO_3H} A \xrightarrow{H_3O^{\oplus}} B \xrightarrow[(2eq)]{PI_3,\Delta} C$
Structure of C is
(1) 
(2) $CH_2=CH_2$
(3) 
(4) 

Q.100 Match the column
Column I
(a) $(CH_3)_3CH \xrightarrow{?} (CH_3)_3C - OH$
(b) $CH_3 - CH = CH_2 \xrightarrow[NaOH]{?} CH_3 - CHOH - CH_2OH$
(c) $CH_2 = CH - CH_3 \xrightarrow{?} CH_2 = CH - CH_2Br$
Column II
(p) NBS (q) $KMnO_4$ (r) CrO_2Cl_2
Choose the correct codes
(1) (a) – q, (b) – q, (c) – p
(2) (a) – p, (b) – q, (c) – r
(3) (a) – r, (b) – q, (c) – p
(4) (a) – p, (b) – r, (c) – q

Q.101 When trans-2-butene is reacted with Br_2 then product formed is
(1) 
(2) 
(3) Meso compounds (4) both (2) and (3)

Q.102 The ozonolysis product(s) of the following reaction is(are) –
$CH_3CH_2 - C \equiv CH \xrightarrow[(ii)\ H_2O]{(i)\ O_3}$ Product(s)
(1) CH_3COCH_3
(2) $CH_3COCH_3 + HCHO$
(3) $CH_3COOH + HCOOH$
(4) $CH_3CH_2COOH + HCOOH$

Q.103 Identify the unknown compounds.



(1) A : Nitrobenzene, B : Dinitrobenzene, C : p-Bromoaniline
(2) A : $C_6H_5SO_3H$, B : m-Benzenesulphonic acid, C : m-Benzenesulphonate
(3) A : $C_6H_5NO_2$, B : m-Bromonitrobenzene, C : m-Bromoaniline
(4) A : p-Nitrobenzene, B : Trinitrobenzene, C : m-Bromoaniline

Q.104 The osmotic pressure of equimolar solutions of $BaCl_2$, NaCl and glucose follow the order :-
(1) $BaCl_2$ > NaCl > Glucose
(2) Glucose > NaCl > $BaCl_2$
(3) NaCl > $BaCl_2$ > Glucose
(4) NaCl > Glucose > $BaCl_2$

Q.105 Each pair forms ideal solution except?
(1) C_2H_5Br and C_2H_5I
(2) C_6H_5Cl and C_6H_5Br
(3) C_6H_6 and $C_6H_5CH_3$
(4) C_2H_5I and C_2H_5OH

Q.106 The Freezing point of 1% aqueous solution of calcium nitrate will be :-
(1) 0°C (2) Above 0°C
(3) 1°C (4) Below 0°C

Q.107 During depression of freezing point in a solution the following are in equilibrium :-
(1) Liquid Solvent, Solid Solvent
(2) Liquid Solvent, Solid Solute
(3) Liquid Solute, Solid Solute
(4) Liquid Solute, Solid Solvent

Q.108 A 0.001 molal solution of [Pt $(NH_3)_4Cl_4$] in water shows a freezing point depression of 0.0054°C. If K_f for water is 1.80, the correct formulation of the above compound is ?
(1) $[Pt(NH_3)_4Cl_3]Cl$
(2) $[Pt(NH_3)_4Cl_2]Cl_2$
(3) $[Pt(NH_3)_4Cl]Cl_3$
(4) $[Pt(NH_3)_4Cl_4]$

Q.109 20 g of naphthoic acid ($C_{11}H_8O_2$) dissolved in 50g of benzene (K_f=1.72Kgmol^{-1}) shows a depression in freezing point of 2 K. The Vant Hoff factor is?
(1) 0.5
(2) 0.1
(3) 2
(4) 3

Q.110 50 g of antifreeze (ethylene glycol) is added to 200g water. What amount of ice will separate out at –9.3°C. (K_f = 1.86 K Kg mol^{-1}) :-
(1) 42 mg (2) 42 g
(3) 38.71 g (4) 38.71 mg

Q.111 The values of observed and calculated molecular mass of silver nitrate are 92.64 and 170 respectively. The degree of dissociation of silver nitrate is :-
(1) 60% (2) 83.5%
(3) 46.7% (4) 60.23%

Q.112 Calculate the weight of non-volatile solute having molecular weight 40, which is dissolved in 57 g octane to reduce its vapour pressure by 20%
(1) 47.2 g (2) 5 g
(3) 106.2 g (4) None of these

Q.113 $Cu^{2+} + 2e^- \rightarrow Cu$. On increasing [$Cu^{2+}$] concentration, electrode potential :-
(1) Increases
(2) Decreases
(3) Will remain unchanged
(4) First increases, then decreases

Q.114 If hydrogen electrode is dipped in two solutions of pH = 3 & pH = 6 & salt bridge is connected, the emf of resulting cell is :-
(1) 0.177 V (2) 0.3 V
(3) 0.052 V (4) 0.104 V

