CHEMISTRY - CET 2024 - VERSION CODE – B-2
## KEYS

1. Select the correct statement :   **[OUT OF SYLLABUS]**

    (A) Roasting involves heating the ore in the absence of air.

    (B) Calcination involves heating the ore above its melting point.

    (C) Smelting involves heating the ore with suitable reducing agent and flux below its melting point.

    (D) Calcination of calcium carbonate is endothermic.

    Ans (C, D)

    Smelting is the process of heating the ore with a suitable reducing agent and flux below its melting point

    $CaCO_3 \xrightarrow{\Delta} CaO + CO_2$
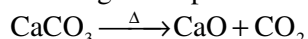
2. NO_2 gas is :   **[OUT OF SYLLABUS]**

    (A) Colourless, neutral   (B) Colourless, acidic   (C) Brown, acidic   (D) Brown, neutral

    Ans (C)

    NO_2 is a brown coloured gas and is acidic in nature.

3. Identify the *incorrect* statement from the following:

    (A) Oxides of nitrogen in the atmosphere can cause depletion of the ozone layer.

    (B) Ozone absorbs the intense ultraviolet radiation of Sun.

    (C) Depletion of ozone layer is because of its chemical reactions with chlorofluoro alkanes.

    (D) Ozone absorbs infrared radiation.

    Ans (D)

    Ozone layer absorbs UV radiations from the sun.

4. Gold sol is *not* a :   **[OUT OF SYLLABUS]**

    (A) Macromolecular colloid   (B) Lyophobic colloid

    (C) Multimolecular colloid   (D) Negatively charged colloid

    Ans (A)

    Gold sol is a multimolecular, lyophobic and negatively charged colloid.

5. The *incorrect* statement about Hall-Heroult process is :   **[OUT OF SYLLABUS]**

    (A) Carbon anode is oxidised to CO and CO_2.

    (B) Na_3AlF_6 helps to decrease the melting point of the electrolyte.

    (C) CaF_2 helps to increase the conductivity of the electrolyte.

    (D) Oxidation state of oxygen changes in the overall cell reaction.

    Ans (D)

    $2Al_2\overset{-2}{O}_3 + 3C \rightarrow 4Al + 3C\overset{-2}{O}_2$; No change in the oxidation state of oxygen.
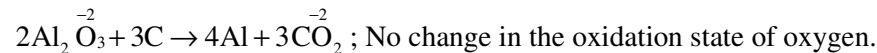
6. Propanone and Propanal are :

    (A) Position isomers   (B) Functional isomers (C) Chain isomers   (D) Geometrical isomers

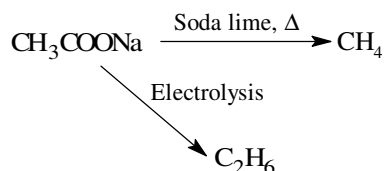   **Ans** (B)

    $CH_3-\underset{\underset{O}{\|}}{C}-CH_3$ and $CH_3CH_2-\underset{\underset{O}{\|}}{C}-H$ have the same molecular formula but different functional group.
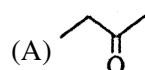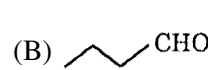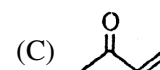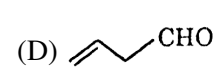
7. Sodium ethanoate on heating with soda lime gives 'X'. Electrolysis of aqueous solution of sodium ethanoate gives 'Y'. 'X' and 'Y' respectively are:

(A) Methane and Ethane   (B) Methane and Methane
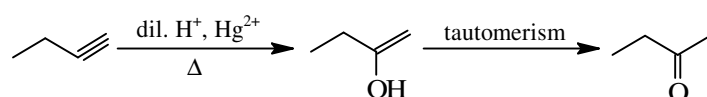
(C) Ethane and Methane   (D) Ethane and Ethane

Ans (A)

$$CH_3COONa \xrightarrow{\text{Soda lime, } \Delta} CH_4$$

$$\xrightarrow{\text{Electrolysis}} C_2H_6$$

8. But-1-yne on reaction with dil. H_2SO_4 in presence of Hg^{2+} ions at 333 K gives :
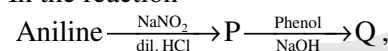
(A)   (B)   (C)   (D)

Ans (A)

