

Total Pages – 4

B.Sc. RNLK-/Chemistry/DSE-2T/21

2021

Chemistry

[Fifth Semester]

Paper - DSE-2T

Full Marks : 40

Time : 2 hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Analytical Methods in Chemistry

Group - A

1. Answer any five questions : 2×5=10

- (a) Distinguish between accuracy and precision.
- (b) Show transmittance vs concentration plot and explain why it is different from Beer's law plot?
- (c) What is determinate error?

(Turn Over)

(2)

- (d) What is 'stationary phase' in an ion-exchange chromatography?
- (e) What criterion is used in selecting an indicator for a particular acid-base titration?
- (f) How does solid-phase extraction differ from solvent extraction?
- (g) Define Chiral solvent.
- (h) What is the basis principle of 'Adsorption Chromatography'?

Group - B

Answer any four questions :

4×5=20

- 2. (a) What is the retention time and the R_f value?
(b) How does fast LC differ from conventional HPLC?
(c) What compounds can be determined by Gas chromatography (GC)? 2+2+1=5
- 3. (a) Write down a short note on counter current extraction.
(b) On heating a sample of 25 mg hydrated compound (Mol.wt =250g/mol) in TGA, 16 mg dehydrated

(3)

compound remains. What is the no of loss of water molecule from hydrated compound? 3+2

4. (a) Draw the conductometric titration curve for Barium Chloride vs Sodium Sulphate with a proper explanation.
- (b) Describe the principles of flame emission spectrometry. 3+2=5
5. (a) Write a short note on 'sampling'.
- (b) What do you mean by isosbestic point?
- (c) What is the significance of $pH_{1/2}$ value in solvent extraction equilibria? 2+2+1
6. (a) Compare the operations of a single-beam spectrophotometer and a double-beam spectrophotometer.
- (b) What are F-test and t-test? 3+2
7. (a) What will be conductometric titration curve when dil acetic acid is titrated by ammonia?
- (b) What is equivalent point?
- (c) What are the limitations of conductometric titration?

3+1+1

(4)

Group - C

Answer any one question : 10×1=10

8. (a) Explain the differences between cation-exchange resin and anion exchange resin.
- (b) Define thermogravimetric analysis. Why maintenance of inert atmosphere is an important factor for thermogravimetric analysis?
- (c) In a paper chromatographic separation of Hg^{2+} , Pb^{2+} and Ag^+ , the solvent front was 21 cm, while fronts due to these metals were 7, 14 and 18.5 cm, respectively. Calculate the R_f values of them.
- (d) Write a note on plate theory of chromatographic separation. 2+3+3+2
9. (a) What do you mean by coefficient of variation?
- (b) Using a proper relation, calculate the transmittance of a solution when its absorbance is 0.222.
- (c) Discuss the principle of liquid-liquid extraction and its important application.
- (d) Write down the limitations of 'Lambert-Beer's law'. 2+2+2+4