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KCET – 2022 CHEMISTRY CODE B-3

PROVISIONAL ANSWER KEY - 2022

1. **A first order reaction is half completed in 45 minutes. How long does it need 99.9% of the reaction to be completed?**

   (A) 10 Hours   (B) 20 Hours   (C) 5 Hours   **(D) 7.5 Hours**

   Ans (D)

   $t_{99.9} = 10 t_{50}$

   $= 10 \times 45$ min

   $= \dfrac{10 \times 45}{60}$ hr

2. **The rate of the reaction: $CH_3COOC_2H_5 + NaOH \rightarrow CH_3COONa + C_2H_5OH$ is given by the equation, Rate = K $[CH_3COOC_2H_5]$ [NaOH]. If concertation is expressed in mol L^{-1}, the unit of K is**

   (A) L mol^{-1} s^{-1}   (B) s^{-1} (C) mol^{-2} L^2 s^{-1} (D) mol L^{-1} s^{-1}

   Ans (A)

   Rate = k$[CH_3COOC_2H_5]^1$ $[NaOH]^1$

   Order = 1 + 1 = 2

   $k_n = mol^{1-n} . L^{n-1} . s^{-1}$

   $k_2 = mol^{-1} . L . s^{-1}$

   $= L . mol^{-1} . s^{-1}$

3. **Colloidal solution commonly used in the treatment of skin disease is**

   (A) Colloidal Gold   (B) Colloidal Antimony

   (C) Colloidal Sulphur   (D) Colloidal Silver

   Ans (C)

   Colloidal sulphur used in treatment of skin disease.

4. **Specific conductance of 0.1 M HNO₃ is 6.3×10^{-2} ohm⁻¹ cm⁻¹. The molar conductance of the solution is**

   (A) 6.300 ohm⁻¹ cm² mol⁻¹

   (B) 63.0 ohm⁻¹ cm² mol⁻¹

   (C) 630 ohm⁻¹ cm² mol⁻¹

   (D) 315 ohm⁻¹ cm² mol⁻¹

   Ans (C)

   $$\Lambda_m = \frac{\kappa \times 1000}{M}$$

   $$= \frac{6.3 \times 10^{-2} \times 1000}{0.1} = 630 \text{ ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$$

5. **For spontaneity of a cell, which correct?**

   (A) $\Delta G = +ve$, $\Delta E = +ve$

   (B) $\Delta G = -ve$

   (C) $\Delta G = 0$, $\Delta E = 0$

   (D) $\Delta G = -ve$, $\Delta E = 0$

   Ans (B)

   $\Delta G = -nF (\Delta E)$

   For spontaneity of a cell $\Delta E = +ve > 0$

   $$\Delta G = -ve < 0$$

6. **For n^{th} order of reaction, Half-life period is directly proportional to**

   (A) a^{n-1}

   (B) a^{1-n}

   (C) $\dfrac{1}{a^{n-1}}$

   (D) $\dfrac{1}{a^{1-n}}$

   Ans (B) and (C)

   $$t_{1/2} \propto \frac{1}{a^{n-1}} \text{ or } t_{1/2} \propto a^{1-n}$$

7. **Half-life of a reaction is found to be inversely proportional to the fifth power of its initial concentration, the order of reaction is**

   (A) 5

   (B) 6

   (C) 3

   (D) 4

   Ans (B)

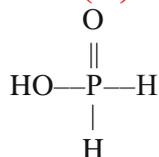 $$t_{1/2} \propto \frac{1}{a^{n-1}} \propto \frac{1}{a^5}$$

   $\therefore n - 1 = 5$

   $n = 6$

8. **The strong reducing property of hypophosphorous acid is due to**

   (A) two P–H bonds

   (B) presence of phosphorus in its highest oxidation state

(C) its concentration

(D) the positive valency of phosphorus

Ans (A)

$$\text{HO}-\overset{\overset{\textstyle O}{\|}}{\underset{\underset{\textstyle H}{|}}{P}}-H$$

Due to the presence of two P–H bonds.

9. **A transition metal exists in its highest oxidation state. It is expected to behave as**

(A) **an oxidizing agent**   (B) a reducing agent

(C) a chelating agent   (D) a central metal in a co-ordination compound

Ans (A)

For example $KMnO_4$, $K_2Cr_2O_7$ used as oxidising agents.

