

CET – CHEMISTRY – 2010

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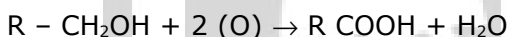
1. Carbon can reduce ferric oxide to iron at a temperature above 983 K because
- a) carbon has a higher affinity towards oxidation than iron
 - b) carbon monoxide formed is thermodynamically less stable than ferric oxide.
 - c) iron has a higher affinity towards oxygen than carbon
 - d) free energy change for the formation of carbon dioxide is less negative than that for ferric oxide

Ans (a)

Carbon can reduce ferric oxide to iron at a temperature above 983K because carbon has a higher affinity towards oxidation than iron

2. An oxygen containing organic compound upon oxidation forms a carboxylic acid as the only organic product with its molecular mass higher by 14 units. The organic compound is
- a) a primary alcohol
 - b) an aldehyde
 - c) a ketone
 - d) a secondary alcohol

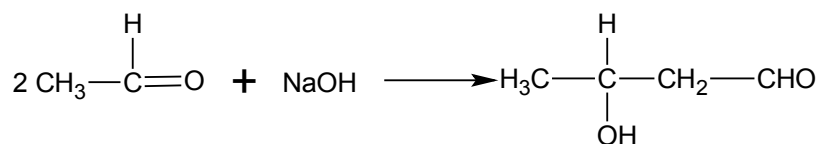
Ans (a)



When primary alcohol is oxidized, two hydrogens are removed and one oxygen is added to the molecule. Hence, molecular mass increases by 14 units.

3. The compound obtained when acetaldehyde reacts with dilute aqueous sodium hydroxide exhibits
- a) optical isomerism
 - b) geometric isomerism
 - c) both optical and geometric isomerism
 - d) neither optical nor geometric isomerism

Ans (a)



The aldol formed has one chiral carbon, hence, it shows optical isomerism

4. The activation energy for a reaction at the temperature TK was found to be $2.303 RT \text{ J mol}^{-1}$. The ratio of the rate constant to Arrhenius factor is

- a) 10^{-2} b) 10^{-1} c) 2×10^{-2} d) 2×10^{-3}

Ans (b)

$$k = A e^{-\frac{E_a}{RT}} \Rightarrow \frac{k}{A} = e^{-\frac{E_a}{RT}} \Rightarrow \ln \frac{k}{A} = -\frac{E_a}{RT} \Rightarrow 2.303 \log \frac{k}{A} = -\frac{E_a}{RT}$$

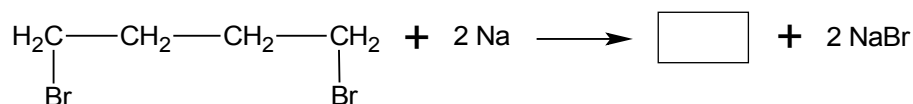
$$\log \frac{k}{A} = \frac{-E_a}{2.303RT} \Rightarrow \log \frac{k}{A} = -\frac{2.303RT}{2.303RT} = -1$$

$$\therefore \frac{k}{A} = 10^{-1}$$

5. A dibromo derivative of an alkane reacts with sodium metal to form an alicyclic hydrocarbon. The derivative is

- a) 2, 2-dibromobutane b) 1, 1-dibromopropane
c) 1, 4-dibromobutane d) 1, 2-dibromoethane

Ans (c)



6. Generally, the first ionization energy increases along a period. But there are some exceptions. One which is NOT an exception is

- a) Na and Mg b) N and O c) Be and B d) Mg and Al

Ans (a)

As we go from Na to Mg I.E increases. It is not an exception

7. 50 cm^3 of 0.2 N HCl is titrated against 0.1 N NaOH solution. The titration is discontinued after adding 50 cm^3 of NaOH. The remaining titration is completed by adding 0.5 N KOH. The volume of KOH required for completing the titration is

- a) 10 cm^3 b) 12 cm^3 c) 10.5 cm^3 d) 25 cm^3

Ans (a)

When 50 cm^3 of 0.2 N HCl is titrated with 50 cm^3 of 0.1 N NaOH, 50 cm^3 of 0.1 N HCl still remains

$$\therefore 50 \times 0.1 = 0.5 \times V_2$$

$$\therefore V_2 = \frac{50 \times 0.1}{0.5} = 10 \text{ cm}^3$$

8. In which one of the following, does the given amount of chlorine exert the least pressure in a vessel of capacity 1 dm³ at 273 K?
- a) 0.071 g b) 0.0355 g c) 0.02 mole d) 6.023 × 10²¹ molecules

