JAIN COLLEGE, Bangalore
Mock Paper – 1, January - 2020
II PUC – Chemistry (34)

Time: 3 Hours 15 Minutes	Max. Marks: 70

INSTRUCTIONS : 1. The question paper has four parts. All parts are compulsory.

2. Part-A carries 10 marks. Each question carries one mark. Part-B carries 10 marks. Each question carries two marks. Part-C carries 15 marks. Each question carries three marks. Part-D carries 35 marks. Each question carries five marks.

3. Write balanced chemical equations and draw diagrams whenever necessary.

4. Use log tables and simple calculator if necessary. (Use of scientific calculator is not allowed)

PART-A

I.   Answer ALL of the following. (Each question carries 1 mark)   10 × 1 = 10

1. On mixing equal volumes of acetone and ethanol, what type of deviation from Raoult's law is expected?
2. What are isotonic solutions?
3. State Faraday's I law of electrolysis.
4. Mention one criterion for intermolecular collision of two reactants to be effective.
5. Give an example for aerosol.
6. Name the depressant used to separate two sulphide ores containing ZnS and PbS.
7. Which noble gas does not have general noble gas configuration? Name it.
8. A racemic mixture is optically inactive. Why?
9. Write the IUPAC name of $CH_3COCH_2CH_2CH_3$.
10. Mention the base present only in DNA.

PART-B

II.   **Answer any ALL of the following. (Each question carries 2 marks)   5 × 2 = 20**

11. Calculate the number of atoms in FCC.
12. Calculate the standard free energy change for the reaction $Zn_{(s)} +2Ag^+_{(aq)} \leftrightarrow Zn^{2+}_{(aq)} +2Ag_{(s)}$ E^0_{cell} =1.56V.Given 1F=96500Cmol^{-1}.
13. Draw a graph of potential energy V\S reaction co-ordinate showing the effect of a catalyst.
14. Study of actinide elements is difficult. Give two reasons
15. What happens when phenol is shaken with excess of bromine water? (In polar medium)
16. How would you prepare acetaldehyde from acetyl chloride. Name the reaction.
17. Give an example: i. antacid ii. sweetening agent
18. What is broad spectrum antibiotics? Give an example.

PART-C

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

19. Describe the steps involved in the leaching of bauxite to get pure Alumina.   (3)
20. With the help of flow chart and equations explain Haber's process.   (3)
21. Mention any three anomalous behavior of oxygen.   (3)
22. i. Give an example for one oxoacid of chlorine.
     ii. Mention any two anomalous behavior of fluorine   (1+2)
23. i. How is $KMnO_4$ prepared from MnO_2.
     Ii .Transition metals exhibit higher enthalpies of atomization. Give reason.   (2+1)
24. What are interstitial compounds? Write their characteristics.   (3)
25. i. Give the IUPAC name of $K_3 [Cr(C_2O_4)_3]$
     ii. What is linkage isomerism? Give an example.   (1+2)
26. On the basis of VBT explain the type of hybridization ,shape and magnetic properties of $[NiCl_4]^{2-}$ (3)

PART-D

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

27. a. Calculate the packing efficiency in FCC lattice.
    b. What is schottky defect? Give an example.   (3+2)

28. a. The vapour pressure of pure benzene at certain temperature is 0.850bar.When 0.5g of a non-volatile solute is added to 39.0g of benzene (M.M of benzene 78gmol^{-1}) vapour pressure of the solution is 0.845bar. What is the molecular mass of non-volatile solute?
    b. What happens to the solubility of a gas in a liquid with increase in temperature? Give reason. (3+2)

29. a. With a neat labeled diagram explain fuel cell.
    b. Write any two methods of prevention of corrosion.   (3+2)

30. a. Derive an integrated rate equation for the rate constant for a zero order reaction.
    b. What is the order of the reaction which has the rate expression rate=k $[A]^{3\backslash 2}.[B]^{-1}$ (3+2)

31. a. What is peptization? Give an example.
    b. Write the equation for the two steps involved in enzyme catalysis.
    c. Give an example for protective colloid   (2+2+1)

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

32. a. Explain the S_N^1 mechanism with suitable example .
    b. With a suitable example explain Wurtz-fittig reaction.
    c. Write the general formula of Grignard reagent.   (2+2+1)

33. a. Phenols are acidic than alcohols. Give reason.
    b. How are the following conversions carried ? Give equations
    i. Ketone to secondary alcohol
    ii. Ethanol to ethanal
    iii. Diethyl ether to ethyl iodide   (2+3)

34. a. Explain the mechanism of HCN to aldehyde in the presence of NaOH.
    b. With a suitable example explain Wolf-Kishner reduction.   (3+2)

35. a. What is Hinsberg's reagent? How is it used to distinguish between primary and tertiary amine?
    b. i.$CH_3COONH_2 \xrightarrow[NaOH]{Br2} P$
    ii. $P \xrightarrow[HCl]{NaNO2} Q$. What is P and Q   (3+2)

36. a. Write the Haworths structure of Lactose.
    b. Give an example for i. Globular proteins ii. Naturally occurring optically inactive amino acid
    iii. Name the hormone which contains iodine   (2+2+1)

37. a. How is Neoprene prepared? Give example.
    b. Name the monomers of Nylon 6:6
    c. Give an example of cross linked polymer   (2+2+1)

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PART A

I. **Answer all of the following (each question carries 1 mark)**   10 × 1 = 10

1. Aquatic species feel more comfortable in the lakes in winter than in summer. Why?
2. How does the volume change on mixing two volatile liquids to form an ideal solution?
3. Name the metal used in galvanisation of iron.
4. What is the unit of rate constant of a first order reaction?
5. What is the role of "Alum" in the purification of drinking water?
6. How does silica helps in the metallurgy of copper?
7. Give reason: noble gases exhibit very high ionization enthalpy
8. What is the condition to be satisfied for a compound to be chiral?
9. Name the reagent used in conversion of ketone to hydrocarbon.
10. Which vitamin is stored in liver and adipose tissues?