10. **What will be the value of x in Fe^{x+}, if the magnetic moment $\mu = \sqrt{24}$ BM?**

(A) 0   (B) +1   **(C) +2**   (D) +3

Ans (C)

Spin only magnetic moment $= \sqrt{n(n+2)}$ BM

Given magnetic moment $= \sqrt{24}$ Bm

$\sqrt{n(n+2)} = \sqrt{24}$

$\qquad n = 4$

$Fe^{2+} = [Ar]\, 3d^6\, 4s^0$

11. **Which can adsorb larger volume of hydrogen gas?**

(A) Finely divided platinum   (B) Colloidal $Fe(OH)_3$

(C) Finely divided nickel   **(D) Colloidal solution of palladium**

Ans (D)

Surface area of palladium is maximum in its colloidal solution.

12. **The property of halogens which is not correctly matched is**

(A) I > Br > Cl > F (density)

(B) F > Cl > Br > I (electron gain enthalpy)

(C) F > Cl > Br > F (ionization enthalpy)

(D) F > Cl > Br > I (electronegativity)

Ans (B)

$\Delta H_{eg} = Cl > F > Br > I$

F has lower electron gain enthalpy than chlorine due to small size 2p-orbital of fluorine.

13. Which noble gas has least tendency to form compounds?
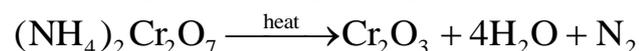
(A) Ar   (B) Kr   **(C) He**   (D) Ne

Ans (C)

Due to small size and high ionization enthalpy of He.

14. $(NH_4)_2Cr_2O_7$ on heating liberates agas. The same gas will be obtained by

(A) treating H_2O_2 with $NaNO_2$ (B) treating Mg_3N_2 with H_2O

(C) heating NH_4NO_3 **(D) heating NH_4NO_2**

Ans (D)

$$NH_4NO_2 \xrightarrow{\text{heat}} N_2 + 2H_2O$$
$$(NH_4)_2Cr_2O_7 \xrightarrow{\text{heat}} Cr_2O_3 + 4H_2O + N_2$$

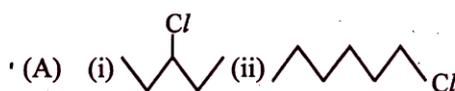**15. The complex hexaamine platinum (IV) chloride will give _____ number of ions on ionization.**

(A) 3   (B) 2   **(C) 5**   (D) 4

Ans (C)

$[Pt(NH_3)_6]Cl_4 \rightarrow [Pt(NH_3)_6]^{4+} + 4Cl^-$

Number of ions = one complex ion + four chloride ions

16. In the following pairs of halogen compounds, which compound undergoes faster S_N1 reaction?
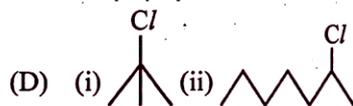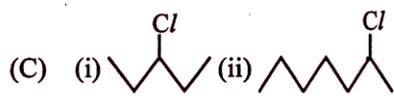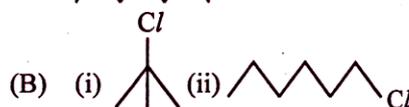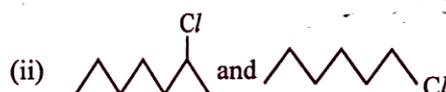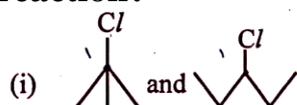
Ans (D)

Reactivity order of alkyl halides in S_N1 reaction is $3° > 2° > 1°$

17. The only Lanthanoid which is radioactive

(A) Promethium   (B) Praseodymium
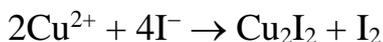
(C) Lanthanum   (D) Cerium

Ans (A)

Promethium is radioactive lanthanoid elements.

NEET 220 Medical Seats out of 240

18. **All Cu (II) halides are known, except the iodide, the reason for it is that**

    (A) Cu^{2+} has much more negative hydration enthalpy.

    (B) Cu^{2+} ion has smaller size.

    (C) Iodide is bulky ion.

    (D) Cu^{2+} oxidises iodide to iodine.