Q.115 The emf of the cell reaction
Ag | Ag^+ (0.1M) || Ag^+ (1M) | Ag at 298 K is :-
(1) 0.0059 V
(2) 0.059 V
(3) 5.9 V
(4) 0.59 V

Q.116 An electrolytic cell contains solution of Ag_2SO_4 & has Platinum electrodes. A current is passed until 1.6g of O_2 is liberated at anode. The amount of silver deposited at cathode would be:-
(1) 107.88 g
(2) 1.6 g
(3) 0.8g
(4) 21.6 gm

Q.117 E° values of Mg^{2+}/Mg, Zn^{2+}/Zn and Fe^{2+}/Fe are –2.37V, –0.76V and –0.44V respectively. Which of the following statements is correct :-
(1) Zn will reduce Fe^{2+}
(2) Zn will reduce Mg^{2+}
(3) Mg oxidises Fe
(4) Zn oxidises Fe

Q.118 If the specific conductance of 1M H_2SO_4 solution is 26×10^{-2} S cm^{-1}, then the equivalent conductivity would be :-

(1) 1.3×10^2 S cm^2 eq^{-1}

(2) 1.6×10^2 S cm^2 eq^{-1}

(3) 13 S cm^2 mol^{-1}

(4) 1.3×10^3 S cm^2 mol^{-1}

Q.119 The expression which gives 1/4th life of Ist order reaction is :

(1) $\frac{K}{2.303}\log\frac{4}{3}$ (2) $\frac{2.303}{K}\log 3$

(3) $\frac{2.303}{K}\log\frac{3}{4}$ (4) $\frac{2.303}{K}\log\frac{4}{3}$

Q.120 Azo isopropane decomposes according to the equation : $(CH_3)_2CHN = NCH(CH_3)_2$ (g)

$$\xrightarrow{250\text{-}290^\circ C} N_2\,(g) + C_6H_{14}(g)$$

It is found to be a first order reaction. If initial pressure is P_0 and pressure of the mixture at time t is P_t the rate constant K would be

(1) $K = \frac{2.303}{t}\log\frac{P_0}{2P_0 - P_t}$

(2) $K = \frac{2.303}{t}\log\frac{P_0 - P_t}{P_0}$

(3) $K = \frac{2.303}{t}\log\frac{P_0}{P_0 - P_t}$

(4) $K = \frac{2.303}{t}\log\frac{2P_0}{2P_0 - P_t}$

Q.121 Mechanism of a hypothetical reaction $X_2 + Y_2 \rightarrow 2XY$ is given below :

(i) $X_2 \rightarrow X + X$ (fast)

(ii) $X + Y_2 \rightleftharpoons XY + Y$ (slow)

(iii) $X + Y \rightarrow XY$ (fast)

The overall order of the reaction will be :

(1) 2 (2) 0

(3) 1.5 (4) 1

Q.122 A first order reaction will have rate constant 5.78×10^{-5} sec^{-1}. How much part of reactant will remain after 10 hours :-

(1) 1/10 (2) 1/16

(3) 1/8 (4) 1/5

Q.123 If $Cu^+ + e^- \rightarrow Cu$; $E^o = X_1$

$Cu^{+2} + 2e^- \rightarrow Cu$; $E^o = X_2$ then the value of E^o for $Cu^{+2} + e^- \rightarrow Cu^+$ will be :

(1) $2X_2 - X_1$ (2) $2X_1 - X_2$

(3) $X_2 - X_1$ (4) $X_1 - X_2$

Q.124 How many EDTA molecules are required to make an octahedral complex with a Ca^{2+} ion?

(1) Six (2) Three

(3) One (4) Two

Q.125 Which complex is most stable ?

(1) $[Cu(CN)_2]^-$; $k_d = 1 \times 10^{-16}$

(2) $[Fe(CN)_6^-]^{-4}$; $k_d = 1 \times 10^{-37}$

(3) $[Fe(CN)_6]^{-3}$; $k_d = 1 \times 10^{-44}$

(4) $[Ag(CN)_2]^-$; $k_d = 1 \times 10^{-20}$

Where k_d = Dissociation constant

Q.126 The total no. of chelate rings in $[Ni(dmg)_2]$ are:

(1) 1 (2) 2

(3) 3 (4) 4

Q.127 In which of the following increasing order of splitting energy correct ?

