

U.G. 5th Semester Examination - 2024**CHEMISTRY****[HONOURS]****Discipline Specific Elective (DSE)****Course Code : CHEM-H-DSE-T-2A**

Full Marks : 40.

Time : $2\frac{1}{2}$ 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.*

1. Answer any five questions: 2×5=10
- a) What is the basic principle of atomic absorption spectrophotometer (AAS)?
 - b) What is the relationship between molar absorptivity coefficient and absorbance?
 - c) What is the application of Q-test?
 - d) What is the distribution coefficient of solvent extraction?
 - e) Write the principle of differential thermal analysis (DTA).

[Turn over]

- f) What is acidimetry and alkalimetry?
- g) What are the chemical interferences in atomic absorption spectroscopy?
- h) What is the application of conductometry?

2. Answer any two questions: $5 \times 2 = 10$

- a) State the basic principle of potentiometric titration. 5
- b) Stat the principle of IR spectroscopy. Write two differences between IR and FTIR. $3 + 2 = 5$
- c) Define precision and error. State their significance interpreting the analytical data. $2 + 3 = 5$
- d) Define the following terms: (i) releasing agent (ii) ionization suppressor in atomic absorption spectrophotometer (AAS). $2\frac{1}{2} + 2\frac{1}{2} = 5$

3. Answer any two questions: $10 \times 2 = 20$

- a) What is sampling? Give a brief description on the different steps involved in general sampling process. What are the two important factors involved with every sampling process? What is the difference between a Q-test and a t-test? $2 + 3 + 2 + 3 = 10$

b) Define the following terms with suitable examples in UV-visible spectroscopy:

- i) Bathochromie shift
- ii) Hypsochromic shift
- iii) Hyperchromic shift
- iv) Hypochromic shift.

Calculate the vibrational degrees of freedom for

(i) CO_2 , (ii) C_6H_6 . $(2 \times 4) + 2 = 10$

c) State the principle of atomic emission spectroscopy (AES). Name different types of radiation source for the atomization in atomic emission method. Why a separate lamp is required to determine each element in AAS?

$5 + 3 + 2 = 10$

d) What is frontal and displacement analysis in Chromatography? State different types of techniques to remove metal ions from aqueous solutions. Illustrate the mechanism of ion exchange and adsorption for separation.

$4 + 2 + 4 = 10$