9. Biologically active adrenaline and ephedrine used to increase blood pressure contain :

(A) Primary amino group   (B) Secondary amino group

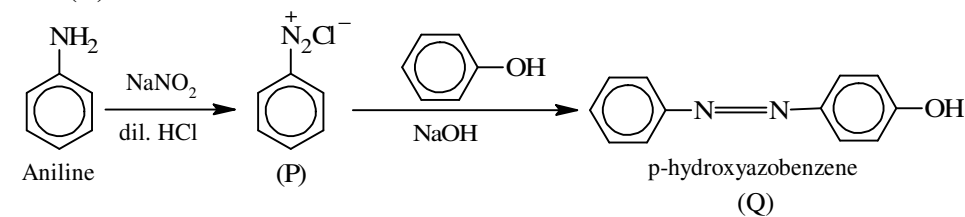(C) Tertiary amino group   (D) Quaternary ammonium salt

Ans (B)

10. In the reaction

$$\text{Aniline} \xrightarrow[\text{dil. HCl}]{NaNO_2} P \xrightarrow[\text{NaOH}]{\text{Phenol}} Q,$$

'Q' is :

(A) $C_6H_5N_2Cl$ (B) ortho-hydroxyazobenzene

(C) para-hydroxyazobenzene   (D) meta-hydroxyazobenzene

Ans (C)

11. The female sex hormone which is responsible for the development of secondary female characteristics and participates in the control of menstrual cycle is :

(A) Testosterone   (B) Estradiol   (C) Insulin   (D) Thyroxine

Ans (B)

12. The type of linkage present between nucleotides is :

(A) Phosphoester linkage   (B) Phosphodiester linkage

(C) Amide linkage   (D) Glycosidic linkage

Ans (B)

13. $\alpha - D - (+) -$ glucose and $\beta - D - (+) -$ glucose are :

(A) Enantiomers   (B) Conformers   (C) Epimers   (D) Anomers

Ans (D)

α – D – (+) – glucose and β – D – (+) – glucose differ with respect to configuration at C1. They are anomers.

14. Which of the following set of polymers are used as fibre?

(i) Teflon   (ii) Starch   (iii) Terylene   (iv) Orlon

[OUT OF SYLLABUS]

(A) (i) and (ii)   (B) (ii) and (iii)   (C) (iii) and (iv)   (D) (i) and (iv)
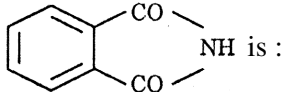
Ans (C)

15. The biodegradable polymer obtained by polymerisation of Glycine and Aminocaproic acid is :

[OUT OF SYLLABUS]

(A) Nylon 6   (B) PHBV   (C) Nylon 2 – Nylon 6   (D) Nylon 6, 10

Ans (C)

16. The compound [structure: benzene ring with CO–NH–CO forming a ring] is :   **[OUT OF SYLLABUS]**

(A) Sucralose   (B) Aspartame   (C) Saccharin   (D) Alitame
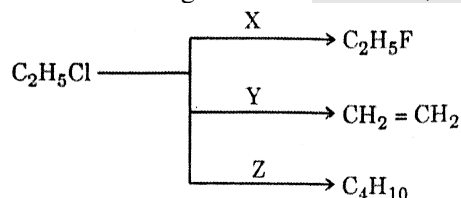
Ans (INCORRECT OPTIONS)

17. Which one of the following is a cationic detergent?   **[OUT OF SYLLABUS]**

(A) Cetyltrimethylammonium bromide   (B) Sodium dodecylbenzene sulphonate

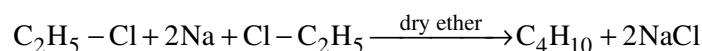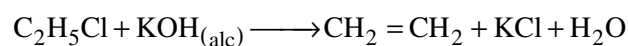(C) Dodecylbenzene sulphonic acid   (D) Dodecylbenzene

Ans (A)

18. In the following scheme of reaction,

$$C_2H_5Cl \xrightarrow{\quad X \quad} C_2H_5F$$
$$\xrightarrow{\quad Y \quad} CH_2=CH_2$$
$$\xrightarrow{\quad Z \quad} C_4H_{10}$$

X, Y and Z respectively are :