(1) $[CrCl_6]^{-4} < [Cr(H_2O)_6]^{+2} < [Cr(NH_3)_6]^{+2} < [Cr(CN)_6]^{-4}$

(2) $[CrCl_6]^{-4} > [Cr(H_2O)_6]^{+2} > [Cr(NH_3)_6]^{+2} > [Cr(CN)_6]^{-4}$

(3) $[Cr(H_2O)_6]^{+2} > [CrCl_6]^{-4} > [Cr(NH_3)_6]^{+2} > [Cr(CN)_6]^{-4}$

(4) None of these

Q.128 Value of CFSE, in tetrahedral complex having $3d^4$ configuration of metal ion, surrounded by weak field ligands, will be :

(1) $(-2/5)\,\Delta_t$ (2) $(+2/5)\,\Delta_t$

(3) $(-4/5)\,\Delta_t$ (4) $(+3/5)\,\Delta_t$

Q.129 The IUPAC name for the complex $[Co(NH_3)_5\,(NO_2)]Cl_2$ is :

(1) Nitrito-N-pentaammine cobalt (III) chloride

(2) Nitrito-N-pentaammine cobalt (II) chloride

(3) Pentaammine nitrito-N-cobalt (II) chloride

(4) Pentaammine nitrito-N-cobalt (III) chloride

Q.130 When excess of ammonia is added to copper sulphate solution, the deep blue coloured complex is formed. The complex is

(1) tetrahedral and paramagnetic

(2) tetrahedral and diamagnetic

(3) square planar and diamagnetic

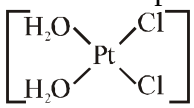
(4) square planar and paramagnetic

Q.131 The overall complex dissociation equilibrium constant for the complex $[Cu(NH_3)_4]^{2+}$ ion will be (β_4 for this complex is 2.1×10^{13}) β_4 = association constant

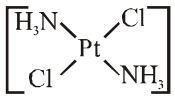
(1) 4.7×10^{-14} (2) 2.1×10^{13}

(3) 11.9×10^{-2} (4) 2.1×10^{-13}

Q.132 Which of the following considered to be an anticancer species ?



(1)



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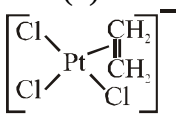

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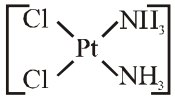


(4)

Q.133 Two complexes $[Cr(H_2O_6)Cl_3]$ (a) and $[Cr(NH_3)_6]Cl_3$ (b) are violet and yellow coloured, respectively. The incorrect statement regarding them is :

(1) Δ_0 value of (a) is less than that of (b).

(2) Δ_0 value of (a) & (b) are calculated from the energies of violet and yellow light, respectively

(3) Both absorb energies corresponding to their complementary colours.

(4) Both are paramagnetic with three unpaired electrons.

Q.134 The highest value of the calculated spin only magnetic moment (in BM) among all the transition metal complex is :

(1) 5.92 (2) 3.87

(3) 6.93 (4) 4.90

Q.135 Observe the following statements,

1. Lanthanides actively participate in chemical reactions.
2. The basic nature of hydroxides of lanthanides increases from $La(OH)_3$ to $Lu(OH)_3$.
3. Lanthanides do not form coordinate compounds as readily as d-block metals.

The correct statements are

(1) 2 and 3 (2) 1, 2 and 3

(3) 1 and 3 (4) 1 and 2

Q.136 Which of these ions is expected to be coloured in aqueous solution ?

I. Fe^{3+} , II. Ni^{2+}, III. Al^{3+}

(1) I and II (2) II and III

(3) I and III (4) I, II and III

Q.137 Identify the correct order of wavelength of light absorbed for the following complex ions.

I. $[Co(H_2O)_6]^{3+}$; II. $Co(CN)_6]^{3-}$

III. $[Co(F)_6]^{3-}$ IV. $[Co(en)_3]^{3+}$

(1) III > I > IV > II (2) II > IV > I > III

(3) III > I > II > IV (4) I > III > IV > II

Q.138 Total number of stereoisomers (i.e. geometrical as well as optical isomers) for the complex $[Pt(NH_3)_2\ (NO_3)_2\ ClBr]$ is:

(1) 2 (2) 4

(3) 6 (4) 8

Q.139 Which of the following statements is not correct?

(1) Copper liberates hydrogen from acids.

(2) In higher oxidation states, manganese forms stable compounds with oxygen and fluorine.

(3) Mn^{3+} and Co^{3+} are oxidising agents in aqueous solution.

(4) Ti^{2+} and Cr^{2+} are reducing agents in aqueous solution.

Q.140 Generally transition elements form coloured salts due to the presence of unpaired electrons. Which of the following compounds will be coloured in solid state ?

(1) Ag_2SO_4 (2) CuF_2

(3) ZnF_2 (4) Cu_2Cl_2

Q.141 Electronic configuration of $[Cu(NH_3)_6]^{2+}$ on the basis of crystal field splitting theory is

(1) $t^4_{2g}\ e^5_g$ (2) $t^6_{2g}\ e^3_g$

(3) $t^9_{2g}\ e^0_g$ (4) $t^5_{2g}\ e^4_g$

Q.142 In the silver plating of copper, $K[Ag(CN)_2]$ is used instead of $AgNO_3$. The reason is

(1) A thin layer of Ag is formed on Cu.

