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

6S : 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 : 2

(i) In paper chromatography, the mobile phase is also called as developing _____.

(ii) Chromophores are the groups responsible for producing _____ to a dye.

(iii) _____ is the numerical difference between a measured value and true value.

(iv) The results of chromatographic separations are expressed in terms of _____.

(B) Choose the correct alternatives : 2

(i) For analytical purpose, the useful X-ray region of electro magnetic spectrum lies between :

(a) 0.1 to 0.5 Å (b) 0.7 to 2.0 Å

(c) 5-50 Å (d) 75-100 Å

(ii) The concept of green chemistry was coined by :

(a) L. Pauling (b) F. Haber

(c) T. Graham (d) P. Anestas

(iii) Which of the following is not the basic component of X-ray fluorescence instrumentation ?

(a) Goniometer (b) Collimator

(c) Column (d) Diffracting crystal

(iv) Paper chromatography is practically suitable for :

(a) Partition (b) Ion exchange

(c) Adsorption (d) Molecular sieving

(C) Answer in one sentence : 4

(i) Define the term accuracy.

(ii) What is ion exchange ?

(iii) Why homonuclear molecules do not exhibit IR spectra ?

(iv) What is a dye ?

UNIT—I

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

(B) Explain the terms :

(i) Deviation

(ii) Standard deviation. 4

(C) Discuss random and non-random sampling. 4

OR

3. (P) How are errors classified ? Explain. 4

(Q) Describe the technique of sampling of gases. 4

(R) Explain the terms :

(i) Mean deviation

(ii) Relative standard deviation. 4

UNIT—II

4. (A) Discuss the technique of GLC. 6

(B) Explain paper chromatography with respect to its principle, stationary and mobile phases and applications. 6

OR

5. (P) Give an account of technique of HPLC. 6

(Q) Explain the principle, stationary and mobile phases and applications of thin layer chromatography. 6

UNIT—III

6. (A) Explain the factors affecting solvent extraction. 4

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

(C) Discuss any four applications of ion exchange. 4

OR

7. (P) Give the experimental technique of column chromatography. 4

(Q) Discuss the classification of ion exchange resins. 4

(R) Explain the technique of continuous extraction. 4

UNIT—IV

8. (A) Discuss the technique of IR spectroscopy. 6

(B) Give an account of elemental theory of flame photometry. 6

OR

9. (P) Explain the technique of X-ray fluorescence. 6

(Q) Give the principle of flame photometry and explain the burners used in it. 6

UNIT—V

10. (A) Explain chromophores and auxochromes. 4

(B) Give the classification of dyes on the basis of mode of application. 4

(C) Discuss the preparation and uses of picric acid dye. 4

OR

11. (P) Discuss crystal violet dye with respect to its preparation and uses. 4

(Q) How are dyes classified as acid and basic dyes ? 4

(R) Explain the preparation and uses of alzarin dye. 4

UNIT—VI

12. (A) Discuss the principles of green chemistry. 4

(B) Give an account of alternative reagents or transformations. 4

(C) Discuss the design of greener synthetic pathway. 4

OR

13. (P) Define green chemistry. Explain the role of ionic liquids in green chemistry. 4

(Q) What are the goals of green chemistry ? 4

(R) Explain alternative reaction conditions. 4

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