Ans (b)

Lower the number of moles, down is the pressure

$$\therefore \text{No. of moles in 0.071 g} = \frac{0.071}{71} = 0.001$$

$$\text{No. of moles in 0.0355 g} = \frac{0.0355}{71} = 0.0005$$

No. of mole = 0.02

$$\text{No. of moles with } 6.023 \times 10^{21} \text{ molecules} = \frac{6.023 \times 10^{21}}{6.023 \times 10^{23}} = 0.01$$

9. Based on the first law of thermodynamics, which one of the following is correct?
- a) For an adiabatic process : $\Delta U = -w$ b) For an isochoric process: $\Delta U = -q$
c) For a cyclic process : $q = -w$ d) For an isothermal process: $q = +w$

Ans (c)

For a cyclic process $\Delta U = 0$

$$\therefore \Delta U = q + w \text{ becomes } 0 = q + w$$

or $q = -w$

10. For alkali metals, which one of the following trends is INCORRECT?

- a) Ionization energy: $\text{Li} > \text{Na} > \text{K} > \text{Rb}$
b) Hydration energy: $\text{Li} > \text{Na} > \text{K} > \text{Rb}$
c) Atomic size : $\text{Li} < \text{Na} < \text{K} < \text{Rb}$
d) Density: $\text{Li} < \text{Na} < \text{K} < \text{Rb}$

Ans (d)

Density of K is less than Na due to exceptional big size of K

11. In the electrolytic refining of Zinc,
- a) the impure metal is at the cathode
b) graphite is at the anode
c) acidified zinc sulphate is the electrolyte
d) the metal ion gets reduced at the anode

Ans (c)

In the electrolytic refining of zinc, acidified ZnSO₄ is used as electrolyte

12. The wave number of the spectral line in the emission spectrum of hydrogen will be equal to 8/9 times the Rydberg's constant if the electron jumps from

- a) $n = 10$ to $n = 1$ b) $n = 3$ to $n = 1$ c) $n = 2$ to $n = 1$ d) $n = 9$ to $n = 1$

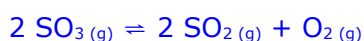
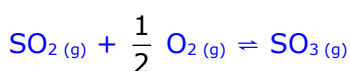
Ans (b)

$$\frac{1}{\lambda} = R \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$$

$$\frac{1}{\lambda} = \frac{8}{9} R \text{ provided } n_1 = 1, n_2 = 3$$

$$\frac{1}{\lambda} = R \left(\frac{1}{1^2} - \frac{1}{3^2} \right) = R \left(\frac{8}{9} \right)$$

13. Consider the following gaseous equilibria with equilibrium constants K_1 and K_2 respectively.



The equilibrium constants are related as

- a) $2K_1 = K_2^2$ b) $K_1^2 = \frac{1}{K_2}$ c) $K_2^2 = \frac{1}{K_1}$ d) $K_2 = \frac{2}{K_1^2}$

Ans (b)

$$K_1 = \frac{[\text{SO}_3]}{[\text{SO}_2][\text{O}_2]^{1/2}} \text{ ---- (1)}$$

$$K_2 = \frac{[\text{SO}_2]^2 [\text{O}_2]}{[\text{SO}_3]^2} \text{ ----- (2)}$$

Comparing (1) and (2): $K_1^2 = \frac{1}{K_2}$

14. Enthalpy of vapourization of benzene is $+35.3 \text{ kJ mol}^{-1}$ at its boiling point of 80°C . The entropy change in the transition of the vapour to liquid at its boiling point [in $\text{JK}^{-1} \text{ mol}^{-1}$] is

- a) -100 b) -441 c) +100 d) +441

Ans (a)

Enthalpy of vapourisation of benzene is $+35.3 \text{ kJ/mol}$

\therefore Enthalpy of conversion of vapour to liquid is -35.3 kJ/mole

$$\Delta S = \frac{\Delta H}{T} = \frac{-35300\text{J}}{353} = -100 \text{ J}$$

15. Which one of the following conversions involve change in both hybridization and shape?

- a) $\text{NH}_3 \rightarrow \text{NH}_4^+$ b) $\text{CH}_4 \rightarrow \text{C}_2\text{H}_6$ c) $\text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+$ d) $\text{BF}_3 \rightarrow \text{BF}_4^-$

Ans (d)

When BF_3 changes to BF_4^- hybridization changes from sp^2 to sp^3 and shape also changes.