(2) More voltage is required.

(3) Ag^+ ions are completely removed from solution.

(4) Less availability of Ag^+ ions, as Cu cannot displace Ag from $[Ag(CN)_2]^-$ ion.

Q.143 A brown ring is formed in the ring test for NO_3^- ion. It is due to the formation of –

(1) $[Fe(H_2O)_5\ (NO)]^{2+}$ (2) $FeSO_4.NO_2$

(3) $[Fe(H_2O)_4(NO)_2]^{2+}$ (4) $FeSO_4.HNO_3$

Q.144 Ethylene dichloride and ethylidene chloride are isomeric compounds. Identify the statement which is not applicable to both of them :-

(1) They react with alcoholic KOH

(2) They are dihalides

(3) They react with aq. KOH and give the same product

(4) They are position isomers

Q.145 The product obtained when ethyl alcohol is distilled with bleaching powder is :-

(1) Chloroform (2) Ethyl chloride

(3) Acetaldehyde (4) Chloral

Q.146 $CH_2-CHCH_3 + PCl_5 \rightarrow$ (a),

$CH_3CH_2CHO + PCl_5 \rightarrow$ (b),

(a) and (b) are :-

(1) gem-dihalides

(2) (a) gem-dihalide, (b) Vic-dihalide

(3) Vic-dihalides

(4) (a) Vic-dihalide, (b) gem-dihalide

Q.147 Compound $C_4H_8Cl_2$ (a) on hydrolysis gives a compound C_4H_8O (b) which reacts with hydroxylamine and does not give any test with Tollen reagent. What are (a) and (b) ?

(1) 1,1-Dichlorobutane and butanal

(2) 2,2-Dichlorobutane and butanal

(3) 1,1-Dichlorobutane and butanone

(4) 2,2-Dichlorobutane and butanone

Q.148 $HC \equiv CH \xrightarrow[H_2SO_4]{HgSO_4} \xrightarrow[HOH]{CH_3MgBr} \xrightarrow{P/Br_2}$

(X); (X) is :-

(1) $CH_3CH(Br)CH_3$

(2) $CH_3CH_2CH_2Br$

(3) $H_2C=CH-Br$

(4) $BrCH=CH-CH_3$

Q.149 Match List I with II and pick the correct matching from the codes given below :-

List I (Haloalkane/arene)	**Lits II(Application)**
a. Iodoform	1. CF_4
b. BHC	2. Antiseptic
c. Freon-14	3. Moth repellent
d. Halothanes	4. Inhalative anaesthetic
e. p-Dichlorobenzene	5. Termite pesticide

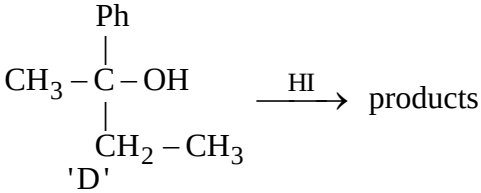
(1) a–2, b–4, c–5, d–3, d–1

(2) a–2, b–5, c–1, d–4, d–3

(3) a–3, b–4, c–2, d–1, d–5

(4) a–1, B–3, c–5, d–2, d–4

Q.150 The following reaction is suppose to take place through S_N1 mechanism



If the configuration of substrate is D, then configuration of products will be :-

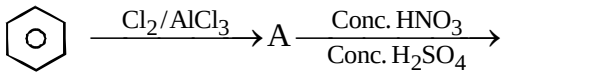
(1) D

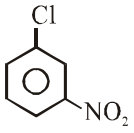
(2) L

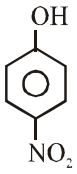
(3) 50% D & 50%L

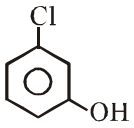
(4) May be D or L

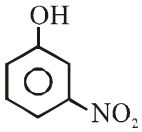
Q.151 The main product of following reaction will be



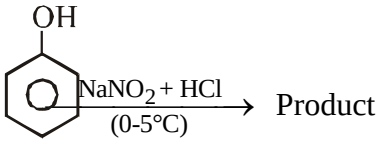
(1) 

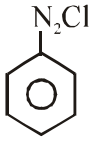
(2) 

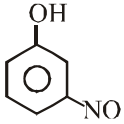
(3) 

(4) 

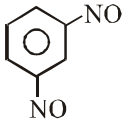
Q.152 Main product of following reaction will be :



(1) 

(2) 

(3) 

(4) 

Q.153 Which of the following reaction involves the formation of carbene intermediate :-

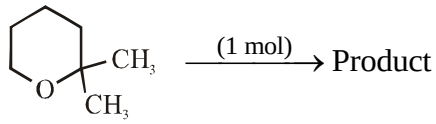
(1) Reimer Tiemann reaction

(2) Carbyl amine reacction

(3) Hoffmann bromoimide reaction

(4) Both 1 & 2

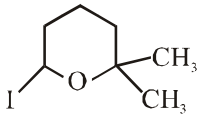
Q.154 The main product of following reaction will be:-