(A) AgF, alcoholic KOH and benzene   (B) HF, aqueous KOH and Na in dry ether

(C) Hg_2F_2, alcoholic KOH and Na in dry ether   (D) CoF_2, aqueous KOH and benzene

Ans (C)

$$2C_2H_5Cl + Hg_2F_2 \xrightarrow{\Delta} 2C_2H_5F + Hg_2Cl_2$$

$$C_2H_5Cl + KOH_{(alc)} \longrightarrow CH_2=CH_2 + KCl + H_2O$$

$$C_2H_5 - Cl + 2Na + Cl - C_2H_5 \xrightarrow{dry\ ether} C_4H_{10} + 2NaCl$$
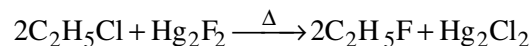
19. 8.8 g of monohydric alcohol added to ethyl magnesium iodide in ether liberates 2240 cm^3 of ethane at STP. This monohydric alcohol when oxidised using pyridinium-chlorochromate, forms a carbonyl compound that answers silver mirror test (Tollens' test). The monohydric alcohol is :

(A) butan-2-ol   (B) 2, 2-dimethyl propan-1-ol

(C) pentan-2-ol   (D) 2, 2-dimethyl ethan-1-ol

Ans (B)

$$CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2OH + CH_3CH_2MgI \xrightarrow{ether} CH_3CH_3 + Mg\,(OH)\,I$$
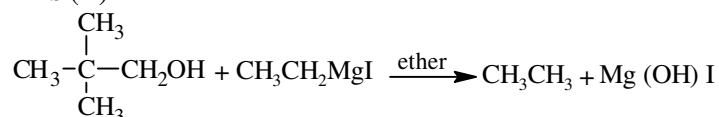
88 g of 2, 2-dimethyl propan-1-ol liberates 22400 cm³ of ethane

88 g of 2, 2-dimethyl propan-l-ol liberates 2240 cm³ of ethane

$$CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2OH \xrightarrow{[o],\ PCC} CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CHO \xrightarrow[\text{reagent}]{\text{Tollens'}} \text{Silver mirror}$$
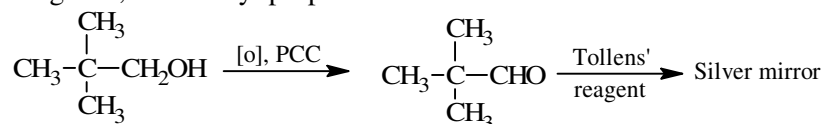
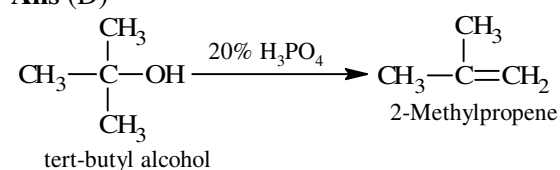20. When a tertiary alcohol 'A' ($C_4H_{10}O$) reacts with 20% H_3PO_4 at 358 K, it gives a compound 'B' (C_4H_8) as a major product. The IUPAC name of the compound 'B' is :

    (A) But-1-ene   (B) But-2-ene   (C) Cyclobutane   (D) 2-Methylpropene

    Ans (D)

$$CH_3-\underset{\underset{\underset{\text{tert-butyl alcohol}}{CH_3}}{|}}{\overset{\overset{CH_3}{|}}{C}}-OH \xrightarrow{20\%\ H_3PO_4} \underset{\text{2-Methylpropene}}{CH_3-\overset{\overset{CH_3}{|}}{C}=CH_2}$$

21. PCC is :

    (A) $K_2Cr_2O_7$ + Pyridine

    (B) CrO_3 + $CHCl_3$

    (C) CrO_3 + H_2SO_4

    (D) A complex of chromium trioxide with pyridine + HCl

    Ans (D)

22. On treating 100 mL of 0.1 M aqueous solution of the complex $CrCl_3.\,6H_2O$ with excess of $AgNO_3$, 2.86 g of AgCl was obtained. The complex is:

    (A) [Cr $(H_2O)_3$ Cl_3] . $3H_2O$ (B) [Cr $(H_2O)_4$ Cl_2] Cl . $2H_2O$

    (C) [Cr $(H_2O)_5$ Cl] Cl_2 . H_2O (D) [Cr $(H_2O)_6$ Cl_3]

    Ans (C)