16. Time required for 100 percent completion of a zero order reaction is

- a) $\frac{a}{2k}$ b) $\frac{2k}{a}$ c) ak d) $\frac{a}{k}$

Ans (d)

$$\frac{x}{t} = k$$

$$t = \frac{x}{k}$$

when it is 100% $x = a \therefore t = \frac{a}{k}$

17. 0.023 g of sodium metal is reacted with 100 cm³ of water. The pH of the resulting solution is

- a) 11 b) 10 c) 12 d) 9

Ans (c)

0.023 g in 100 cm³

$$[\text{OH}^-] = \frac{\text{mass} / \text{dm}^3}{\text{eq. mass}} = \frac{0.023 \times 10}{23} = 0.01$$

$\therefore \text{pOH} = -\log(1 \times 10^{-2}) = +2 \therefore \text{pH} = 14 - 2 = 12$

18. Which one of the following is wrongly matched?

- a) $[\text{Ni}(\text{CO})_4]$ – neutral ligand b) $[\text{Cu}(\text{NH}_3)_4]^{+2}$ – square planar
c) $[\text{Co}(\text{en})_3]^{+3}$ – follows EAN rule d) $[\text{Fe}(\text{CN})_6]^{-3}$ – sp^3d^2

Ans (d)

$[\text{Fe}(\text{CN})_6]^{3-}$ because it is d^2sp^3

19. Which one of the following conformations of cyclohexane is the least stable?

- a) Boat b) Half-chair c) Chair d) Twisted-boat

Ans (b)

Stability order: Chair form > Twisted boat > Boat form > Half chair form

20. Which one of the following is a molecular crystal?

- a) Quartz b) Rock salt c) Diamond d) Dry ice

Ans (d)

Quartz and diamond are covalent Rock salt is ionic

21. One gram of silver gets distributed between 10 cm³ of molten zinc and 100 cm³ of molten lead at 800°C. The percentage of silver in the zinc layer is approximately

- a) 91 b) 89 c) 94 d) 97

Ans (d)

$$A \rightarrow 10$$

$$? \rightarrow 1000$$

$$\frac{1000 \times x}{10} = 100x$$

$$(1 - x) \rightarrow 100$$

$$? \rightarrow 1000$$

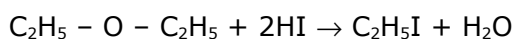
$$= \frac{1000x(1-x)}{100} = 10(1-x) \Rightarrow \frac{100x}{10(1-x)} = 300$$

$$\frac{10x}{1-x} = 300 \Rightarrow 10x = 300 - 300x \Rightarrow 310x = 300 \Rightarrow x = \frac{300}{310} = 0.9677 = 97\%$$

22. One mole of an organic compound 'A' with the formula C_3H_8O reacts completely with two moles of HI to form X and Y. When 'Y' is boiled with aqueous alkali forms Z. Z answers the iodoform test. The compound 'A' is

- a) Propan-1-ol b) Propan-2-ol c) methoxyethane d) ethoxyethane

Ans (d)



23. The IUPAC name of $K_2 [Ni (CN)_4]$ is

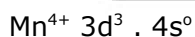
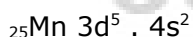
- a) Potassium tetracyanonickelate (II) b) Potassium tetracyanonickelate (II)
c) Potassium tetracyanonickel (III) d) Potassium tetracyanonickel (II)

Ans (b)

24. The spin only magnetic moment of Mn^{+4} ion is nearly

- a) 6 BM b) 3 BM c) 5 BM d) 4 BM

Ans (d)



$$= \sqrt{3(3+2)} = \sqrt{15}$$

25. In Kjeldahl's method, ammonia from 5 g of food neutralizes 30 cm³ of 0.1 N acid. The percentage of nitrogen in the food is