(1) $HO-CH_2-CH_2-CH_2-CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-I$

(2) $I-CH_2-CH_2-CH_2-CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-OH$

(3) $I-CH_2-CH_2-CH_2-CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-I$

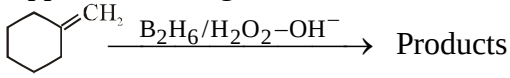
(4) 

Q.155 Which of the following compound on hydration (addition of H_2O) with $H_2SO_4/HgSO_4/H_2O$ give aldehyde as major product :-

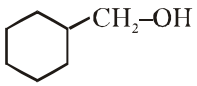
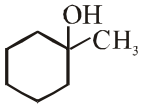
(1)  (2) $CH_3-C\equiv CH$

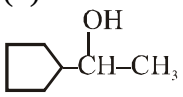
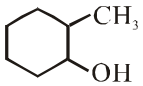
(3) $CH\equiv CH$ (4) $CH_3-C\equiv C-CH_3$

Q.156 Suppose following reaction



The major product will be :-

(1)  (2) 

(3)  (4) 

Q.157 In hydroboration reaction :-

I. Syn addition takes place

II. Reaction proceed through formation of cyclic transition state

III. Markownikoff rule is followed in reaction

IV. Anti addition takes place and anti markownikoff rule is followed.

Correct statement is/are :-

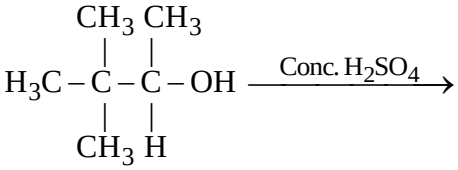
(1) III

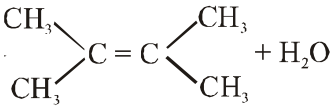
(2) I, II, III

(3) II,III,IV

(4) All of them are correct

Q.158 In following reaction :-





Which type of reaction intermediate is likely to involve

(1) Carbocation

(2) Carbanion

(3) Crabon free radical

(4) Carbene

Q.159 In the anion $HCOO^-$, the two carbon oxygen bonds are found to be equal length. What is the reason:-

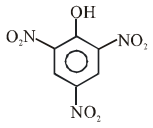
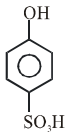
(1) The C = O are weaker than the C–O bond.

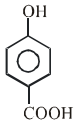
(2) The anion is obtained by removal of proton from acid molecules.

(3) The anion has two equal contributing resonating structure.

(4) Carbon is present in sp^2 state of hybridisation

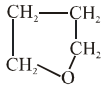
Q.160 Which of the following does not give bicarbonate test with $NaHCO_3$:-

(1)  (2) 

(3)  (4) 

Q.161 Ether on heating at high temperature in Presence of air form explosive compound. The structure of this compound is :-

(1) $CH_3-CH_2-O-\underset{\displaystyle OH}{\overset{|}{CH}}-CH_3$

(2) 

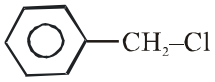
(3) $CH_3-CH_2-O-\underset{\displaystyle O-O-H}{\overset{|}{CH}}-CH_3$

(4) $CH_3-CH_2-\underset{\oplus}{O}-\underset{\displaystyle H}{\overset{|}{CH_2}}-CH_3$

Q.162 In which of the following reaction ether is not a main product :-

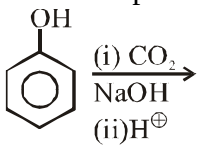
(1) $CH_3 - CH_2 - Cl \xrightarrow{CH_3ONa}$

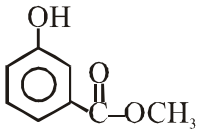
(2) $CH_3 - Cl \xrightarrow{CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}H-ONa}$

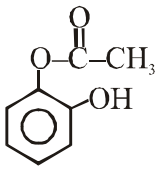
(3)  $\xrightarrow{CH_3-CH_2-ONa}$

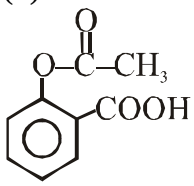
(4) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}-Cl \xrightarrow{CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}H-ONa}$

Q.163 The main product of following reaction will be

 $\xrightarrow[(ii)H^{\oplus}]{(i)\ CO_2,\ NaOH}$ **A** $\xrightarrow{(CH_3CO)_2O}$ Product

(1) 

(2) 

(3) 

(4) All of these

Q.164 $CH_3-\underset{\displaystyle NH_2}{\underset{|}{C}}H-CH_3 \xrightarrow{HNO_2} A \xrightarrow{\text{oxidation}} B \xrightarrow[(ii)\ H_2O]{(i)\ CH_3MgI} C$