    Ans (D)

    $2Cu^{2+} + 4I^- \rightarrow Cu_2I_2 + I_2$

19. **The correct IUPAC name of *cis-platin* is**

    (A) diammine dichlorido platinum (O)

    (B) dichlorido diammine platinum (IV)

    (C) diammine dichlorido platinum (II)

    (D) diammine dichlorido platinum (IV)

    Ans (C)

    cis-platin is $[Pt(NH_3)_2Cl_2]$

    IUPAC name: diamine dichloride platinum (II)

20. **Crystal Field Splitting Energy (CFSE) for $[CoCl_6]^{4-}$ is 1800 cm^{-1}. The Crystal Field Splitting Energy (CFSE) for $[CoCl_6]^{4-}$ will be**

    (A) 8000 cm^{-1}   (B) 10,000 cm^{-1} (C) 18000 cm^{-1} (D) 16000 cm^{-1}

    Ans (A)

    $$\Delta t = \frac{4}{9}\Delta_o = \frac{4}{9}(18000) = 8,000 \text{ cm}^{-1}$$

21. **The major product obtained when ethanol is heated with excess of concentrated H_2SO_4 at 443 K is**

    (A) ethane   (B) methane   **(C) ethene**   (D) ethyne

    Ans (C)

    $C_2H_5OH \xrightarrow[\text{443 K}]{\text{conc.}H_2SO_4} H_2C = CH_2$
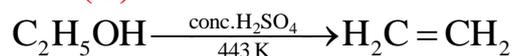
22. **Among the following, the products formed by the reaction of anisole with HI are**

    (A) Benzene + Methanol   (B) Phenol + Methane

    (C) Phenol + Iodomethane   (D) Sodium phenate + Methanol

    Ans (C)

23. Which one of the following Chlorohydrocarbon readily undergoes solvolysis?

(A) CH_2Cl

(B) CH_2CH_2Cl

(C) $CH_2 = CHCl$

(D) Cl
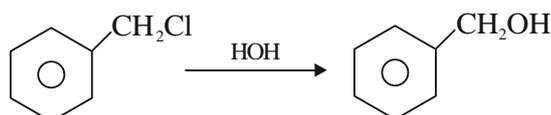
Ans (A)

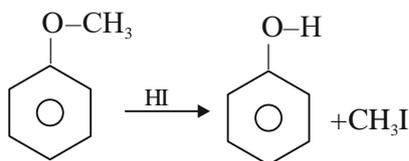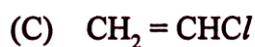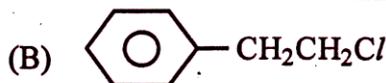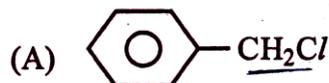Due to stable benzyl carbocation

24. Identify the products A and B in the reactions

$R-X + AgCN \rightarrow A + AgX$

$R-X + KCN \rightarrow B + KX$

(A) A = RNC; B = RCN   (B) A = RNC; B = RNC

(C) A = R−CN; B = RCN   (D) A = RCN; B = RNC

Ans (A)

$R - X + AgCN \rightarrow R-NC + KX$ due to covalent linkage between Ag and CN

$R-X + KCN \rightarrow R-CN + KX$ due to ionic nature of K^+ and CN^-.

25. An organic compound with molecular formula C_7H_8O dissolves in NaOH and gives a characteristic colour with $FeCl_3$. On treatment with bromine, it gives a tribromo derivative $C_7H_5OBr_3$. The compound is

(A) *m*-Cresol   (B) *p*-Cresol

(C) Benzyl alcohol   (D) *o*-Cresol

Ans (A)
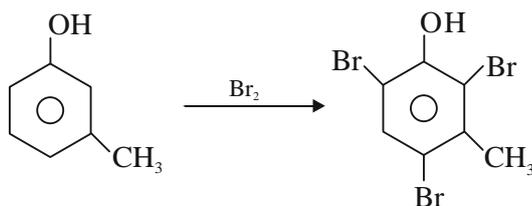
Neutral FeCl$_3$ test is a characteristic test for phenolic group.

