Roll No. ....   Total Pages : 3

BT-I/D-18   **31015**

APPLIED CHEMISTRY
Paper : AS-103N

Time : Three Hours]   [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) Calculate the change in entropy when 5 mol of an ideal gas expands from a volume of 4 liter to 40 liter at 27°C.   (5)

    (b) The boiling point of chloroform is 61.2°C at 760 mm pressure. At what temperature will it boil at 1000 mm, given that latent heat of vaporization of chloroform is 59.3 cal/g and the molecular weight of chloroform is 119.5 amu?   (10)

2. (a) Discuss the application of phase rule to study a two-component system of solids, forming a compound with congruent melting point.   (9)

    (b) Distinguish between triple point and eutectic point by taking suitable example in each case.   (4)

    (c) Write reduced phase rule equation and its importance.   (2)

UNIT–II

3. (a) A standard hard water contains 0.15 g of $CaCO_3$ per liter. About 20 ml of this sample required 25 ml of EDTA solution of 100 ml of the hard water sample required 18 ml of EDTA solution. The same sample after boiling required 12 ml of EDTA solution. Calculate the total, temporary and permanent hardness of water in ppm and in degree Clarke.   (9)

    (b) Describe the given terms.   (6)
    (i) Phosphate Conditioning
    (ii) Alkalinity of Water.

4. (a) Define Green Chemistry. Name the scientist who gave the concept of green chemistry.   (3)

    (b) What are super critical fluids? How these can act as green solvents? Discuss with appropriate example.   (6)

    (c) Discuss the concept of atom economy by taking examples from addition reaction, elimination reaction, substitution reaction and rearrangement reactions.   (6)

UNIT–III

5. (a) What is meant by corrosion? Explain the electrochemical theory of corrosion.   (3)

    (b) What are Corrosion Inhibitors? How these are helpful in prevention of corrosion?   (6)

    (c) Write short notes on :
    (i) Pitting corrosion
    (ii) Water-line corrosion   (6)

6. (a) Define the following terms with reference to the lubricating oil (6)
      (i) Emulsification
      (ii) Aniline point

   (b) Explain the mechanism of
      (i) Boundary lubricants
      (ii) Hydrodynamic lubricants
      (iii) Temperature lubricants (9)

UNIT–IV

7. (a) Describe the following materials with emphasis on their chemical composition and their properties
      (i) Clay
      (ii) Vitreous Enamels (6)

   (b) What are Nanoscale materials? How are they classified on the basis of number of dimensions? (4)

   (c) Write short note on the following:
      (i) Nanocrystals
      (ii) Nanoclusters. (5)

8. Explain the characteristics and applications of following:
   (i) Dendrimers
   (ii) Nanocomposites (15)