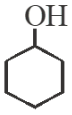
C is :-

(1) $CH_3CH_2CH_2CH_2OH$

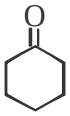
(2) $CH_3-CH_2-\underset{\displaystyle OH}{\underset{|}{C}}H-CH_3$

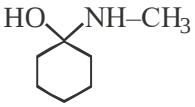
(3) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}H-CH_2-OH$

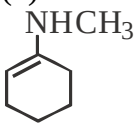
(4) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}}-OH$

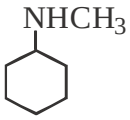
Q.165  $\xrightarrow{CrO_3} \xrightarrow{CH_3NH_2} \xrightarrow{H_2/Pd}$ [X]

Product [X] of given reaction is :-

(1) 

(2) 

(3) 

(4) 

Q.166 $CH_3COOH \xrightarrow[\Delta]{NH_3} X \xrightarrow{NaOBR} Y \xrightarrow{NaNO_2+HCl} Z$. What is Z ?

(1) $CH_3-\underset{\displaystyle O}{\underset{\|}{C}}-H$ (2) CH_3-CH_2-OH

(3) CH_3-O-CH_3 (4) CH_3-CH_2-Cl

Q.167 In which case alkylamine is not formed ?

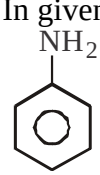
(1) $R—X + NH_3 \rightarrow$

(2) $R—CH = NOH + [4H] \xrightarrow[C_2H_5OH]{Na}$

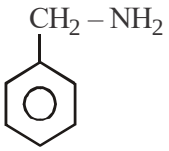
(3) $R—CN + H_2O \xrightarrow{H^+}$

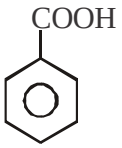
(4) $RCONH_2 + 4[H] \xrightarrow{LiAlH_4}$

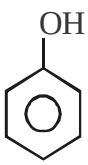
Q.168 In given reaction

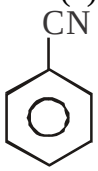
 $\xrightarrow[0-5°C]{NaNO_2+HCl} A \xrightarrow[KCN]{CuCN} B \xrightarrow{H_2O/H^+} C$

The end product (C) is :-

(1) 

(2) 

(3) 

(4) 

Q.169 $(CH_3)_2CH-\underset{\underset{O}{\|}}{C}-NH_2 \xrightarrow[Br_2]{NaOH} A \xrightarrow{COCl_2} B$

B is :-

(1) $(CH_3)_2CH–N=C=O$

(2) $CH_3-\underset{\underset{NH_2}{|}}{CH}-CH_3$

(3) $(CH_3)_2CH–NH–COCH_3$

(4) $CH_3–CH_2–NHCOCH_3$

Q.170 (A) and (B) in the following reactions are :

$$R-\underset{\underset{O}{\|}}{C}-R' \xrightarrow{HCN} (A) \xrightarrow{(B)} \begin{matrix} R & OH \\ & C \\ R' & CH_2NH_2 \end{matrix}$$

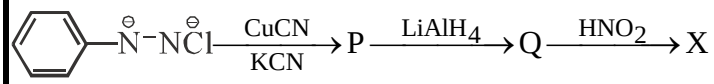
(1) (A) = RR'C(OH)(CN) ; (B) = $LiAlH_4$

(2) (A) = RR'C(OH)(COOH) ; (B) = NH_3

(3) (A) = RR'C(OH)(CN) ; (B) = H_3O^+

(4) (A) = $RR'CH_2CN$; (B) = NaOH

Q.171 Identify 'X' in the following sequence of reaction :-



(1) Benzoic acid

(2) Phenyl acetic acid

(3) Benzyl alcohol

(4) Benzamide

Q.172 The final product (IV) obtained in the reaction sequence :

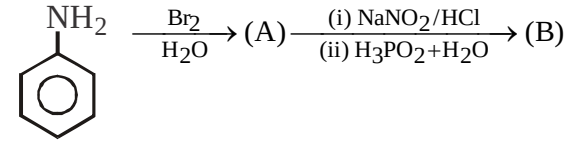
Toluene $\xrightarrow[2.\,H^+]{1.\,KMnO_4/OH^-} I \xrightarrow{SOCl_2} II \xrightarrow{NH_3} II \xrightarrow{OBr^-} IV$ is :

