B.Sc. (Part–III) Semester–VI Examination

INDUSTRIAL CHEMISTRY (R/V)

(Instrumental Methods of Chemical Analysis, Green Chemistry)

Time : Three Hours] [Maximum Marks : 80

Note :— (1) Question No. **1** is compulsory and carries **8** marks.
(2) Remaining questions carry **12** marks each.
(3) Give chemical equations and draw diagrams wherever necessary.
(4) Use of scientific calculator is allowed.

1. (A) Fill in the blanks :
(i) The small quantity removed from the bulk for analysis is called _____.
(ii) Precision is defined as the degree of agreement between repeated measurement of _____ quantity.
(iii) In all chromatographic techniques, difference in affinity involves the process of either adsorption or _____.
(iv) Anion exchangers are cross linked high molecular weight polymers containing _____ groups. 2

(B) Choose the correct alternatives :
(i) Paper chromatography is practically suitable for :
(a) Ion exchange (b) Partition
(c) Adsorption (d) Size exclusion
(ii) Picric acid is _____ coloured dye.
(a) Red (b) Blue
(c) Black (d) Yellow
(iii) Which of the following is not the basic component of X-ray fluorescence instrumentation ?
(a) Goniometer (b) Column
(c) Collimator (d) Diffracting crystal
(iv) In chromatography on stationary phase the substance gets :
(a) Reabsorbed (b) Absorbed
(c) Adsorbed (d) None of these 2

(C) Answer in **one** sentence :
(i) Define ion exchange capacity.
(ii) What is auxochrome ?
(iii) Define sampling.
(iv) What is a dye ? 4

UNIT–I

2. (a) Give an account of sampling techniques of gases. 4
(b) Explain the terms :
(i) Mean deviation (ii) Relative standard deviation 4
(c) Discuss the types of errors. 4

OR

3. (p) Discuss the techniques of sampling of liquids. 4
   (q) Explain the process of sampling of solids. 4
   (r) Discuss :
      (i) Standard deviation
      (ii) Confidence limit. 4

UNIT–II

4. (a) Discuss the technique of paper chromatography. 4
   (b) Give an account of thin layer chromatography with applications. 4
   (c) Discuss the applications of HPLC. 4

OR

5. (p) Discuss the applications of chromatography in general. 4
   (q) Define chromatography. Give classification of chromatographic techniques. 4
   (r) Explain the principle and techniques of Gas Liquid Chromatography (GLC). 4

UNIT–III

6. (a) Explain the experimental requirements and factors affecting column efficiency. 6
   (b) Discuss the techniques of solvent extraction. 6

OR

7. (p) Define ion exchange. Discuss the ion exchange capacity of resins. 6
   (q) Describe factors affecting solvent extraction and application of solvent extraction in industries. 6

UNIT–IV

8. (a) Explain the technique of X-ray fluorescence with its applications. 6
   (b) Describe the principle, techniques and application of IR spectroscopy. 6

OR

9. (p) Give an account of elementary theory of flame photometry. 6
   (q) Draw and explain X-ray fluorescence spectrophotometer. 6

UNIT–V

10. (a) How are dyes classified as acid and basic dyes ? 4
    (b) Explain the preparation and uses of Indigo dye. 4
    (c) Discuss the manufacture of aurine dye. 4

OR

11. (p) Discuss crystal violet dye with respect to its preparation and uses. 4
    (q) Explain chromophores and auxochromes. 4
    (r) Describe the preparation of picric acid with uses. 4

UNIT–VI

12. (a) Explain the goals of Green Chemistry. 6
    (b) Discuss the principles of Green Chemistry. 6

OR

13. (p) Explain the basic components of green chemistry as alternative starting materials and alternative product and target molecules. 6
    (q) Explain the following
       (i) Green solvent
       (ii) Bio catalysis
       (iii) Green fuels. 6