

**B.N.Bandodkar College of Science, Thane.**  
**A.T.K.T EXAM. FEB. 2011**  
**F.Y.B.Sc.**

**CHEMISTRY Paper-II**

**Marks: 90**  
**Duration: 3hrs.**

**N.B.**

- 1) All questions are compulsory.
- 2) Figures to the right indicate full marks.
- 3) Use of log table/nonprogrammable calculator is allowed.
- 4) Answers to the two sections should be written in the same answer book.

**SECTION – I**

- Q.1) A. What are significant figures? (3)  
B. Attempt any **THREE** of the following:  
i) Calculate the entropy change taking place when 2.0 moles of an ideal gas is expanded isothermally and reversibly from a volume of 5 dm<sup>3</sup> to 50 dm<sup>3</sup> at 300K. (4)  
( R = 9.314 J/mol/K).  
ii) Derive the relation between Helmholtz energy and Gibbs energy. (4)  
iii) Derive an expression for the efficiency of a reversible engine using a Carnot cycle. (4)  
iv) Give the various statements of 1<sup>st</sup> law of Thermodynamics. (4)  
v) Explain the significance of graphical representation of experimental data. (4)
- Q.2) A. Explain Homolytic and heterolytic fission of the covalent bond. (3)  
B. Attempt any **THREE** of the following:  
i) Discuss what are the factors affecting the stability of Carbocations. (4)  
ii) Explain Kolbe's electrolytic reaction of formation of Carbon Free Radicals. (4)  
iii) Discuss the structures of Singlet and Triplet Carbenes. (4)  
iv) Explain the Lowry-Bronsted concept of Acid-Base. (4)  
v) Explain Petroleum refining with the diagram. (4)
- Q.3) A. Justify Cs-F bond is electrovalent in nature. (3)  
B. Attempt any **THREE** of the following:  
i) Explain Born-Haber cycle for the formation of NaCl. (4)  
ii) What is hybridization? Explain in Boron trifluoride molecule. (4)  
iii) What is VSEPR Theory? Discuss the structure of BrF<sub>5</sub> on the basis of VSEPR Theory. (4)  
iv) Explain in short: (4)  
a) Lattice energy.  
b) Co-ordinate Covalent bond.  
v) Explain energies involved in electrovalent bond formation. (4)

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## SECTION – II

- Q.4) A. Define the terms wavelength and frequency. (3)  
B. Attempt any **THREE** of the following:  
i) Explain the use of Computers in chemical analysis. (4)  
ii) Define molarity and mole fraction. (4)  
iii) Vinegar is a solution of acetic acid. What is the molarity of the solution produced when 125 g of acetic acid is ( $\text{CH}_3\text{COOH}$ ) dissolved in sufficient water to prepare 1.5L of solution? (4)  
iv) Explain various types of molecular spectra. (4)  
v) Write a note on Selection Rule. (4)
- Q.5) A. Explain the Huckel's rule of aromaticity. (3)  
B. Attempt any **THREE** of the following:  
i) What are the characteristic properties of aromatic compounds. (4)  
ii) Discuss the aromaticity of Benzene with MOT diagram. (4)  
iii) Explain Aldol condensation reaction. (4)  
iv) Explain: (4)  
a) Wolf-Kishner reduction reaction.  
b) Clemenson's reduction reaction.  
v) Discuss: (4)  
a) quaternisation reaction of amines.  
b) Hofmann elimination reaction.
- 6) A. Discuss the role of Copper in Biological system.  
B. Attempt any **THREE** of the following:  
i) Write a short note on Green house effect. (4)  
ii) Discuss the pollution of atmosphere by acids of Nitrogen with respect to: (4)  
a) Source of emission.  
b) Health Hazards.  
iii) Give electronic configuration of elements of Gr.14 and discuss their oxidation states. (4)  
iv) Explain preparation and uses of Silicons. (4)  
v) Discuss the role of Na and K in biological system. (4)