(1) $C_6H_5CONH_2$

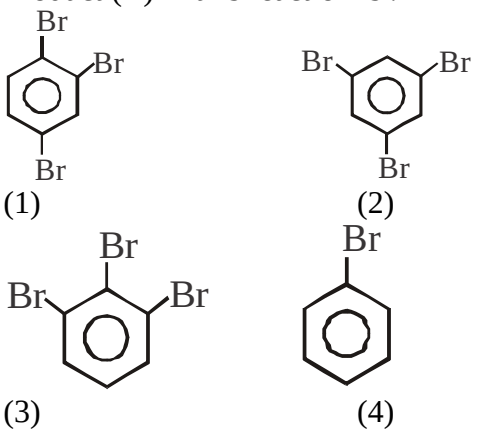
(2) p-$CH_3C_6H_4NO_2$

(3) $C_6H_5CH_2NH_2$

(4) $C_6H_5NH_2$

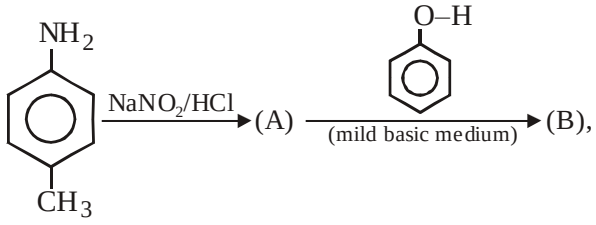
Q.173 

Product (B) in this reaction is :-

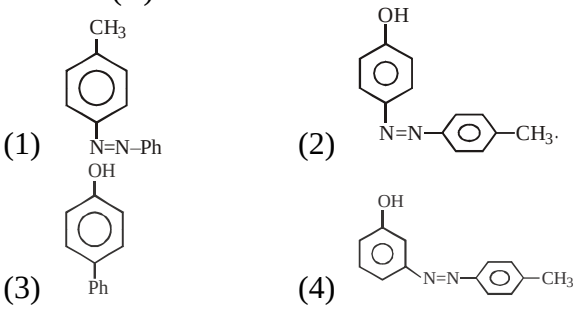


(1) (2) (3) (4)

Q.174



Product (B) of this reaction is :-



(1) (2) (3) (4)

Q.175 In a Lassaignes's test for sulphur in the organic compound with sodium nitroprusside solution the purple colour formed is due to-

(1) $[Fe(CN)_5\ NOS]^{4-}$

(2) $[Fe(CN)_5\ S]^{2-}$

(3) $[Fe(CN)_5\ NOS]^{2-}$

(4) None of these

Q.176 Method by which Aniline cannot be prepared is

(1) reduction of nitrobenzene with H_2/Pd in ethanol.

(2) potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution.

(3) hydrolysis of phenylisocyanide with acidic solution.

(4) degradation of benzamide with bromine in alkaline solution.

Q.177 Carbon and hydrogen in an organic compound are detected as
(1) $CaHCO_3$, $CaCO_3$
(2) $CaHCO_3$, $CuSO_4 .5H_2O$
(3) $CaCO_3$, $CuSO_4.5H_2O$
(4) $CaCO_3$, $Cu(OH)_2$

Q.178 In the Hofmann mustard oil reaction of primary amines, the black precipitate is due to –
(1) HgS (2) Ag_2S
(3) CuS (4) BaS

Q.179 Which of the following is incorrect?
(1) $FeCl_3$ is used in detection of phenols.
(2) Fehling solution is used in detection of glucose.
(3) Tollen's reagent is used in detection of unsaturation.
(4) $NaHSO_3$ is used in detection of carbonyl compounds.

Q.180 An organic compound having carbon, hydrogen and sulphur contains 4% of sulphur. The minimum molecular weight of the compound is
(1) 200 (2) 400
(3) 600 (4) 800

Q.181 One percent composition of an organic compound A is, carbon 85.71% and hydrogen : 14.29%. Its vapour density is 14. Consider the following reaction sequence
$A \xrightarrow{Cl_2/H_2O} B \xrightarrow[(ii)\ H_3O^+]{(i)\ KCN/EtOH} C$. Identify C.
(1) $CH_3-\underset{\underset{OH}{|}}{CH}-CO_2H$
(2) $HO-CH_2-CH_2-CO_2H$
(3) $HO-CH_2-CO_2H$
(4) $CH_3-CH_2-CO_2H$

Q.182 0.3780 g of an organic compound gave 0.5740 g of silver chloride in Carius estimation. Calculate the percentage of chlorine present in the compound.
(1) 37.6% (2) 19.6%
(3) 62.4% (4) 79.4%

Q.183 In the estimation of sulphur by Carius method, 0.468 g of an organic sulphur compound gave 0.668 g of barium sulphate. Find the percentage of sulphur in the given compound.
(1) 37.6% (2) 19.6%
(3) 62.4% (4) 79.4%

Q.184 D-glucose and L-glucose are :-
(1) Daistereomers (2) Enantiomers
(3) Epimer (4) Anomers

Q.185 C_4-epimer of glucose is :-
(1) Allose (2) Mannose
(3) Galactose (4) Fructose

Q.186 Glucose gives positive test with :-
(1) Tollen reagent (2) Fehling solution
(3) Benedict solution (4) All of these

Q.187 Which amino acid does not contain chiral centre:-
(1) Valine (2) Leucine
(3) Glycine (4) Isoleucin

