UNIVERSITY OF NORTH BENGAL

B.Sc. Honours Part-III Examination, 2021

CHEMISTRY

PAPER-X

Full Marks: 65

ASSIGNMENT

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

1 mark for neat and precise presentation

GROUP-A

(ANALYTICAL)

Answer any *two* questions from the following 16×2 = 32

1. (a) Explain with example what do you mean by accuracy and precision. — 3

   (b) What are determinate and indeterminate errors? How determinate errors are minimized? — 3+3

   (c) Five careful determination of iron in an iron ore by a volumetric method give the percentage 67.48, 67.37, 67.47, 67.43 and 67.40. Find out the average deviation and standard deviation. — 4

   (d) Discuss briefly the least square method for best fitted straight line $(y = mx + c)$. — 3

2. (a) (i) Find the decimal equivalents of 100.1010 and 1100.1011. — 2+2

      (ii) Give the full form of BASIC and FORTRAN.

   (b) Write the essential characteristics of the precipitate for gravimetric analysis. Differentiate between co-precipitation and post-precipitation. How are they minimized? — 2+2+3

   (c) "Multiple washing is better than single washing with the same volume of wash solvent" — Discuss. — 3

   (d) Define separation factor in solvent extraction. — 2

3. (a) What do you mean by elutotropic series in chromatography? — 2

   (b) In a gas chromatographic separation of benzene, toluene and xylene the areas under the peak were noted to be 31.0 cm^2, 14.5 cm^2 and 53.2 cm^2 respectively. Calculate the percentage composition of the sample. — 3

   (c) What are ascending, descending and horizontal paper chromatography? Write the applications of Thin Layer Chromatography. — 4+3

   (d) What is ion exchange capacity of a resin? Outline the important features of a good ion exchanger. — 2+2

4. (a) Discuss the basic principle of solvent extraction. What are the factors to be considered in the selection of solvent in solvent extraction? 3+3

   (b) 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

   (c) What is Zimmerman-Reinhardt reagent? Explain its role in the estimation of Fe^{2+} against $KMnO_4$ solution in HCl medium. 1+3

   (d) What is formal potential? 2

GROUP-B
(INDUSTRIAL)
Answer any *two* questions from the following $16 \times 2 = 32$

5. (a) Differentiate between low temperature and high temperature carbonization of coal. 3

   (b) Explain the terms Flash point and Aniline point. 2+2

   (c) Discuss the basic chemical reactions involved in the manufacture of glass. 3

   (d) Write the composition of Portland cement. Discuss briefly about the setting of cement. 2+4

6. (a) Write down the differences between natural and artificial fibres. 3

   (b) What do you mean by vulcanization of rubber? Describe the important properties of vulcanized rubber. 2+2

   (c) Explain briefly the cleansing action of detergents. What are the advantages of detergent over soap as cleansing agent? 3+2

   (d) Give the chemical structure and name of 'Aspirin'. Write the uses of it. 2+2

7. (a) What are sulpha drugs? Give examples. Discuss the preparation and uses of Sulphathiazole. 2+4

   (b) Discuss briefly the different constituents of paints. 4

   (c) Describe the process of manufacture of Urea with a flow chart diagram. 6

8. (a) Distinguish between glass and porcelain. 2

   (b) How stainless steel is manufactured? 4

   (c) Write short notes on (any *four*): $2\frac{1}{2} \times 4 = 10$
      (i) Cetane number
      (ii) Water Gas
      (iii) Penicillin G
      (iv) DDT
      (v) Hydrogenation of oils
      (vi) Nylon 6, 6.

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