- a) 8.4 b) 0.84 c) 1.68 d) 16.8

Ans (b)

$$\frac{1.4 \times 30 \times 0.1}{5} = 0.84$$

26. The set of quantum numbers for the outermost electron for copper in its ground state is

- a) 3, 2, 2, +1/2 b) 4, 1, 1, +1/2 c) 4, 2, 2, +1/2 d) 4, 0, 0, +1/2

Ans (d)

Ground state

$$n = 4, \ell = 0 = s, m = 0, S = +1/2$$

27. Peroxide ion

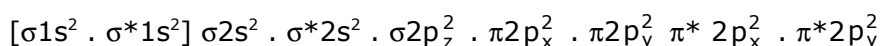
- (1) is diamagnetic
(2) has five completely filled antibonding molecular orbitals
(3) is isoelectronic with neon
(4) has bond order one

Which one of these is correct?

- a) (1), (2) and (4) b) (4) and (3) c) (1) and (4) d) (1), (2) and (3)

Ans (c)

O_2^{2-}



$$B.O = \frac{8 - 6}{2} = \frac{2}{2} = 1$$

28. Which one of these is NOT true for benzene?

- a) There are three carbon-carbon single bonds and three carbon-carbon double bonds
b) It forms only one type of monosubstituted product
c) The bond angle between the carbon-carbon bonds is 120°
d) The heat of hydrogenation of benzene is less than the theoretical value.

Ans (d)

29. A mixture of $CaCl_2$ and $NaCl$ weighing 4.44 g is treated with sodium carbonate solution to precipitate all the Ca^{+2} ions as calcium carbonate. The calcium carbonate so obtained is heated strongly to get 0.56 g of CaO . The percentage of $NaCl$ in the mixture (atomic mass of $Ca = 40$) is

- a) 30.6 b) 75 c) 69.4 d) 25

Ans (b)

Weight of $CaO = 0.56$ g

0.56 g of CaO contains 0.40 g of calcium.

Mol. weight of $CaCl_2 = 40 + 71 = 111$

40 g of calcium present in 111 g of $CaCl_2$

$$\therefore 0.4 \text{ g of calcium present in } \frac{0.40 \times 111}{40} = 1.11 \text{ g of CaCl}_2$$

$$\text{Amount of NaCl present in mixture} = 4.44 - 1.11 = 3.33 \text{ g}$$

$$\therefore \text{Percentage of NaCl} = \frac{3.33}{4.44} \times 100 = 75$$

30. For one mole of an ideal gas, increasing the temperature from 10°C to 20°C

- a) increases the rms velocity by $\sqrt{2}$ times.
- b) increases the average kinetic energy by two times
- c) increases both the average kinetic energy and rms velocity, but not significantly.
- d) increases the rms velocity by two times.

Ans (c)

$$\frac{3}{2}RT_1 = E_1, \quad \frac{3}{2}RT_2 = E_2$$

$$\frac{E_1}{E_2} = \frac{3}{2}RT_1 \times \frac{2}{3RT_2} \Rightarrow \frac{E_1}{E_2} = \frac{T_1}{T_2} = \frac{283}{293}$$

$$E_1 = 0.9658$$

$$C_1 = \sqrt{\frac{3RT_1}{M}} \quad C_2 = \sqrt{\frac{3RT_2}{M}}$$

$$\frac{C_1}{C_2} = \sqrt{\frac{T_1}{T_2}} = \sqrt{\frac{283}{293}}$$

31. A buffer solution contains 0.1 mole of sodium acetate dissolved in 1000 cm³ of 0.1 M acetic acid. To the above buffer solution, 0.1 mole of sodium acetate is further added and dissolved. The pH of the resulting buffer is equal to

- a) pK_a
- b) pK_a - Log 2
- c) pK_a + Log 2
- d) pK_a + 2

Ans (c)

Buffer solution containing 0.1 mole of sodium acetate dissolved in 1000 cm³ of 0.1 mole of acetic acid.

