



**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 calculator and steam tables is **allowed**.
  - 5) Assume **suitable** data, if necessary.

1. A) What are liquid crystals ? Give their types and applications. 7
- B) State the law of rational indices. How are the lattice planes in a lattice designated by Miller method ? 6
- C) What is radius ratio ? How is it related to co-ordination numbers of a cations ? 4

**OR**

2. A) State the causes of defects in metals ? Give the types of defects in metals and their effect on properties of metals. 7
- B) Explain structure of fullerene and its conductivity. Give applications of fullerenes. 6
- C) (211) planes in a cubic lattice of edge length  $5 \text{ \AA}$ , produces first order reflection maxima with X-rays of wavelength  $0.8 \text{ \AA}$ . Find the glancing angle. 4
3. A) Explain Mohr's and Volhard's methods for determination of halide ion quantity in a water sample. 6
- B) Explain the role of indicators used in
  - i) iodometric titration
  - ii) titration of  $\text{K}_2\text{Cr}_2\text{O}_7$  versus  $\text{Fe}^{++}$ . 6
- C) A solution contains 4 gms of  $\text{KMnO}_4$  per litre. Find the normality of solution which is to be used for titration in acidic medium. 4

**OR**

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4. A) Explain the strong acid - strong base titration curve with suitable indicator. Also give the formulae for calculation of pH before and after equivalence point. 6
- B) 25 ml 0.1 N acetic acid in conical flask, is titrated against 0.075 N NaOH from burette. If dissociation constant of acetic acid is  $1.85 \times 10^{-5}$ , then find the pH of titration mixture at following stages : 6
- 1) 20 ml NaOH added 2) 36 ml NaOH added.
- C) Give a note on complexometric titrations. 4
5. A) What is vulcanisation of rubber ? Give the structural changes and effect on properties of natural rubber on vulcanisation by sulphur ? 7
- B) Give preparation reaction, properties and uses of **any two** of the following : 6
- i) Polypropylene ii) HDPE iii) SBR.
- C) Give a brief account of thermally stable polymers. 4

OR

6. A) What is glass transition temperature ? Give the factors affecting it. What is the importance of glass transition temperature ? 7
- B) Write a note on recycling of polymers. 6
- C) Give the mechanism of addition polymerisation catalysed by cation. 4