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FIRST TEST MODEL QUESTION PAPER

(2021-22 ACADEMIC YEAR)

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Time: 1.30min   **II PUC Chemistry (34)**   **Max. Marks: 35**

INSTRUCTIONS:

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

2. (a) Part-A carries 5 marks. Each question carries 1 mark.

     (b) Part-B carries 4 marks. Each question carries 2 marks.

     (c) Part-C carries 6 marks. Each question carries 3 marks.

     (d) Part-D carries 20 marks. Each question carries 5 marks.

3. Write balance chemical equations and draw diagrams wherever necessary.

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

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PART-A

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I. **Answer all questions. Each question   carries 1 mark.**   **1 X 5 = 5**

1. Give an example for a solid solution in which solute is a solid?

2. Define the term molarity.

3. Normal molar mass of solute is $246 gmol^{-1}$ and observed molar mass of the same solute in a solvent is $346 gmol^{-1}$. What is the value of Van't Hoff factor (i)?

4. Give the IUPAC name of vinyl chloride?

5. Chloroform is stored in dark coloured bottles. Give reason?

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Part-B

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II. Answer any TWO of the following questions. Each question carries 2 marks.   **2 × 2 = 4**

6. Write any two differences between Frenkel and Schottky defects.

7. What are ferromagnetic substances? Give an example.

8. (a) Name a member of lanthanoid series which is well known to exhibit +4 oxidation state.

   (b) Actinoid contraction is greater from element to element than lanthanoid contraction. Give reason

9. Give any two differences between lanthanides and actinides.

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Part-C

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III. Answer any TWO of the following questions. Each Question carries 3 marks.   **3 × 2 = 6**

10. How is potassium dichromate ($K_2 Cr_2O_7$) manufactured from chromite? Give balanced chemical equations.

11. Transition metals form large number of coordination compounds. Give any three reasons.

12. How does potassium permanganate react with (i) H_2S (ii) Oxalic acid (iii) Fe^{2+} ions.

13. (a) Calculate the magnetic moment of Mn^{2+} ion in aqueous solution (Z =25).

    (b) Write the general electronic configuration for 3d series of elements.

Part-D

IV. Answer any THREE of the following questions. Each question carries 5 Marks.   **5 × 3 = 15**

14. (a) Calculate the packing efficiency in simple cubic lattice.

    (b) X-ray diffraction studies show that copper crystallizes in an FCC unit cell with cell edge of 3.608×10^{-8}cm. In a separate experiment, copper is determined to have a density of $8.92 g/cm^3$. Calculate the atomic mass of copper ($N_A = 6.023 \times 10^{23}$).   (3+2)

15. (a) Calculate the packing efficiency in a cubic close packed (CCP) structure.

    (b) Calculate the number of particles (atoms) per unit cell in Body Centered Cubic unit cell (BCC). **(3+2)**

16.   (a) 31g of an unknown molecular material is dissolved in 500g of water. The resulting solution freezes at 271.14K. Calculate the molar mass of the material [Given $K_f = 1.86 Kkgmol^{-1}$ and T_f^0 of water = 273K].

    (b) Give any two differences between ideal and non-ideal solutions.   **(3+2)**

17.   (a) Calculate the osmotic pressure of 5% (m/V) solution of urea at 300K. (Given R=0.0821L atm K^{-1} and Molar mass of urea = $60 gmol^{-1}$).

    (b) State Henry's law .Write its mathematical form.   **(3+2)**

V. Answer any ONE of the following questions. Each question carries 5 marks.   **5 × 1 = 5**

18.   (a) Write S_N1 mechanism for the conversion of tert-butyl bromide to tert- butyl alcohol.

    (b) Explain Fittig reaction with chemical equation.

    (c) Name the organic product formed for the reaction of isopropyl iodide on alcoholic KOH.   (2+2+1)

19. (a) What are Grignard reagents? Give its general formula.

    (b) In the preparation of aryl halides by Sandmeyer's reaction, name the

       (i) Catalyst used   (ii) Gas liberated.

    (c) What are polyhalogen compounds?   (2+2+1)

PRACTICAL CHEMISTRY

If offline classes are not started: All experiments mentioned in the first term syllabus should be recorded in the practical record. Allot 15 marks for practical record.

If offline classes are started: Conduct practical examination by selecting any one experiment mentioned in the first term syllabus.

Note: Previous Years question paper pattern (full syllabus) and guidelines are retained.

First Term assignment questions

Unit 1: Solid state

1. Calculate the packing efficiencies of

(a) simple cubic

(b) body entered cubic

(c) face entered cubic unit cells.

2. Explain various types of defects in crystalline solids.

3. Explain different types of crystal system with their parameters and examples.

Unit 2: Solutions

1. Write short notes on;

(a) Units to express concentration of solution

(b) Henry's law

(c) Ideal solutions

2. Explain colligative properties

3. Problems on colligative properties

Unit-10 Haloalkanes and Haloarenes

1. Explain S_N1 and S_N2 mechanism with an example

2. With a balanced equation explain the following reactions

   a) Wurtz reaction   b) Wurtz –fittig Reaction   c) Fittig Reaction

   d) Firedel craft reaction   e) Finkelsteins reaction

3. Explain with an example:

   a) Swarts reaction   b) Sandmeyers Reaction   c) β- Elimination reaction

   d) Reaction of Haloalkanes with metals

   e) Addition of hydrogen halide to unsymmetrical alkene