26. In Kolbes reaction the reacting substances are

(A) Sodium phenate and CCl_4 (B) Phenol and $CHCl_3$

(C) Sodium phenate and CO_2   (D) Phenol and CCl_4

Ans (C)

27. In Carbylamine test for primary amines the resulting foul smelling product is

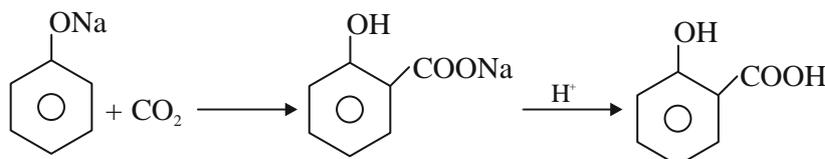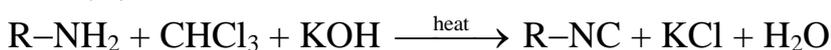**(A) CH_3NC**   (B) $COCl_2$ (C) CH_3NCl_2 (D) CH_3CN

Ans (A)

$$R-NH_2 + CHCl_3 + KOH \xrightarrow{heat} R-NC + KCl + H_2O$$

28. Ethanoic acid undergoes Hell-Volhard Zelinsky reaction but Methanoic acid does not, because of

(A) absence of α−H atom in ethanoic acid

(B) higher acidic strength of ethanoic acid than methanoic acid

(C) presence of α−H atom in methanoic acid

(D) presence of α−H atom in ethanoic acid

Ans (D)

Condition to exhibit HVZ reaction is presence of α-hydrogen in a given carboxylic acid.

29. The general name of the compound formed the reaction between aldehyde and alcohol is

(A) Glycol   (B) Acetate   (C) Ester   **(D) Acetal**

Ans (D)

Nucleophilic condition of aldehydes and ketones forms corresponding hemiacetals and acetals.

30. Reaction by which benzaldehyde cannot be prepared is

(A) Toluene $\xrightarrow[\text{(ii) } H_3O^+]{\text{(i) } CrO_2Cl_2 \text{ in } CS_2}$

(B) Benzoyl chloride + H_2 $\xrightarrow[\text{heat}]{Pd-BaSO_4}$

(C) Benzene + CO + HCl $\xrightarrow{\text{anhydrous } AlCl_3}$

(D) Benzoic acid $\xrightarrow{\text{Zn-Hg and conc.HCl}}$

Ans (D)

Option (A), (B) and (C) are the methods of preparation of benzaldehyde.

31. **The test to differentiate between pentan-2-one and pentan-3-one is**

(A) Fehling's test **(B) Iodoform test**

(C) Baeyer's test (D) Benedict's tests

Ans (B)

Iodoform test is useful to differentiate pentan-2-one and pentan-3-one because pentan-2-one has methyl keto group but not pentan-3-one.

32. **A secondary amine is**

(A) a compound with an NH_2 group on the carbon atom in number 2 position

(B) a compound in which 2 of the hydrogen of NH_3 have been replaced by organic groups

(C) an organic compound with two NH_2 group

(D) a compound with two carbon atom and an NH_2 group

Ans (B)

Amines are classified based on attachment of number of alkyl or aryl groups attached to the N.

$$R-NH_2 \qquad R-NH \qquad R_3N$$
$$\underset{R}{\big|}$$
$$(1°) \qquad (2°) \qquad (3°)$$
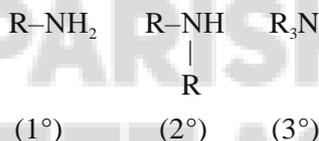
33. **Which of the following is correctly matched?**

(A) Bakelite – Novolac (B) Polyster – tetrafluoroethene

(C) Nylon – acrylonitrile (D) Teflon – copralactum

Ans (A)

Novolac on further polymerization produces bakelite.

34. **Which institute has approved the emergency use of 2-deoxy-D-Glucose as additive therapy for COVID-19 patients?**

(A) Ministry of Health and Family Welfare

(B) Drug Controller General of India

(C) Indian Council of Medical Research

(D) World Health Organisation

Ans (B)

Drug controller general of India has approved the emergency use of 2-deoxy-D-Glucose.

35. **A Nucleic acid, whether DNA or RNA gives on complete hydrolysis, two purine bases, two pyrimidine bases, a pentose sugar and phosphoric. Nucleotides which are intermediate products in the hydrolysis contain**

    (A) purine or pyrimidine base and ortho-phosphoric acid

    (B) Purine or pyrimidine base, a pentose sugar and ortho-phosphoric acid

    © purine or pyrimidine base and pentose sugar.

    (D) a purine base, pentose sugar and ortho-phosphoric acid

    Ans (B)

    Nucleic acid on hydrolysis produces nitrogeneous base + pentose sugar + ortho phosphoric acid.

