



F.E. (Semester – I) Examination, 2011
APPLIED SCIENCE – I (Chemistry)
(2008 Pattern)

Time : 2 Hours

Max. Marks : 50

- Instructions :** 1) Solve **Q. 1** or **Q. 2**, **Q. 3** or **Q. 4**, and **Q.5** or **Q.6**.
2) **Neat** diagrams must be drawn **wherever** necessary.
3) **Black** figures to the **right** indicate **full** marks.
4) **Use** of logarithmic tables, slide rule, Mollier charts, electronic pocket calculators and steam tables is **allowed**.
5) Assume suitable data, if **necessary**.

1. a) What is meant by crystal defects ? State the effects of crystal defects on the properties of crystal. Compare Schottky and Frenkel defects. **7**
b) i) Show that radius ratio for ionic crystals with co-ordination no. 3 is 0.155. **4**
ii) Convert the following Weiss indices of the following planes into Miller's Indices.
a) (2, 1,2) b) (3, -1, 1) **2**
c) What are carbon nanotubes ? State different types of carbon nanotubes and give their applications. **4**

OR

2. a) Define Atomic Packing Factor (APF). Calculate APF for SC, BCC and FCC unit cells of cubic crystal. **7**
b) Define co-ordination no.. Explain co-ordination no. with respect to cubic crystal system. **6**
c) At what glancing angle would the first order diffraction from (110) plane of NaCl be observed using X-ray of wave length 150 pm. The dimension of unit cell is 300 pm. **4**

P.T.O.



3. a) Explain Ostwald's theory of pH indicators. 6
- b) Calculate the equivalent weight of KMnO_4 in acidic, alkaline and neutral medium. 6
- c) Define primary standard solution. Give examples of primary standard solutions used in redox titration, precipitation titration and complexometric titration. 4

OR

4. a) How hardness of water is determined using complexometric titration ? 6
- b) i) Find the pH of the solution after adding 18 ml and 26 ml of 0.2 N NaOH solution to 25 ml of 0.2 N HCl in the titration. 4
- ii) 100 ml of NaCl solution when titrated with 0.05 N AgNO_3 requires 36.5 ml in Mohr's method for the end point. Calculate amount of chloride ions per lit. of NaCl soln. 2
- c) State the different types of indicators used in direct redox titration with example. 4
5. a) Explain addition polymerization on the basis of free-radical reaction mechanism with suitable example. 7
- b) Compare : 6
- i) Thermosoft and Thermoset polymers
- ii) Natural rubber and vulcanized rubber.
- c) Explain various stages involved in polymer dissolution. 4

OR

6. a) What are plastics ? Discuss various compoundings of plastics. 7
- b) Give synthesis, properties and applications of **any two** : 6
- i) Polystyrene (PS)
- ii) Polypropylene (PP)
- iii) Neoprene rubber
- iv) Silicone Rubber.
- c) Write a short note on : Conducting polymers. 4