    No. of moles of $AgCl = \dfrac{2.86}{143.5} = 0.02$ moles of Cl^-

    Moles of the complex = $100 \times 10^{-3} \times 0.1 = 0.01$

    $x \times 0.01$ moles of the complex = 0.02 moles of Cl^-

    $x = \dfrac{0.02}{0.01} = 2$ moles

23. The complex compounds [Co$(NH_3)_5$ SO_4] Br and [Co$(NH_3)_5$ Br] SO_4 are:

    (A) Coordination isomers   (B) Geometrical isomers

    (C) Optical isomers   (D) Ionisation isomers

    Ans (D)

    [Co$(NH_3)_5$ SO_4] Br and [Co$(NH_3)_5$ Br] SO_4 are ionisation isomers as they produce different ions in solution.

24. Which of the following statements are true about $[CoF_6]^{3-}$ ion?
    I.   The complex has octahedral geometry.
    II. Coordination number of Co is 3 and oxidation state is +6.
    III. The complex is sp^3d^2 hybridised.
    IV. It is a high spin complex.
    (A) I, II and IV   (B) I, III and IV   (C) II and IV   (D) II, III and IV
    Ans (B)
    Coordination number of Co is 6 and oxidation state of Co is +3.

25. A haloalkane undergoes S_N2 or S_N1 reaction depending on :
    (A) Solvent used in the reaction   (B) Low temperature
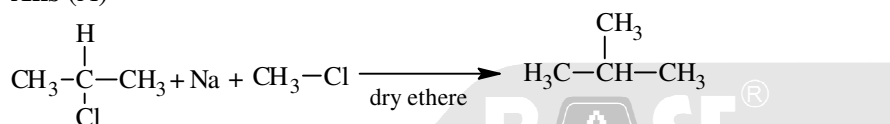   (C) The type of halogen atom   (D) Stability of the haloalkane
    Ans (A)
    S_N2 and S_N1 reaction is favoured by the usage of apolar and polar protic solvents respectively.

26. 2-Methyl propane can be prepared by Wurtz reaction. The haloalkanes taken along with metallic sodium and dry ether are:
    (A) chloromethane and 2-chloropropane   (B) chloroethane and chloromethane
   (C) chloroethane and 1-chloropropane   (D) chloromethane and 1-chloropropane
    Ans (A)

$$CH_3-\underset{\underset{Cl}{|}}{\overset{\overset{H}{|}}{C}}-CH_3 + Na + CH_3-Cl \xrightarrow{\text{dry ethere}} H_3C-\underset{\overset{|}{CH_3}}{CH}-CH_3$$

27. In the analysis of III group basic radicals of salts, the purpose of adding $NH_4Cl_{(S)}$ to NH_4OH is :
    (A) to increase the concentration of OH^- ions.   (B) to precipitate the radicals of group IV and V.
    (C) to suppress the dissociation on NH_4OH.   (D) to introduce Cl^- ions.
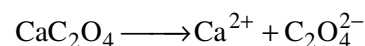   **Ans** (C)
    Due to common ion effect
    $$NH_4OH \rightleftharpoons \overset{+}{N}H_4 + OH^-$$
    $$NH_4Cl \longrightarrow \overset{+}{N}H_4 + Cl^-$$
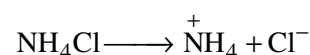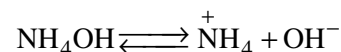
28. Solubility product of CaC_2O_4 at a given temperature in pure water is 4×10^{-9} $(mol\ L^{-1})^2$. Solubility of CaC_2O_4 at the same temperature is:
    (A) 6.3×10^{-5} mol L^{-1} (B) 2×10^{-5} mol L^{-1} (C) 2×10^{-4} mol L^{-1} (D) 6.3×10^{-4} mol L^{-1}
    Ans (A)
    $$CaC_2O_4 \longrightarrow Ca^{2+} + C_2O_4^{2-}$$
    AB type of salt
    $K_{sp} = S^2$
    $S = \sqrt{K_{sp}}$
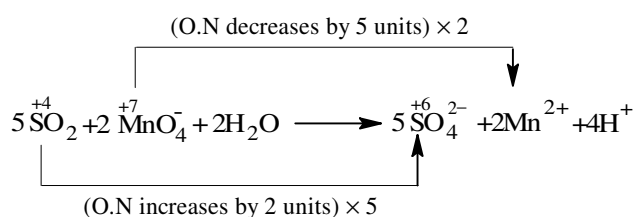 $\quad = \sqrt{4 \times 10^{-9}}$
    $\quad = \sqrt{40 \times 10^{-10}}$
    $\quad = 6.3 \times 10^{-5}$ mol L^{-1}

