AS–1477

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

INDUSTRIAL CHEMISTRY (R/V)

(Instrumental Methods of Chemical Analysis, Green Chemistry)

Time : Three Hours] [Maximum Marks : 80

N.B. :— (1) Question No. **1** is compulsory and carries 8 marks.

(2) Remaining all **SIX** 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 :— 2

(i) Ion exchange involves the reversible exchange of ions of _____ charge between a solid and a solution.

(ii) The degree of agreement between repeated measurements of same quantity is termed as _____.

(iii) A dye should be resistant to the action of light, water and _____.

(iv) In paper chromatography, stationary and mobile phases are always _____.

(B) Choose the correct alternatives :— 2

(i) Which of the following is not the region of electromagnetic spectrum in IR spectroscopy ?

(a) Near (b) Over

(c) Middle (d) Far

(ii) Ionic liquids are emerging as _____ solvents.

(a) Green (b) Yellow

(c) Black (d) Red

(iii) Which of the following gases is used as a carrier gas for gas liquid chromatography ?

(a) Oxygen (b) Sulfur dioxide

(c) Ammonia (d) Nitrogen

(iv) In column chromatography, the method of separation is/are :

(a) Adsorption (b) Partition

(c) Ion exchange (d) All

(C) Answer in **ONE** sentence :— 4

(i) Define error.

(ii) What is green chemistry ?

(iii) What is ion exchange capacity ?

(iv) What is meant by synergistic extraction ?

UNIT—I

2. (A) Give an account of sampling technique of Solids. 4

(B) Describe random and non-random sampling. 4

(C) Explain :— (i) Accuracy (ii) Mean deviation. 4

OR

3. (P) Discuss the sampling of gases. 4

(Q) In an alloy, the percentage of tin is found to be 40.22, 40.46, 40.28 and 40.32. Determine mean and standard deviation. 4

(R) Explain the terms :—

(i) Confidence limit

(ii) Deviation. 4

UNIT—II

4. (A) Discuss the experimental details of paper chromatography. 6

(B) Explain the technique of HPLC. 6

OR

5. (P) Give an account of GLC with respect to its principle, stationary and mobile phases and applications. 6

(Q) Discuss the technique of thin layer chromatography. 6

UNIT—III

6. (A) Explain the classification of ion exchange resins. 4

(B) Give the principle and applications of column chromatography. 4

(C) Discuss the factors affecting solvent extraction. 4

OR

7. (P) Explain :—

(i) Ion exchange capacity

(ii) Ion exchange equilibria. 4

(Q) Describe the experimental technique of column chromatography. 4

(R) Discuss the classification of solvent extraction systems. 4

UNIT—IV

8. (A) Explain the instrumentation of flame photometry. 6

(B) Discuss IR spectroscopy with respect to its principle and applications. 6

OR

9. (P) Draw the flow sheet diagram of X-ray fluorescence technique and explain it. 6

(Q) Give the principle of flame photometry and explain its applications. 6

UNIT—V

10. (A) Give the preparation and uses of crystal violet dye. 4

(B) Discuss acid and basic dyes. 4

(C) Give an account of indigo dye with respect to its preparation and uses. 4

OR

11. (P) Explain the classification of dyes on the basis of modes of applications. 4

(Q) Discuss the preparation and uses of methyl orange dye. 4

(R) What are dye intermediates ? Explain. 4

UNIT—VI

12. (A) Give an account of alternative feed stock or starting materials. 4

(B) Describe green fuels and E-green propellants. 4

(C) Discuss the goals of green chemistry. 4

OR

13. (P) Explain alternative reaction conditions. 4

(Q) Give an account of green solvents. 4

(R) Discuss alternative reagents or transformations with an example. 4