Henderson's equation is

$$\text{pH} = \text{pK}_a + \log \frac{0.1}{0.1}$$

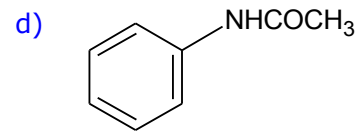
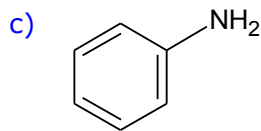
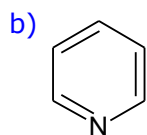
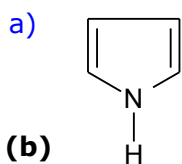
$$\text{pH} = \text{pK}_a$$

to the above Buffer 0.1 mole of sodium acetate is added, conc. sodium acetate (salt) doubles

$$\therefore \text{pH} = \text{pK}_a + \log \frac{0.2}{0.1}$$

$$\text{pH} = \text{pK}_a + \log 2$$

32. Which one of the following has the most nucleophilic nitrogen?



Ans (b)

Lone pair of electrons present on nitrogen atom easily available, in other cases lone pair of electrons are involved in delocalization.

33. Chloroacetic acid is a stronger acid than acetic acid. This can be explained using

a) - I effect

b) - M effect

c) + I effect

d) + M effect

Ans (a)

-Cl group is an example for -I group. -I group stabilizes -COOH group due to their electron withdrawing nature. The release of proton becomes easier

34. The correct sequence of reactions to convert p-nitrophenol into quinol involves

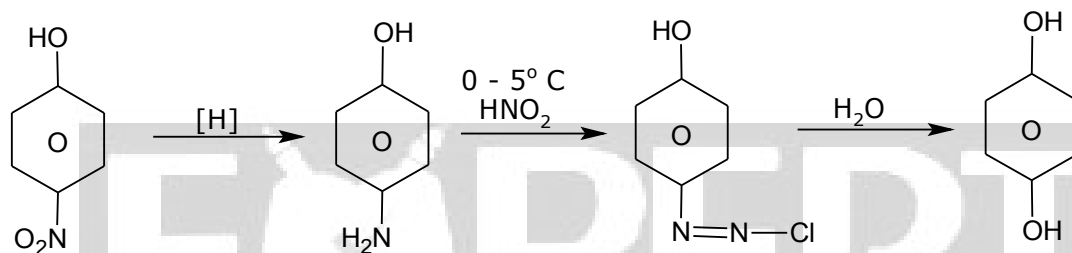
a) hydrolysis, diazotization and reduction

b) reduction, diazotization and hydrolysis

c) diazotization, reduction and hydrolysis

d) hydrolysis, reduction and diazotization

Ans (b)



35. $\text{CH}_3\text{CH}_2\text{Br} \xrightarrow[\Delta]{\text{Aq. KOH}} \text{A} \xrightarrow[\Delta]{\text{KMnO}_4/\text{H}^+} \text{B} \xrightarrow[\Delta]{\text{NH}_3} \text{C} \xrightarrow[\text{alkali}]{\text{Br}_2} \text{D}$; "D" is

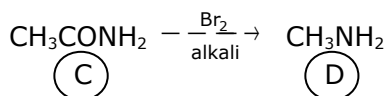
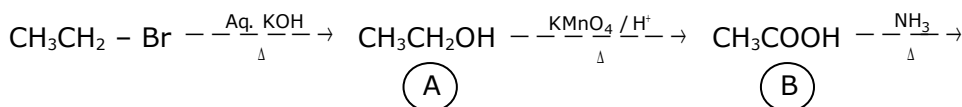
a) CH_3CONH_2

b) CH_3Br

c) CHBr_3

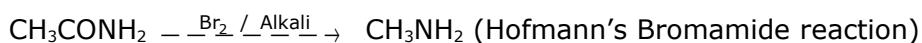
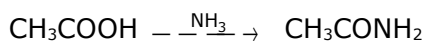
d) CH_3NH_2

Ans (d)



$\text{CH}_3 - \text{CH}_2 - \text{Br} \xrightarrow{\text{Aq. KOH}} \text{CH}_3\text{CH}_2\text{OH}$ (Nucleophilic substitution reaction)

$\text{CH}_3\text{CH}_2\text{OH} \xrightarrow{\text{KMnO}_4/\text{H}^+} \text{CH}_3\text{COOH}$ (Oxidation)



36. In chromite ore, the oxidation number of iron and chromium are respectively

- a) +3, +6 b) +3, +2 c) +2, +3 d) +2, +6

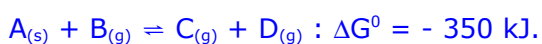
Ans (c)

Chromite ore - $\text{FeO} \cdot \text{Cr}_2\text{O}_3$

In ferrous oxide (FeO) oxidation state of Iron is +2

In chromic oxide (Cr_2O_3) oxidation state of chromium is +3

37. For the reversible reaction



Which one of the following statements is true?