29. In the reaction between moist SO_2 and acidified permanganate solution :

    (A) SO_2 is oxidised to SO_4^{2-}

       MnO_4^- is reduced to Mn^{2+}

    (B) SO_2 is reduced to S

       MnO_4^- is oxidised to MnO_4

    (C) SO_2 is oxidised to SO_3^{2-}

       MnO_4^- is reduced to MnO_2

    (D) SO_2 is reduced to H_2S

       MnO_4^- is oxidised to MnO_4

Ans (A)

$$\overset{\text{(O.N decreases by 5 units)} \times 2}{5\overset{+4}{S}O_2 + 2\overset{+7}{Mn}O_4^- + 2H_2O \longrightarrow 5\overset{+6}{S}O_4^{2-} + 2Mn^{2+} + 4H^+}$$

(O.N increases by 2 units) $\times 5$

30. Which one of the following properties is generally ***not*** applicable to ionic hydrides?

    (A) Non-volatile   (B) Non-conducting in solid state

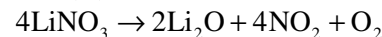   (C) Crystalline   (D) Volatile

Ans (D)

Ionic hydrides are solid crystalline solids, non-conducting and non-volatile.

31. Which one of the following nitrate will decompose to give NO_2 on heating?

    (A) $NaNO_3$ (B) KNO_3 (C) $RbNO_3$ (D) $LiNO_3$

Ans (D)

$4LiNO_3 \rightarrow 2Li_2O + 4NO_2 + O_2$

32. Which of the following halides ***cannot*** be hydrolysed?

    (A) CCl_4 (B) $SiCl_4$ (C) $GeCl_4$ (D) $SnCl_4$

Ans (A)

Due to smaller size of C, it is shielded by the larger Cl atom. So attack of water is not possible for hydrolysis.
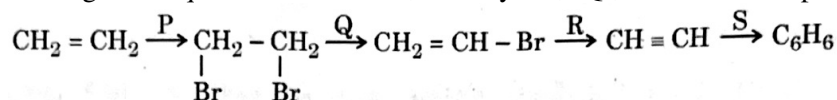
33. 0.48 g of an organic compound on complete combustion produced 0.22 g of CO_2. The percentage of C in the given organic compound is :

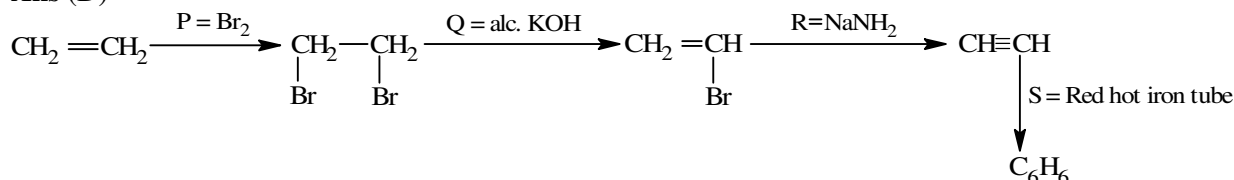   (A) 25   (B) 50   (C) 12.5   (D) 87.5

Ans (C)

$$\%C = \frac{12}{44} \times \frac{m_{CO_2}}{m_{OC}} \times 100$$

$$= \frac{12}{44} \times \frac{0.22}{0.48} \times 100$$

$$= 12.5\%$$

34. In the given sequence of reactions, identify 'P', 'Q', 'R' and 'S' respectively.

$$CH_2 = CH_2 \xrightarrow{P} \underset{\underset{Br\ \ Br}{|\ \ \ \ |}}{CH_2 - CH_2} \xrightarrow{Q} CH_2 = CH - Br \xrightarrow{R} CH \equiv CH \xrightarrow{S} C_6H_6$$