36. **Which is most VISCOUS?**

    (A) Ethylene glycol   **(B) Glycerol**

    (C) Methanol   (D) Ethanol

    Ans (B)

    Viscosity $\propto$ force of attraction (H-bonding)

37. **The volume of 2.8 g of CO at 27 °C and 0.821 atm pressure is**

    (R = 0.08210 L atm K^{-1} mol^{-1})

    (A) 3 litres   (B) 30 litres   (C) 0.3 litres   (D) 1.5 litres

    Ans (A)

    $$V = \frac{nRT}{P}$$

    $$n_{CO} = \frac{2.8}{28} = 0.1$$

    $$V = \frac{0.1 \times 0.0821 \times 300}{0.821} = 3 \text{ litres}$$

38. **The work done when 2 moles of an ideal gas expands reversibly and isothermally from a volume of 1 L to 10 L at 300 K is (R = 0.0083 kJ K mol^{-1})**

    (A) 0.115 kJ   (B) 58.5 kJ   **(C) 11.5 kJ**   (D) 5.8 kJ

    Ans (C)

    $$W = 2.303 nRT \log_{10}\left[\frac{V_2}{V_1}\right]$$

    $$= 2.303 \times 2 \times 0.0083 \times 300 \times \log_{10}\left(\frac{10}{1}\right) = 11.5 \text{ kJ}$$

39. **An aqueous solution of alcohol contains 18 g of water and 414 g of alcohol. The mole fraction water is**

(A) 0.7 (B) 0.9 **(C) 0.1** (D) 0.4

Ans (C)

$$\chi_{H_2O} = \frac{n_{H_2O}}{n_{H_2O} + n_{C_2H_5OH}} \qquad n_{H_2O} = \frac{18}{18} = 1$$

$$= \frac{1}{1+9} = 0.1 \qquad n_{C_2H_5OH} = \frac{414}{46} = 9$$

40. **If wavelength of photon is 2.2×10^{-11} m and $h = 6.6 \times 10^{-34}$ s, then momentum of photon**

(A) 1.452×10^{-44} kg ms^{-1} (B) $6.89 \times 10^{+43}$ kg ms^{-1}

(C) 3×10^{-23} kg ms^{-1} (D) 3.33×10^{-22} kg ms^{-1}

Ans (C)

$$\lambda = \frac{h}{p} \Rightarrow p = \frac{h}{\lambda}$$

$$p = \frac{6.6 \times 10^{-34}}{2.2 \times 10^{-11}} = 3 \times 10^{-23}$$

41. **Elements X, Y and Z have atomic numbers 19, 37 and 35 respectively. Which of the following statements is true about them?**

(A) Z would have the highest ionization potential.

(B) Y would have the highest ionization potential.

(C) Their ionization potential, would increase with increasing atomic number.

(D) Y would have an ionization potential between those of X and Z.

Ans (D)

Down to the group of ionization enthalpy decreases.

42. **In oxygen and carbon molecule the bonding is**

(A) $O_2 : 1\sigma, 1\pi; C_2 : 0\sigma, 2\pi$ (B) $O_2 : 0\sigma, 2\pi ; C_2 : 2\sigma, 0\pi$

(C) $O_2 : 1\sigma, 1\pi; C_2 : 1\alpha, 1\pi$ (D) $O_2 : 2\sigma, 0\pi; C_2 : 0\sigma, 2\pi$

Ans (A)

$$O \frac{\pi}{\sigma} O \qquad \pi^{*1}_{2px} - \pi^{*1}_{2p_y}$$
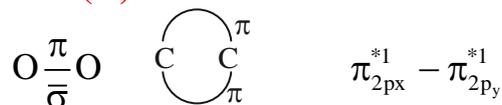
43. **Amphoteric oxide among the following:**

(A) Ag_2O (B) SnO_2 **(C) BeO** (D) CO_2

Ans (C)

BeO-Amphoteric oxide.

44. Which property of CO_2 makes it biologically and geo-chemically important?

   (A) Its low solubility in water   (B) Its high compressibility

   (C) Its acidic nature   (D) Its colourless and odourless nature

   Ans (A)

   Its low solubility in water

   Due to low solubility of CO_2 in water, it is important in biological and geochemical process.

45. The IUPAC name for $CH_3 - \overset{\overset{O}{\|}}{C} - CH_2 - CH_2 - \overset{\overset{O}{\|}}{C} - O - H$ **is**

   (A) 1-carboxybutan-3-one   **(B) 4-oxopentanoic acid**

   (C) 1-hydroxy pentane-l, 4-dione   (D) 1, 4-dioxopentanol

   Ans (B)

   4-oxopentanoic acid.