- a) Equilibrium constant is greater is true?
b) The entropy change is negative.
c) The reaction is thermodynamically not feasible.
d) The reaction should be instantaneous.

Ans (a)

$$\Delta G^\circ = -2.303 RT \log K_p$$

when $K_p = 1$,

$$\Delta G^\circ = 0$$

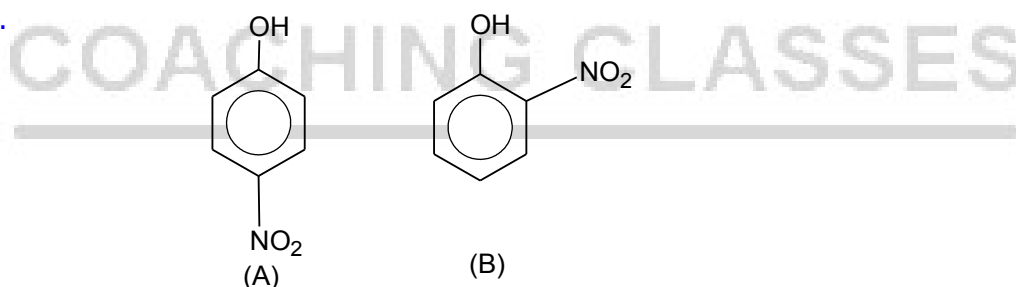
$K_p > 1$

$$\Delta G^\circ = -ve$$

$K_p < 1$

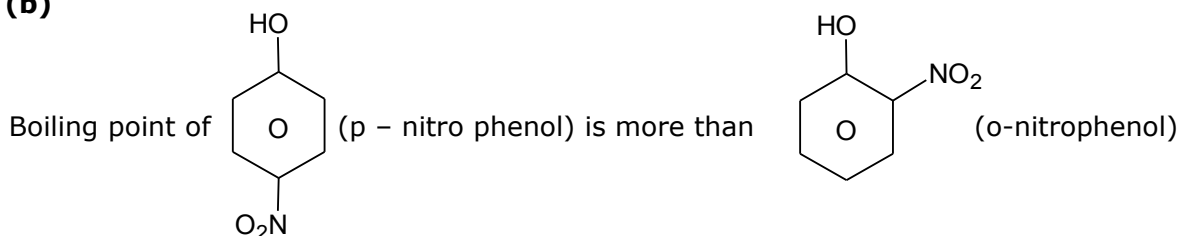
$$\Delta G^\circ = +ve$$

38. Out of the below two compounds, the vapour pressure of (B) at a particular temperature is



- a) lower than that of (A)
b) higher than that of (A)
c) same as that of (A)
d) higher or lower than (A), depending on the size of the vessel.

Ans (b)



Lower the vapour pressure, it must be heated to a higher temperature to make its vapour pressure equal to atmospheric pressure (boiling point more)

Vapour pressure of p-nitrophenol (A) is less than o-nitrophenol (B)

39. The amount of heat evolved when 500 cm³ of 0.1 M HCl is mixed with 200 cm³ of 0.2 M NaOH is

- a) 1.292 kJ b) 2.292 kJ c) 3.392 kJ d) 0.292 kJ

Ans (b)

$$\text{No. of gram equivalent of HCl} = \frac{500 \times 0.1}{1000} = 0.05$$

$$\text{No. of gram equivalent of NaOH} = \frac{200 \times 0.2}{1000} = 0.04$$

Sodium hydroxide is completely neutralized by HCl

1 gram equivalent of sodium hydroxide liberates 57.3 kJ

$$\therefore 0.04 \text{ gram equivalent of NaOH on neutralization will liberates} = \frac{0.04 \times 57.3}{1} = 2.292 \text{ kJ}$$

40. During the adsorption of krypton on activated charcoal at low temperature,

- a) $\Delta H < 0$ and $\Delta S < 0$ b) $\Delta H > 0$ and $\Delta S < 0$
c) $\Delta H < 0$ and $\Delta S > 0$ d) $\Delta H > 0$ and $\Delta S > 0$