(A) Br_2, Alc. KOH, NaOH, Al_2O_3
(B) HBr, Alc. KOH, CaC_2, $KMnO_4$
(C) HBr, Alc. KOH, $NaNH_2$, Red hot iron tube
(D) Br_2, Alc. KOH, $NaNH_2$, Red hot iron tube

Ans (D)

$$CH_2 = CH_2 \xrightarrow{P = Br_2} \underset{\underset{Br\ \ \ Br}{|\ \ \ \ \ |}}{CH_2 - CH_2} \xrightarrow{Q = alc.\ KOH} \underset{\underset{Br}{|}}{CH_2 = CH} \xrightarrow{R = NaNH_2} CH \equiv CH$$

$$\downarrow S = \text{Red hot iron tube}$$

$$C_6H_6$$

35. The first chlorinated organic insecticide prepared is :
    (A) Gammexane
    (B) Chloroform
    (C) $COCl_2$
    (D) DDT

    Ans (D)

36. Which of the following crystals has the unit cell such that $a = b \neq c$ and $\alpha = \beta = 90°$, $\gamma = 120°$?
    [OUT OF SYLLABUS]

    (A) Zinc blende
    (B) Graphite
    (C) Cinnabar
    (D) Potassium dichromate

    Ans (B)

37. MnO exhibits:
    [OUT OF SYLLABUS]
    (A) Ferrimagnetism
    (B) Antiferromagnetism
    (C) Ferromagnetism
    (D) Paramagnetism

    Ans (B)

38. The number of atoms in 4.5 g of a face-centred cubic crystal with edge length 300 pm is :
    (Given density = 10 g cm^{-3} and $N_A = 6.022 \times 10^{23}$)
    [OUT OF SYLLABUS]

    (A) 6.6×10^{20}
    (B) 6.6×10^{23}
    (C) 6.6×10^{19}
    (D) 6.6×10^{22}

    Ans (D)

    Volume of unit cell = $a^3 = (300\ pm)^3 = 27 \times 10^{-24}$ cm^3

    Volume of 4.5 g of the element $= \dfrac{\text{Mass}}{\text{density}} = \dfrac{4.5}{10} = 0.45\,\text{cm}^3$

    Number of unit cells $= \dfrac{\text{Total volume}}{\text{Volume of unit cell}} = \dfrac{0.45}{27 \times 10^{-24}}$

    $$= 1.66 \times 10^{22}$$

    Number of atoms in 4.5 g = Number of atoms/unit cell × Number of unit cells

    $$= 4 \times 1.66 \times 10^{22}$$
    $$= 6.64 \times 10^{22}$$

    Z = 4 for fcc

39. Vapour pressure of a solution containing 18 g of glucose and 178.2 g of water at 100°C is :
    (Vapour pressure of pure water at 100°C = 760 torr)
    (A) 76.0 torr
    (B) 752.4 torr
    (C) 7.6 torr
    (D) 3207.6 torr

    Ans (B)

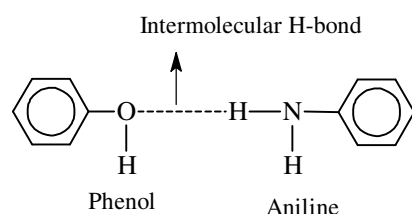 $$\frac{p_1^o - p_1}{p_1^o} = \frac{w_2 \cdot M_1}{w_1 \cdot M_2}$$

$$\frac{760 - p_1}{760} = \frac{18 \times 18}{178.2 \times 180}$$

$\therefore$ $p_1 = 752.4$ torr

40. A mixture of phenol and aniline shows negative deviation from Raoult's law. This is due to the formation is:

(A) Polar covalent bond
(B) Non-polar covalent bond
(C) Intermolecular Hydrogen bond
(D) Intramolecular Hydrogen bond

Ans (C)

Intermolecular H-bond

Phenol   Aniline

41. Which one of the following pairs will show positive deviation from Raoult's Law?

(A) Water – HCl
(B) Benzene – Methanol
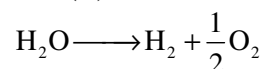(C) Water – HNO_3
(D) Acetone – Chloroform

Ans (B)

The other pairs show negative deviation from Raoult's Law.