46. 1 mole of HI is heated in a closed container of capacity of 2 L. At equilibrium half a mole of HI is dissociated. The equilibrium constant of the reaction is

   (A) 0.25   (B) 0.35   **(C) 1**   (D) 0.5

   Ans (C)

$$2HI \rightleftharpoons H_2 + I_2$$
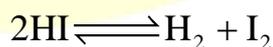
   Initial   1   0   0

   At equ.   ½   ¼   ¼

$$k = \frac{[H_2][I_2]}{[HI]^2}$$

$$k = \frac{\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)}{\left(\frac{1}{2}\right)^2} = \frac{1}{4} = 0.25$$

47. Which among the following has highest pH?

   (A) 1 M H_2SO_4 (B) 0.1 M NaOH

   (C) 1 M HCl   **(D) 1 M NaOH**

   Ans (D)

   1 M NaOH; $[OH^-]$ 1, pOH = $-\log 1 = 0$

   ∴ pH = 14

48. **In which of the following compounds, an element exhibits two different oxidation states?**
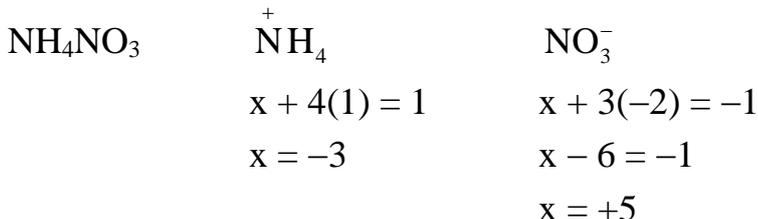
    (A) N_2H_4 (B) N_3H (C) NH_2CONH_2 **(D) NH_4NO_3**
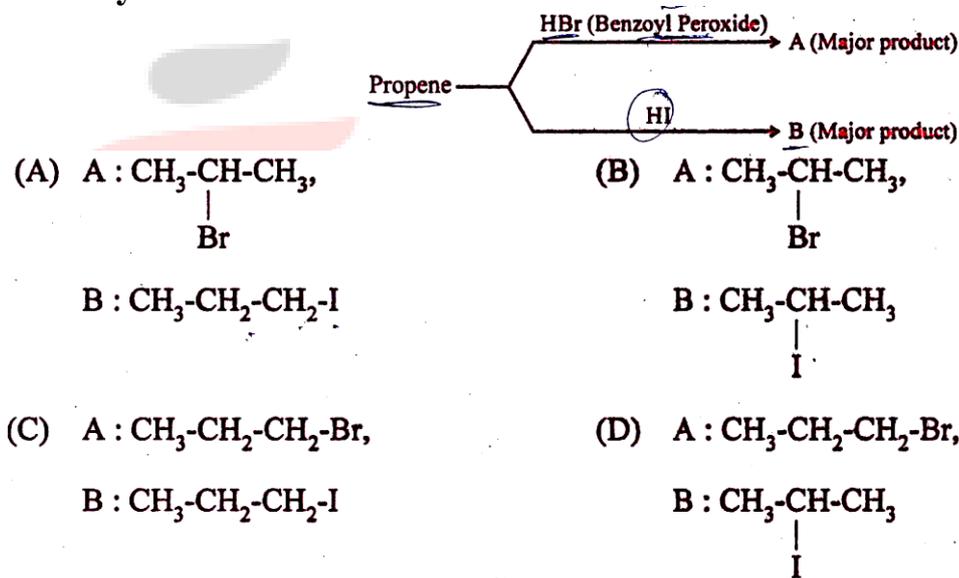
    Ans (D)

    NH_4NO_3 $\overset{+}{N}H_4$ NO_3^-

                        $x + 4(1) = 1$ $x + 3(-2) = -1$

                        $x = -3$ $x - 6 = -1$

                                             $x = +5$

49. **Which of the following hydrides is electron deficient?**

    (A) CH_4 **(B) B_2H_6**   (C) NaH (D) CaH_2

    Ans (B)

    B_2H_6 [13th group hydrides are electron deficient and also Lewi's acids]

50. **Identify A and B in the reaction**

    (A) A : CH₃-CH-CH₃,   (B) A : CH₃-CH-CH₃,
             | |
             Br   Br

         B : CH₃-CH₂-CH₂-I   B : CH₃-CH-CH₃
                                              |
                                              I

