

First Year B.Sc. Degree Examination
Aug/Sept 2009
Directorate of Correspondence Course
(Freshers)

PAPER - I : CHEMISTRY

Time : 3 Hours

Max. Marks : 85

- Note :** 1) This paper consists of four sections. Answer all sections.
2) Write equations & neat diagrams wherever necessary.

SECTION - A

- I. Answer in a word, phrase or a sentence. 10x1=10
1. State Pauli's Exclusion principle.
 2. How free radicals are formed?
 3. Define Gold number.
 4. What are propellants? Give one example.
 5. Why sigma bond is stronger than pi bond?
 6. What are isotonic solutions?
 7. Define critical volume.
 8. What are cycloalkanes?
 9. What is Adsorption?
 10. State Huckel's rule.

SECTION - B

- II. Answer any FIVE of the following. 5x3=15
11. Explain Berkeley and Hartley's method for determining the osmotic pressure of a dilute solution.
 12. What is Hybridisation? Explain the formation of methane molecule on the basis of hybridisation.
 13. a) Write a note on Wurtz's reaction. 2
b) Define most probable velocity. 1
 14. Discuss the diagonal relationship between Lithium and Magnesium.
 15. What is atomic hydrogen? How is it produced? Mention its uses.
 16. The Vanderwaal's constants per mole of CO_2 are $a=2.8 \text{ N M}^4 \text{ mol}^{-2}$ & $b=3.38 \times 10^{-5} \text{ M}^3 \text{ mol}^{-1}$. Calculate the values of critical temp & critical volume.
 17. What are Emulsions? Mention types of emulsions with examples.

SECTION - C

III. Answer any FIVE of the following. 5x6=30

18. a) Define ionisation energy. How does it vary along a period & down the group? 3
b) Define covalent radius. How does it vary along a period & down a group? 3
19. a) State Markownikoff's rule. Give the reaction mechanism of addition of HBr to propene. 3
b) Explain the acidic character of acetylene. 3
20. a) What are azeotropic mixtures? Give an example. 2
b) What is Ebullioscopic constant? 5 gm of a substance dissolved in 100 gm of water solvent produced a depression of 1.5⁰c in the freezing point of the solvent. Calculate molecular weight of the substance Kf for water (1kg)=1.85. 4
21. a) How Nitrogen and Sulphur are detected by Lassaigne's test? Write equations. 4
b) How do you synthesize cyclopropane by Freund's method? 2
22. a) Explain the mechanism of Friedel crafts alkylation of Benzene. 3
b) Give the mechanism of SN¹ reaction. 3
23. a) Write the composition of Soda glass, potash glass & flint glass & mention their uses. 3
b) Discuss the manufacture of cement by dry process. 3
24. Explain P-V Isotherms of CO₂ (Andrews curves).
b) Explain the terms i) syneresis ii) Imbibition

SECTION - D

IV. Answer any THREE of the following. 3x10=30

25. a) Give any three applications of colloids. 3
b) Draw the shapes of d orbitals. 3
c) Give the mechanism of chlorination of methane. 4
26. a) Define RMS velocity. Calculate RMS velocity of CO₂ at 27⁰c. 3
b) What are i) Electrophiles ii) Nucleophiles iii) Carbanions ? 3
c) Derive the relation between molar-mass of a non-volatile solute & elevation in boiling point of solution. 4

27. a) What is magnetic quantum number? Give all the possible values of ' l ' & ' m ' when $n=3$. 3
- b) What are adsorption isotherms? Derive Langmuir adsorption isotherm equation for unimolecular layer. 4
- c) Explain the classification of elements in the periodic table on the basis of their electronic configuration. 3
28. a) State the distribution law. What are its applications? 3
- b) Explain the laws of osmotic pressure. 3
- c) Calculate the osmotic pressure of a 7% solution of cane sugar at 300K (Molecular mass=342, $R=8.314$ J/K/mol). 3
- d) Define Inversion temperature. 1

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