42. How many Coulombs are required to oxidise 0.1 mole of H_2O to oxygen?

(A) 1.93×10^5 C   (B) 1.93×10^4 C   (C) 3.86×10^4 C   (D) 9.65×10^3 C

Ans (B)

$$H_2O \longrightarrow H_2 + \frac{1}{2}O_2$$

1 mol $\Rightarrow$ 2 F i.e., $2 \times 9.65 \times 10^4$

$\therefore$ 0.1 mol   ?

$= 0.1 \times 2 \times 9.65 \times 10^4$

$= 1.93 \times 10^4$ C

43. A current of 3 A is passed through a molten calcium salt for 1 hr 47 min 13 sec. The mass of calcium deposited is : (Molar mass of Ca = 40 g mol^{-1})

(A) 6.0 g   (B) 2.0 g   (C) 8.0 g   (D) 4.0 g

Ans (D)

w = z.I.t

$$= \frac{40 \times 3 \times (107 \times 60 + 13)}{96500 \times 2}$$

= 3.99 g or 4.0 g

44. The value of 'A' in the equation $\lambda_m = \lambda_m^\circ - A\sqrt{C}$ is same for the pair:

(A) NaCl and $CaCl_2$ (B) $CaCl_2$ and $MgSO_4$ (C) NaCl and KBr   (D) $MgCl_2$ and NaCl

Ans (C)

Same charge on cation and anion.

45. For the reaction, $A \rightleftharpoons B$, $E_a = 50 \text{ kJ mol}^{-1}$ and $\Delta H = -20 \text{ kJ mol}^{-1}$. When a catalyst is added, E_a decreases by 10 kJ mol^{-1}. What is the E_a for the backward reaction in the presence of catalyst?

(A) 60 kJ mol^{-1} (B) 40 kJ mol^{-1} (C) 70 kJ mol^{-1} (D) 20 kJ mol^{-1}

Ans (A)

$\Delta H = E_{a(forward)} - E_{a(backward)}$

$-20 \text{ kJ mol}^{-1} = (50 - 10) \text{ kJ mol}^{-1} - E_{a(backward)}$

$E_{a(backward)} = 40 + 20 = 60 \text{ kJ mol}^{-1}$

46. For the reaction $PCl_5 \rightarrow PCl_3 + Cl_2$, rate and rate constant are $1.02 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$ and $3.4 \times 10^{-5} \text{ s}^{-1}$ respectively at a given instant. The molar concentration of PCl_5 at that instant is :

(A) 8.0 mol L^{-1} (B) 3.0 mol L^{-1} (C) 0.2 mol L^{-1} (D) 2.0 mol L^{-1}

Ans (B)

$r = k [PCl_5]$

$[PCl_5] = \dfrac{r}{k} = \dfrac{1.02 \times 10^{-4}}{3.4 \times 10^{-5}} = 3.0 \text{ mol/L}$

47. Which one of the following does ***not*** represent Arrhenius equation?

(A) $\log k = \log A - \dfrac{Ea}{2.303 RT}$ (B) $k = A e^{-Ea/RT}$

(C) $ln\, k = -\dfrac{Ea}{Rt} + ln\, A$ (D) $k = A e^{Ea/RT}$

Ans (D)

$k = Ae^{-Ea/RT}$

48. Identify the ***incorrect*** statement: **[OUT OF SYLLABUS]**

(A) Values of colligative properties of colloidal solution are of small order compared to values of true solution.

(B) Tyndall effect is observed only when diameter of the dispersed particles is not much smaller than wavelength of incident light.

(C) Colour of colloidal solution depends on the wavelength of light scattered by the dispersed particles.

(D) Brownian movement is due to balanced bombardment of molecules of dispersion medium on colloidal particles.

Ans (D)

Brownian movement is due to unbalanced bombardment of molecules and not balanced bombardment of molecules.

49. For the coagulation of positively charged hydrated ferric-oxide sol, the flocculating power of the ions is in the order :   **[OUT OF SYLLABUS]**

(A) $PO_4^{3-} > SO_4^{2-} > Cl^- > [Fe(CN)_6]^{4-}$ (B) $Cl^- > SO_4^{2-} > PO_4^{3-} > [Fe(CN)_6]^{4-}$

(C) $SO_4^{2-} = Cl^- = PO_4^{3-} = [Fe(CN)_6]^{4-}$ (D) $[Fe(CN)_6]^{4-} > PO_4^{3-} > SO_4^{2-} > Cl^-$

Ans (D)

