1024583

M – 2020

Register Number :

Subject Code : 34 (NS)

CHEMISTRY

(English Version)

Instructions :

1. *The question paper has four parts. All parts are compulsory.*
2. *Part-A carries 10 marks. Each question carries 1 mark.*
   Part-B carries 10 marks. Each question carries 2 marks.
   Part-C carries 15 marks. Each question carries 3 marks.
   Part-D carries 35 marks. Each question carries 5 marks.
3. *Write balanced chemical equations and draw diagrams wherever necessary.*
4. *Use log tables and simple calculator if necessary. (Use of scientific calculator is not allowed.)*

PART – A

I. Answer **all** the questions. Each question carries **1** mark. (Answer each question in **one word** or in **one sentence**) : **(10 × 1 = 10)**

1) What is the value of Van't Hoff factor (i) for K_2SO_4 ?

2) 10 mL of liquid A is mixed with 10 mL of liquid B, the volume of the resultant solution is 19.9 mL. What type of deviation is expected from Raoult's law?

3) What is a secondary cell?

4) Identify the order of the reaction from the rate constant $K = 2.3 \times 10^{-5} L\,mol^{-1}s^{-1}$.

5) Give reason. Zeolites are good shape-selective catalyst.

6) Iron scraps are advisable and advantageous than zinc scraps for reducing the low grade copper ores. Why?

7) Complete the reaction

$$XeF_6 + H_2O \longrightarrow \underline{\quad ? \quad} + 2HF\,.$$

8) Give reason. In case of optically active alkyl halides S_N1 reactions are accompanied by racemisation.

9) Identify 'A' in the reaction

$$>C=O \xrightarrow[HCl]{Zn-Hg} \underline{\quad A \quad} + H_2O\,.$$

10) Give an example for water soluble vitamin.

PART – B

II. Answer **any five** of the following. Each question carries **2** marks : **(5 × 2 = 10)**

11) Calculate the no. of particles present per unit cell in a B.C.C unit cell. (2)

12) A solution of $Ni(NO_3)_2$ is electrolysed between platinum electrodes using a current of 5 amperes for 20 minutes. What mass of nickel is deposited at the cathode? [molar mass of Ni = 58.7 gram mol^{-1}]. (2)

13) Mention any two factors which influence the rate of the reaction. (2)

14) Give two reasons. The chemistry of actinoids is more complicated than Lanthanoids. (2)

15) How is phenol prepared from Aniline? Write the equation. (2)

16) Explain Cannizzaro's reaction taking benzaldehyde as an example. (2)

17) a) Give an example for non narcotic analgesics. (1)

b) Why the use of Aspartame is limited to cold foods and soft drinks? (1)

18) a) Why detergents with straight chain of hydrocarbons are prefered over branched chain hydrocarbons? (1)

b) Give one example for detergent with straight chain hydrocarbon. (1)

PART – C

III. Answer **any five** of the following. Each question carries **3** marks : **(5 × 3 = 15)**

19) Write the equations involved in leaching of alumina from bauxite ore. (3)

20) Mention any three anomalous properties of Nitrogen. (3)

21) In the manufacture of sulphuric acid write

i) The equation with condition for oxidation of SO_2 to SO_3. (2)

ii) Formation of Oleum from SO_3. (1)

22) a) Complete the following reaction.

i) $NH_3 + 3Cl_2 \longrightarrow \underline{\quad ? \quad} + 3\,HCl$ (1)

ii) $Cl_2 + F_2 \xrightarrow{473\,K} \underline{\quad ? \quad}$ (1)

b) Write the structure of perchloric acid ($HClO_4$). (1)

23) a) Transition elements show catalytic property. Give two reasons. (2)

b) Name one 3d series element that do not show variable oxidation state. (1)

24) Write the equation for the manufacture of potassium dichromate from chromite ore. (3)

25) Using valence bond theory explain geometry hybridisation and magnetic property of $[CoF_6]^{3-}$. [Given atomic no. of Co-27]. (3)

26) a) Mention any two postulates of Werner's theory of co-ordination compounds. (2)

b) Indicate the type of Isomerism in the following set of complex compounds.