Ans (a)

Adsorption is an example for exothermic process ΔH is -ve. It proceeds with decrease in entropy ($\Delta S = -ve$)

41. One dm³ solution containing 10⁻⁵ moles each of Cl⁻ ions and CrO₄⁻² ions is treated with 10⁻⁴ mole of silver nitrate. Which one of the following observations is made?

$$[K_{SP} \text{ Ag}_2 \text{ CrO}_4 = 4 \times 10^{-12}]$$

$$[K_{SP} \text{ AgCl} = 1 \times 10^{-10}]$$

- a) Silver chromate gets precipitated first.
b) Precipitation does not occur.
c) Both silver chromate and silver chloride start precipitating simultaneously.
d) Silver chloride gets precipitated first.

Ans (d)

Concentration of Ag in Ag_2CrO_4 is 10^{-8} and chromate ion is 10^{-5}

$$\text{Ionic product} = 10^{-8} \times 10^{-5} = 10^{-13}$$

Concentration of Ag in AgCl is 10^{-4} and chloride ion is 10^{-5}

$$\text{Ionic product} = 10^{-5} \times 10^{-4} = 10^{-9}$$

In AgCl ionic product is greater than solubility product

42. pH value of which one of the following is not equal to one?

a) 0.05 M H_2SO_4

b) 0.1 M HNO_3

c) 50 cm^3 of 0.4 M HCl + 50 cm^3 of 0.2 M NaOH

d) 0.1 M CH_3COOH

Ans (d)

CH_3COOH is a weak acid 10^{-1} M CH_3COOH will give much less $[\text{H}^+]$ concentration than 10^{-1} M. Hence pH will be more than 1

43. E_1 , E_2 and E_3 are the emf values of the three galvanic cells respectively.

1. $\text{Zn} | \text{Zn}_{1\text{M}}^{+2} || \text{Cu}_{0.1\text{M}}^{+2} | \text{Cu}$

2. $\text{Zn} | \text{Zn}_{1\text{M}}^{+2} || \text{Cu}_{1\text{M}}^{+2} | \text{Cu}$

3. $\text{Zn} | \text{Zn}_{0.1\text{M}}^{+2} || \text{Cu}_{1\text{M}}^{+2} | \text{Cu}$

a) $E_3 > E_2 > E_1$

b) $E_2 > E_3 > E_1$

c) $E_1 > E_3 > E_2$

d) $E_1 > E_2 > E_3$

Ans (a)

Increase or decrease in concentration of ions at an electrode increases or decrease EMF correspondingly

Concentration of ion at the cathode increases EMF of the cell increases.

(1) $\text{Zn} | \text{Zn}_{(1\text{M})}^{2+} || \text{Cu}_{0.1}^{+2} | \text{Cu}$

(2) $\text{Zn} | \text{Zn}_{(1\text{M})}^{2+} || \text{Cu}_{(1\text{M})}^{+2} | \text{Cu}$

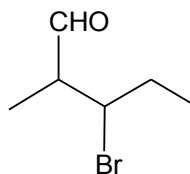
(3) $\text{Zn} | \text{Zn}_{0.1}^{2+} || \text{Cu}_{(1\text{M})}^{+2} | \text{Cu}$

In cell (i) concentration of the ion at cathode has decreased EMF decreases

In cell (ii) concentration of the ion at anode and cathode is same, therefore EMF remains same

In cell (iii) concentration of the cathode has increased which will increase the EmF of the cell.

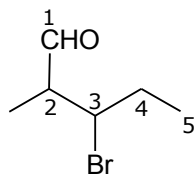
44. The IUPAC name of



is

- a) 3 - bromo - 2 - methylbutanal b) 2 - methyl - 3 - bromohexanal
c) 3 - bromo - 2 methylpentanal d) 2 - methyl - 3 - bromobutanal

Ans (c)



Root word = Pent -

Suffix (1°) = -ane

(2°) = -al

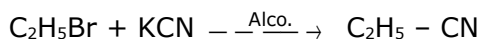
Prefix = 3-bromo-2-methyl

IUPAC Name: 3-bromo-2-methyl pentanal

45. Which one of the following forms propanenitrile as the major product?

- a) Propyl bromide + alcoholic KCN b) Ethyl bromide + alcoholic KCN
c) Ethyl bromide + alcoholic AgCN d) Propyl bromide + alcoholic AgCN

