

II – PUC – CHEMISTRY (34)
MODEL QUESTION PAPER -1
For reduced syllabus 2020-21

Time: 3 hours 15 minutes

Maximum Marks: 70

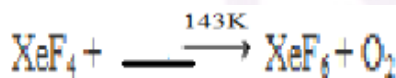
Instructions:

1. The question paper has four parts: A, B, C and D. All parts are compulsory.
2. Write balanced chemical equations and draw labelled diagrams wherever required.
3. Use log tables and the simple calculators if necessary. (Use of Scientific Calculator is not allowed)

PART- A

I. ANSWER ALL THE QUESTIONS. EACH QUESTION CARRIES 1 MARK. $10 \times 1 = 10$

1. What is the effect of temperature on molality of a solution?
2. How does the size of blood cell changes when placed in an aqueous solution containing less than 0.9% (m/v) sodium chloride?
3. The resistance of a conductivity cell containing 0.001M KCl solution at 298K is 1500Ω. What is the cell constant if conductivity of 0.001M KCl solution at 298K is $0.146 \times 10^{-3} \text{ Scm}^{-1}$?
4. Give an example for pseudo first order reaction.
5. What is adsorption isotherm?
6. Noble gases have large positive values of electron gain enthalpy. Why?
7. Complete the following equation:



8. Give an example for geminal halide.
9. Which type of Aldehydes does not undergo Cannizzaro's reaction?
10. What are nucleotides?

PART- B

II. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 2 MARKS. $5 \times 2 = 10$

11. Give any two differences between amorphous and crystalline solids.
12. Write the overall cell reaction during the working of Daniel cell.
13. For the reaction $R \rightarrow P$, the concentration of reactant changes from 0.03M to 0.02M in 25 min. Calculate the average rate of reaction in seconds.
14. How will you account for the following?
 - i) Zr and Hf sizes are almost same.
 - ii) What is the composition of mischmetal..
15. Explain Friedel-Crafts acylation with equation by taking chlorobenzene as example.
16. Explain Kolbe's reaction.
17. Give the preparation of phenol from cumene.
18. Explain carbylamine reaction with an example.

PART- C

III. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 3MARKS. 5×3= 15

19. Discuss the principle involved in the manufacture of ammonia by Haber's process along with the chemical equation. 3
20. Give any three reasons for the anomalous behavior of oxygen. 3
21. i) What is aqua regia?
ii) Write the structure of chlorous acid.
iii) Complete the equation: $\text{Br}_2 + 5\text{F}_2(\text{excess}) \rightarrow \underline{\hspace{2cm}}$ 1+1+1
22. i) Many copper(I) compounds are unstable in aqueous solution and undergo disproportionation. Explain.
ii) What are interstitial compounds? 2+1
23. a) Write general valence shell electronic configuration of d-block elements.
b) d-Block elements act as good catalysts. Give any two reasons. 1+2
24. Give any three postulates of Werner's theory of coordination compounds
25. Based on VBT, explain the formation of $[\text{Ni}(\text{CN})_4]^{2-}$. 3
26. i) Write the structure of decacarbonyldimanganese(0), $\text{Mn}_2(\text{CO})_{10}$.
ii) What are homoleptic complexes? Give an example. 1+2

PART -D

IV. ANSWER ANY THREE OF THE FOLLOWING. EACH QUESTION CARRIES 5MARKS. 3×5=15

27. a) Calculate the packing efficiency in a cubic close packed (ccp) structure.
b) An element having atomic mass 60u has fcc lattice, the edge length of the unit cell 400pm. Calculate the density of the crystal ($N_A = 6.022 \times 10^{23}$) 3+2
28. a) Addition of 0.643g of a compound to 50mL of a liquid (density=0.879g/mL) lowers the freezing point from 5.51°C to 5.03°C . Calculate the molar mass of the compound. (K_f for benzene = 5.12K Kg mol^{-1})
b) Give any two differences between ideal and non-ideal solutions. 3+2
29. a) The standard electrode potential for Daniel cell is 1.1V. Calculate the standard Gibbs energy change for the reaction;
$$\text{Zn}_{(\text{s})} + \text{Cu}^{2+}_{(\text{aq})} \rightarrow \text{Zn}^{2+}_{(\text{aq})} + \text{Cu}_{(\text{s})}$$

b) Write any two factors affecting ionic conductance. 3+2
30. a) Derive integrated rate equation for a first order reaction.
b) Which step of the reaction mechanism decides the order of reaction in complex reactions? 4+1
31. a) How does free energy and entropy changes during adsorption?
b) What is coagulating value? The coagulating value of A and B will be 2.4×10^{-3} millimole per litre and 1.2×10^{-2} millimole per litre, which one has higher coagulating power?
c) What is Craft temperature (T_k)? 2+2+1

V. ANSWER ANY FOUR OF THE FOLLOWING. EACH QUESTION CARRIES 5MARKS. 4×5=20

32. a) Write S_N^2 mechanism and mention the order of this reaction.

- b) What are Grignard reagents? Write its general formula. 3+2
33. a) Explain the mechanism of dehydration ethanol to ethene.
- b) Explain Williamson's synthesis with an example. 3+2
34. a) Lower members of aldehydes and ketones are miscible with water. Give reason
- b) Complete the following reactions:
- i)
- $$\text{C}_6\text{H}_6 \xrightarrow[\text{Anhy. AlCl}_3/\text{CuCl}]{\text{CO, HCl}}$$
- ii)
- $$\text{C}_6\text{H}_5\text{CHO} + \text{C}_6\text{H}_5\text{COCH}_3 \xrightarrow[293\text{K}]{\text{OH}^-}$$
- c) How does acetaldehyde reacts with hydrazine? Give equation. 1+2+2
35. a) What is Hell-Volhard-Zelinsky reaction? Give an example
- b) Explain the effect of electron withdrawing groups on acidity of carboxylic acid.
- c) Explain decarboxylation of benzoic acid with equation. 2+2+1
36. a) Write the equation and IUPAC name of the product formed when aniline reacts with bromine water at room temperature.
- b) Write the increasing order of basicity of the following amines in aqueous solution.
 NH_3 , $(\text{C}_2\text{H}_5)_3\text{N}$, $\text{C}_2\text{H}_5\text{NH}_2$, $(\text{C}_2\text{H}_5)_2\text{NH}$
- c) How do you prepare primary amine by Gabriel's phthalimide synthesis? Give equation. 2+1+2
37. a) Write the Haworth structure of α -D-(+)-glucopyranose.
- b) What are fibrous proteins? Give an example.
- c) Name the base which forms hydrogen bond with adenine in double stranded helix structure of DNA. 2+2+1