Seat
No.

F.E. (Semester – I) (2008 Course) Examination, 2012
APPLIED SCIENCE – I
(Chemistry)

Time : 2 Hours   Max. Marks : 50

Instructions : 1) *Solve Q.* ***1*** *or Q.* ***2****, Q.* ***3*** *or Q.* ***4****, 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 the type of symmetries for crystals ? Explain them for a cubic crystal.   **7**

   b) i) Draw following planes in a cubic system ; a) 1 0 0   b) 1 1 1

      ii) Define :
         a) Atomic packing factor
         b) Co-ordination number
         c) Radius ratio
         d) Unit cell   **6**

   c) Derive Bragg's law of diffraction.   **4**

                          OR

2. a) What is a liquid crystal phase ? State types of liquid crystals and applications of liquid crystal.   **7**

   b) i) Show that radius ratio for ionic crystal with co-ordination number 4 is 0.225.   **4**

      ii) Explain electrical conductivity in polythiophene.   **2**

   c) Compare : SC, BCC and FCC unit cell regarding :
      i) Co-ordination number   ii) AP
      iii) Atomic radius   iv) Atoms per unit cell.   **4**

3. a) How are the pH of titration mixture calculated at various stages during strong acid strong base titration ?   **6**

   b) i) 20 ml of standard solution of 0.04 M KCl takes 35.5 ml of $AgNO_3$ from burette, during standardization of the $AgNO_3$. 100 ml of water sample requires 12.5 ml of the $AgNO_3$ solution. Calculate chloride content per litre in the given water sample.   **4**

   ii) 50 ml of a solution containing Ca^{++} is titrated against 0.035 M disodium EDTA from burette to get the end point 20.4 ml, in the complexometric titration. Calculate the amount of Ca^{++} ions per litre of the solution.   **2**

   c) Explain the different indicators used in direct titration method.   **4**

                                   OR

4. a) What is precipitation titration ? Explain Mohr's method for determination of Cl^- ions.   **6**

   b) i) Find the pH of the solution when 10 ml of 0.2 N HCl is added to 25 ml of $0.1N\ NH_4OH$ in a titration.   **4**

   ii) 50 ml sample water containing Mg salts, when titrated with 0.05 M EDTA requires 41.5 ml for the end point. Calculate Mg ions present per litre of the water sample.   **2**

   c) Define: i) Titrant   ii) Titrand   iii) Indicator   iv) Equivalence point.   **4**

5. a) What is addition polymerization ? Explain cationic mechanism with example.   **7**

   b) Give synthesis, properties and applications of **any two** :   **6**
      i) Poly Vinyl Choride (PVC)
      ii) Acrylonitrile butadiene styrene (ABS) plastics
      iii) Styrene – butadiene rubber (SBR)/ GR-S.
      iv) Poly propylene (PP).

   c) Write a note on liquid crystal polymers.   **4**

                                   OR

6. a) What is Glass transition temperature ? What are the factors affecting it ? State its importance.   **7**

   b) Distinguish: i) Addition and condensation   ii) LDPE and HDPE   **6**

   c) Give preparation, properties and uses of Epoxy resin.   **4**

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