Ans (b)



46. The standard emf of a galvanic cell involving 3 moles of electrons in its redox reaction is 0.59 V. The equilibrium constant for the reaction of the cell is

- a) 10^{20} b) 10^{25} c) 10^{30} d) 10^{15}

Ans: (c)

$$\Delta G^\circ = -nFE^\circ = -2.303 RT \log K_p$$

$$n = 3, F = 1, E^\circ 0.59 \text{ V}$$

1 Faraday \equiv 1 mole of electrons

$$\log k_p = \frac{3 \times 0.59}{0.059} = 3^\circ$$

$$\therefore k_p = 10^{30}$$

47. Benzaldehyde and acetone can be best distinguished using

- a) sodium hydroxide solution b) Fehling's solution
c) Tollens' reagent d) 2, 4 - DNPH

Ans (c)

Tollen's reagent

48. Which one of the following statements is true?
- a) Drying of oil involves hydrolysis b) Saponification of oil yields a diol.
 c) Refining of oil involves hydrogenation d) Addition of antioxidant to oil minimizes rancidity

Ans (d)

Addition of antioxidant to oil minimises rancidity.

49. The following data is obtained during the first order thermal decomposition of $2A_{(g)} \rightarrow B_{(g)} + C_{(s)}$, at constant volume of temperature.

Sr. No.	Time	Total pressure in Pascal
1.	At the end of 10 minutes	300
2.	After completion	200

The rate constant in min^{-1} is

- a) 6.93 b) 0.0693 c) 69.3 d) 0.00693

Ans (b)

After completion pressure = 200 Pa. Therefore initial pressure = 400 Pa.

If x has reacted. $400 - 2x + x = 300$ $\therefore x = 100$

$a - x = 300 - 100 = 200$

At 10 min., $k = \frac{2.303}{10} \log \frac{400}{200} = 0.0693$

50. Phenol \xrightarrow{X} forms a tribromo derivative. "X" is

- a) bromine in water b) bromine in benzene
 c) bromine in carbon tetrachloride at 0°C . d) potassium bromide solution

Ans (a)

Bromine in water

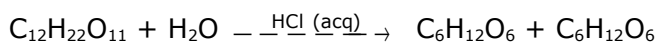
51. The letter 'D' in D-glucose signifies

- a) dextrorotatory b) configuration at all chiral carbons
 c) configuration at a particular chiral carbon d) that it is a monosaccharide

Ans (c)

Configuration at a particular chiral carbon

(highest chiral centre)

Ans (d)

sucrose – liquid

dil. HCl – liquid

58. The empirical formula of a nonelectrolyte is $C_3H_5O_2$. A solution containing 6 g of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution at the same temperature. The molecular formula of the compound is

- a) $C_3H_6O_3$ b) $C_2H_4O_2$ c) $C_4H_8O_4$ d) $C_5H_{10}O_5$

Ans (c)

Isotonic solutions have same molar conc.

$$\frac{6}{M} = 0.05 \qquad M = \frac{6}{0.05} = 120$$

Empirical formula (CH_2O)

Molecular formula = n x Empirical formula = 4 x CH_2O = $C_4H_8O_4$

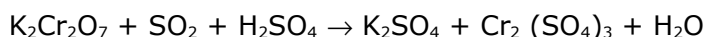
59. A white crystalline salt A reacts with dilute HCl to liberate a suffocating gas B and also forms a yellow precipitate. The gas B turns potassium dichromate acidified with dilute H_2SO_4 to a green coloured solution C. A, B and C are respectively

- a) $Na_2S_2O_3, SO_2, Cr_2(SO_4)_3$ b) $Na_2SO_3, SO_2, Cr_2(SO_4)_3$
 c) $Na_2SO_4, SO_2, Cr_2(SO_4)_3$ d) $Na_2S, SO_2, Cr_2(SO_4)_3$

Ans (a)

Suffocating yellow

gas



green

60. Molecules of a noble gas do not possess vibrational energy because a noble gas

- a) is chemically inert b) is monoatomic
 c) is diamagnetic d) has completely filled shells

Ans (b)

Monoatomic molecules cannot vibrate