PART –B

II. **Answer any ALL of the following (each question carries 2 mark)**   5 × 2 = 10

11. A compound A_xB_y crystallises in FCC lattice in which A occupies each corner of a cube and B occupies the centre of each face of the cube. What is the formula of the compound.
12. State Faraday's second law
13. Calculate the half-life period of a first order reaction if the rate constant of the reaction is $6.93 \times 10^{-3} \, S^{-1}$
14. Give reason :i. Transition metals exhibit higher enthalpy of atomization
    ii. Cr^{2+} is a stronger reducing agent than Fe^{2+}
15. Complete the following reactions
    i. $RCH_2OH \xrightarrow[573k]{CU}$ -------+ H_2
    ii. $CH_3 -CH=CH_2 + H_2O \xrightarrow{H+}$ -------
16. Benzaldehyde is treated with NaOH .Write the equation for the reaction. Name the reaction
17. Give an example for i. Anionic detergent ii. Sweetening agent
18. What are analgesics? Give an example

PART –C

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

19. i. Describe Mond's process for refining nickel
    ii. Write the composition of copper matte   (2+1)
20. Write the flow chart diagram for the manufacture of sulphuric acid by contact process   (3)
21. i. Give an example in which oxygen shows +2 oxidation state
    ii. Write the structure of S_8 molecule
    iii. Complete the reaction $2Fe^{3+} + SO_2 +2H_2O \rightarrow$ -----+ ------   (3)
22. Describe the preparation of ozonized oxygen with equation. Name the oxidized product obtained when ozone reacts with lead sulphide   (3)
23. Explain the variation in atomic and ionic radii in d-block elements   (3)
24. Transition elements and their compounds are used as catalysts. Why?   (3)
25. i. Give the facial and meridional isomeric structure of $[Co(NH_3)_3(NO_2)_3]$
    ii. Give an example for bidentate ligand   (2+1)
26. Using VBT explain the type of hybridization, geometry and magnetic property of the complex $[Co (F_6)]^{3-}$

PART –D₁

IV.   Answer any ALL of the following (each question carries 5 marks)   3 × 5 = 15

27. a. Calculate the packing efficiency in a BCC
    b. What is Frenkel defect? Give an example   (3+2)

28. a. 5.8g of a non-volatile solute was dissolved in 100g of carbon disulphide. The vapour pressure of the solution was found to be 190mm of Hg. Calculate the molar mass of the solute. Given the vapour pressure of pure CS_2 is 195mm of Hg, M.M of CS_2 =76gmol^{-1}
    b. What are low boiling azeotropes? Give an example   (3+2)

29. a. With a neat labeled diagram explain construction and working of SHE
    b. Calculate the std Gibbs free energy for the following reaction. $2Fe^{3+}_{(aq)} + 2I^{-}_{(aq)} \rightarrow 2Fe^{2+} + I_{2(S)}$
    Given E^{0}_{cell} = 0.236V, F=96487C   (3+2)

30. a. Show that for first order $t_{87.5\%}= 3t_{50\%}$
    b. Mention the factors affecting the rate of reaction constant   (3+2)

31. a. Write any three differences between lyophilic and lyophobic sols
    b. With an example explain heterogenous catalysis   (3+2)

PART D₂

V.   Answer any ALL of the following questions (each question carries 5 marks)   4 × 5 = 20

32. a. Write the general equation for the reaction of primary alcohol with $SOCl_2$ and name the reaction
    b. What are enantiomers? Give an example
    c. Mention the uses of Freons   (2+2+1)

33. a. Explain the mechanism of acid catalyzed dehydration of ethanol to ethene
    b. With a suitable example explain Williamson's ether synthesis   (3+2)

34. a. Formaldehyde is heated with con.KOH. Write the equation for the reaction. Name the reaction and products
    b. Identify the products A and B
    $$C=O \xrightarrow{NH2NH2} A \xrightarrow[glycol\ \Delta]{KOH\backslash ethylene} B + N_2$$ (3+2)

35. a. How is aniline converted into benzene diazonium chloride?
    b. Write the IUPAC name of the product formed when aniline reacts with bromine water at room temperature and the equation for the same reaction.
    c. What is Hinsberg reagent ?   (2+2+1)

36. a. How do you show that glucose contains carbonyl group?
    b. What are essential α-amino acids? Give an example   (3+2)

37. a. Name the monomers and give the partial structure of Dacron
    b. Give an example for i. thermosetting polymer   ii. semi-synthetic polymer (3+2)

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