UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 5th Semester Examination, 2020

DSE1-CHEMISTRY

ANALYTICAL METHODS IN CHEMISTRY

Full Marks: 40

ASSIGNMENT

The figures in the margin indicate full marks.
All symbols are of usual significance.

Answer any *four* questions from the following 10×4=40

1. (a) Explain what are meant by precision and accuracy. 2
   (b) What is indeterminate errors? 2
   (c) What is the difference between F-test and T-Test? 2
   (d) Discuss the rejection of data and confidence interval in analytical techniques. 2+2

2. (a) Discuss the basic principle of Solvent Extraction. 3
   (b) What are the factors to be considered in the selection of solvent in solvent extraction? 3
   (c) Prove mathematically that better efficiency in solvent extraction is achieved by using small volume of solvent for a larger number of times than to use large volume for once. 4

3. (a) What is R_f value? Explain its significance and use. What are factors on which R_f depends? 1+2+2
   (b) State and explain Lambert-Beer's law. 2
   (c) Discuss the basic principle of UV-visible spectroscopy. 3

4. (a) Describe the method of separation of thin layer chromatography. 4
   (b) What are the selection rules for IR spectroscopy? 2
   (c) Explain the following terms: 2+2
      (i) Signal to noise ratio
      (ii) Width of spectral lines.

5. (a) Write down the theory of thermogravimetry. 4
   (b) Discuss the determination of composition of metal complexes using Job's method of continuous variation. 4
   (c) Define separation factor in solvent extraction. 2

6. (a) Explain the nature of the conductometric titration curve for the titration of 2+2
   (i) HCl vs. NaOH
   (ii) CH_3COOH vs. NaOH.
   (b) Elucidate the principles of gas-liquid chromatography. 4
   (c) What is the detector used in IR spectroscopy? 2

7. (a) Discuss the role of complexing agents in solvent extraction. 4
   (b) Write down the basic principle of Potentiometric titration. 4
   (c) What are the essential characteristics of the substance used as a developer? 2

8. (a) Discuss the role of computers in instrumental methods of analysis. 4
   (b) Explain the basic principle of pH metric titration. 4
   (c) Differentiate between RAM and ROM. 2

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