$[Co(NH_3)_5SCN]\,Cl_2$ and $[Co(NH_3)_5NCS]\,Cl_2$. (1)

PART – D

IV. Answer **any three** of the following. Each question carries **5** marks : **(3 × 5 = 15)**

27) a) Calculate the packing efficiency in F.C.C. cubic lattice. (3)

b) Calcium metal crystallises in a face centered cubic lattice with edge length of 0.556 nm. Calculate the density of the metal.

[Atomic mass of calcium 40 g/mol. $N_A = 6.022 \times 10^{23}$ atoms/mol]. (2)

28) a) Vapour pressure of benzene is 200 mm of Hg. When 2 gram of a non-volatile solute dissolved in 78 gram benzene. Benzene has vapour pressure of 195 mm of Hg. Calculate the molar mass of the solute. [molar mass of benzene is 78 gram mol^{-1}] (3)

b) What are azeotropes? Give an example for binary solutions showing minimum boiling azeotrope. (2)

29) a) Calculate the e.m.f. of the cell in which the following reaction takes place.

$$Ni + 2Ag^{+}_{(0.002M)} \longrightarrow Ni^{2+}_{(0.160M)} + 2Ag_{(s)}$$

Given $E^{0}_{cell} = 1.05\ V$. (3)

b) i) State Kohlrausch's law of Independent Migration of ions. (1)

ii) What is meant by limiting molar conductivity? (1)

30) a) Derive an Integrated rate equation for a first order reaction. (3)

b) According to collission theory write two factors responsible for effective collissions. (2)

31) a) Write a note on Dialysis. (2)

b) What is the effect on ΔH and ΔS during the process of adsorption? (2)

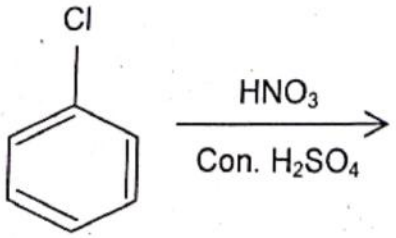
c) Give an example for heterogeneous catalysis. (1)

V. Answer **any four** of the following. Each question carries **5** marks : **(4 × 5 = 20)**

32) a) Explain S_N1 mechanism for the conversion of tertiary butyl bromide to tertiary butyl alcohol. (2)

b) Complete the following reactions :

i) $CH_3 - CH = CH_2 + HI \longrightarrow$ (1)

ii) 

(1)

iii) $CH_3CH_2Br \xrightarrow[\text{Aq. Ethanol}]{\text{AqCN}}$ (1)

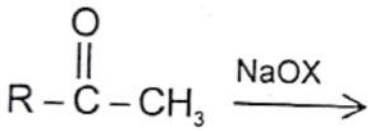
33) a) Explain the mechanism for acid catalysed dehydration of ethanol to ethene. (3)

b) How does anisole react with methyl chloride? (2)

34) a) How is benzoyl chloride converted into benzaldehyde. Write the equation and name the equation. (2)

b) Write a general equation for the formation of carboxylic acid from Grignard reagent. (2)

c) Complete the reaction (1)



35) a) Mention the I.U.P.A.C. name of $(CH_3)_2 - N - CH_3$. (1)

b) How is Aniline is prepared from nitro benzene? (2)

c) Give the equation for the conversion of aniline to 4-Bromo aniline. (2)

36) a) Write a chemical reactions to ellucidate

i) Glucose contains five –OH groups.

ii) Glucose contains six carbon atoms in a straight chain. (2)

b) Explain denaturation of proteins with example. (2)

c) Name the sugar moiety present in DNA. (1)

37) a) Name the monomers present in the following polymers.

i) PVC

ii) Neoprene

iii) Nylon-6. (3)

b) Explain Valcanisation of rubber. (2)