    (C) A : CH₃-CH₂-CH₂-Br,   (D) A : CH₃-CH₂-CH₂-Br,

         B : CH₃-CH₂-CH₂-I   B : CH₃-CH-CH₃
                                              |
                                              I

    Ans (D)
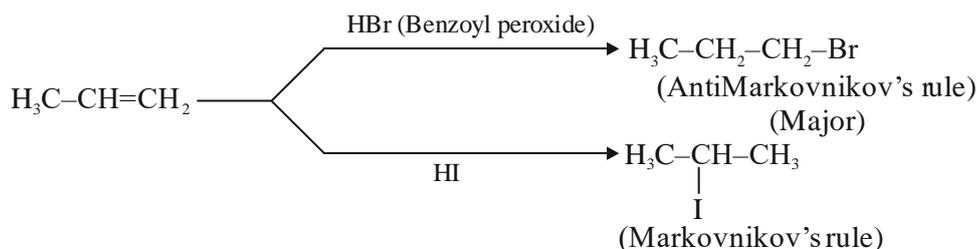
51. **Vacant space in body centered cubic lattice unit cell is about**

    (A) 23%   (B) 46%   **(C) 32%**   (D) 10%

    Ans (C)

BCC-void space – 32%

52. **How many number of atoms are there in a cube based unit cell having one atom on each corner and 2 atom on each body diagonal of cube?**

(A) 4   **(B) 9**   (C) 8   (D) 6

Ans (B)

Each corner = $8 \times \dfrac{1}{8} = 1$

4 body diagonals = 4 × 2 = 8

Total = 9

53. **Which of the following is NOT true about the amorphous solids?**

(A) Amorphous solids can be moulded by heating.

(B) They are anisotropic in nature.

(C) On heating they may become crystalline at certain temperature.

(D) They may become crystalline on keeping for long time.

Ans (B)

They are anisotropic in nature.

54. **Which of the following colligative properties can provide molar mass of proteins, polymers, and colloids with greater precision?**

(A) Depression in freezing point

(B) Osmotic pressure

(C) Relative lowering of vapour pressure

(D) Elevation in boiling point

Ans (B)

Osmotic pressure can provide molar mass of proteins, polymers and colloids.

55. **In Fuel cells _____ are used as catalysts**

(A) Zinc - Mercury   (B) Lead - Manganese

(C) Platinum - Palladium   (D) Nickel - Cadmium

Ans (C)

Pt, Pd used as catalysis in fuel cells.

56. **The molar conductivity is maximum for the solution of concentration**

(A) 0.005 M   **(B) 0.001 M**   (C) 0.004 M   (D) 0.002 M

Ans (B)

$$\Lambda_m = \frac{\kappa \times 1000}{M}$$

$$\Lambda_m \propto \frac{1}{Molarity} \propto Volume$$

57. Alkali halides do not show dislocation defect because

(A) Cations and anions have almost equal size.

(B) There is large difference in size of cations and anions.

(C) Cations and anions have low co-ordination number.

(D) Anions cannot be accommodated in vacant spaces.

Ans (A)

Cations and anions have low co-ordination number.

58. Solubility of a gas in a liquid increases with

(A) increase of P and decrease of T   (B) decrease of P and decrease of T

(C) increase of P and increase of T   (D) decrease of P and increase of T

Ans (A)

Increase of P and decrease of T.

59. The rise in boiling point of a solution containing 1.8 g of glucose in 100 g of solvent is 1 °C. The molal elevation constant of the liquid is

(A) 2 K kg/mol   (B) 10 K kg/mol   (C) 0.1 K kg/mol   **(D) 1 Kkg/mol**

Ans (D)

$\Delta T_b = i \times k_b \times m$

$$0.1 = 1 \times k_b \times \frac{1.8}{180} \times \frac{1000}{100} \Rightarrow \boxed{k_b = 1}$$

60. If 3 g of glucose (molar mass = 180 g) is dissolved in 60 g of water at 15 °C, the osmotic pressure of the solution will be

(A) 6.57 atm   (B) 5.57 atm   (C) 0.34 atm   (D) 0.65 atm

Ans (A)

$$\pi = i \times c \times R \times T = 1 \times \frac{3}{180} \times \frac{1000}{60} \times 0.0821 \times 288 = 6.57 \text{ atm}$$

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