50. For which one of the following mixtures is composition uniform throughout?

(A) Sand and water   (B) Grains and pulses with stone

(C) Mixture of oil and water   (D) Dilute aqueous solution of sugar

Ans (D)

51. The energy associated with first orbit of He$^+$ is :

(A) 0 J   (B) -8.72×10^{-18} J   (C) -4.58×10^{-18} J   (D) -0.545×10^{-18} J

Ans (B)

$$E_n = \frac{-2.18 \times 10^{-18} Z^2}{n^2} J$$

For Helium n = 1   Z = 2

$$E = \frac{-2.18 \times 10^{-18} \times 4}{1}$$

$$E = -8.72 \times 10^{-18} J$$

52. A metalloid is :

(A) Bi   (B) Sb   (C) P   (D) Se

Ans (B)

53. A pair of isoelectronic species having bond order of one is:

(A) N_2, CO   (B) N_2, NO$^+$ (C) O_2^{2-}, F_2 (D) CO, NO$^+$

Ans (C)

$O_2^{2-} = 16 + 2 = 20\ e^-$ Bond order of $O_2^{2-} = 1$

$F_2 = F-F = 9 + 9 = 18\ e^-$ Bond order of $F_2 = 1$

54. Identify the *wrong* relation for real gases:

(A) $Z = \dfrac{V_{ideal}}{V_{real}}$ (B) $p_{ideal} = p_{real} + \dfrac{an^2}{V^2}$
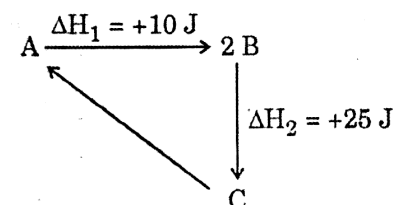
(C) $V_{real} = V_{ideal} - nb$ (D) $\left(p + \dfrac{a}{V^2}\right)(V - b) = RT$

Ans (A)

55. From the diagram

$\Delta_r H$ for the reaction C $\rightarrow$ A is :

(A) + 35 J   (B) – 15 J   (C) –35 J   (D) + 15 J

Ans (C)

56. The transition element ($\approx 5\%$) present with lanthanoid metal in Misch metal is :

(A) Mg   (B) Fe   (C) Zn   (D) Co

Ans (B)

Misch metal contains $\approx 5\%$ Fe and 95% lanthanoids.

57. Match the following :

I	Zn^{2+}	i	d^8 configuration
II	Cu^{2+}	ii	colourless
III	Ni^{2+}	iii	$\mu = 1.73$ BM

Codes:

	I	II	III
(A)	i	ii	iii
(B)	ii	iii	i
(C)	ii	i	iii
(D)	i	iii	ii

Ans (B)

Zn^{2+} : $3d^{10}$; colourless as there are no unpaired electrons

$Cu^{2+} \rightarrow 3d^9$; one unpaired electron; $\mu = 1.73$ B.M.

$Ni^{2+} \rightarrow d^8$ configuration

58. Which of the following statements related to lanthanoids is ***incorrect***?

    (A) Lanthanoids are silvery white soft metals.

    (B) Samarium shows + 2 oxidation state.

    (C) Ce^{+4} solutions are widely used as oxidising agents in titrimetric analysis.

    (D) Colour of Lanthanoid ion in solution is due to d – d transition.

    Ans (D)

    Colour of lanthanoid ions in solution is due to f-f-transition not due to d-d-transition.

59. The correct decreasing order of boiling point of hydrogen halides is :

    (A) HF > HCl > HBr > HI

    (B) HI > HBr > HCl > HF

    (C) HF > HI > HBr > HCl

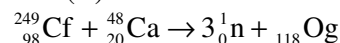   (D) HI > HF > HBr > HCl

    Ans (C)

    HF has a higher boiling point than the other hydrogen halides due to intermolecular hydrogen bonding.

60. The synthetically produced radioactive noble gas by the collision of $^{249}_{98}Cf$ with $^{48}_{20}Ca$ is :

    [OUT OF SYLLABUS]

    (A) Radon   (B) Radium   (C) Oganesson   (D) Xenon

    Ans (C)

    $^{249}_{98}Cf + ^{48}_{20}Ca \rightarrow 3\,^{1}_{0}n + \,_{118}Og$

✳ ✳ ✳