Q.188 D-glucose and D-fructose can be differentiated by
(1) Fehling solution (2) Tollens reagent
(3) Benedict test (4) Br_2/H_2O

Q.189 Glucose does not react with :-
(1) Phenyl hydrazine (2) 2, 4–DNP
(3) CH_3–OH/HÅ (4) HCN/OH

Q.190 Which one of the following is reducing sugar?
(1) Starch (2) Cellulose
(3) Glycogen (4) Fructose

Q.191 Scurvy is caused due to deficiency of vitamin:-
(1) B_2 (2) B_{12}
(3) C (4) D

Q.192 $X \xleftarrow{HI} \text{Glucose} \xrightarrow{HNO_3} Y$, What are X and Y?
(1) X-n-hexane, Y-Gluconic acid
(2) X-Gluconic acid, Y-Saccharic acid
(3) X-n-hexanol, Y-Saccharic acid
(4) X-n-hexane, Y-Saccharic acid

Q.193 α-D(+)- and β-D(+)-glucopyranoses are known as
(1) epimers (2) anomers
(3) tautomers (4) enantiomers

Q.194 Choose the correct statement from the following.
(1) All amino acids have a common isoelectric point.
(2) All naturally occurring α-amino acids are optically active except glycine.
(3) At pH = 0 all amino acids are present as their anions.
(4) In strongly basic solutions, all amino acids are present as their cations.

Q.195 A certain compound gives negative test with ninhydrin and positive test with Benedict's solution. The comp. is –
(1) a protein
(2) a monosaccharide
(3) a lipid
(4) an amino acid

Q.196 Which of the following pairs give positive Tollen's test?

(1) Glucose, sucrose
(2) Glucose, fructose
(3) Hexanal, acetophenone
(4) Fructose, sucrose

Q.197 How many tripeptides can be prepared by linking the amino acids glycine, alanine and phenyl alanine?

(1) One (2) Three
(3) Six (4) Twelve

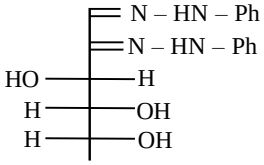
Q.198 Hydrolysis of sucrose with dilute aq. sulphuric acid yields

(1) 1 : 1 D-(+)-glucose; D-(–)-fructose
(2) 1 : 2 D-(+)-glucose; D-(–)-fructose
(3) 1 : 1 D-(–)-glucose; D-(+)-fructose
(4) 1 : 2 D-(–)-glucose; D-(+)-fructose

Q.199 Glycogen is –

(1) a polymer of β-D-glucose units
(2) a structural polysaccharide
(3) structurally very much similar to amylopectin,
(4) structurally similar to amylopectin but extensively branched.

Q.200 The given osazone could be obtained from.



(1) Glucose and galactose
(2) Glucose and mannose
(3) Galactose and fructose
(4) Sucrose and Galactose

ANSWERS

Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.	Q. No.	Ans.
1	2	41	2	81	4	121	3	161	3
2	4	42	2	82	4	122	3	162	4
3	4	43	4	83	4	123	1	163	3
4	1	44	4	84	4	124	3	164	4
5	2	45	2	85	4	125	3	165	4
6	3	46	3	86	4	126	4	166	3
7	3	47	2	87	2	127	1	167	3
8	1	48	3	88	2	128	1	168	2
9	3	49	4	89	2	129	4	169	1
10	3	50	2	90	2	130	4	170	1
11	4	51	4	91	3	131	1	171	3
12	3	52	4	92	2	132	4	172	4
13	4	53	1	93	1	133	2	173	2
14	4	54	4	94	2	134	1	174	2
15	4	55	1	95	4	135	3	175	1
16	3	56	2	96	2	136	1	176	2
17	1	57	1	97	3	137	1	177	3
18	2	58	2	98	4	138	4	178	1
19	1	59	1	99	2	139	1	179	3
20	2	60	2	100	1	140	2	180	4
21	2	61	3	101	4	141	2	181	2
22	1	62	3	102	4	142	4	182	1
23	4	63	1	103	3	143	1	183	2
24	3	64	2	104	1	144	3	184	2
25	2	65	2	105	4	145	1	185	3
26	3	66	3	106	4	146	4	186	4
27	3	67	3	107	1	147	4	187	3
28	4	68	2	108	2	148	1	188	4
29	4	69	4	109	1	149	2	189	2
30	3	70	2	110	3	150	3	190	4
31	4	71	3	111	2	151	2	191	3
32	3	72	3	112	2	152	3	192	4
33	2	73	2	113	1	153	4	193	2
34	3	74	1	114	1	154	1	194	2
35	2	75	2	115	2	155	3	195	2
36	1	76	1	116	4	156	1	196	2
37	4	77	4	117	1	157	2	197	3
38	4	78	2	118	1	158	1	198	1
39	1	79	4	119	4	159	3	199	4
40	4	80	2	120	1	160	3	200	2