

**U.G. 3rd Semester Examination - 2021**

**CHEMISTRY**

**[HONOURS]**

**Skill Enhancement Course (SEC)**

**Course Code : CHEM-H-SEC-T-1A&B**

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.*

**Answer all the questions from selected Option.**

**OPTION-A**

**CHEM-H-SEC-T-1A**

**(IT Skills for Chemists)**

1. Answer any **five** questions:  $2 \times 5 = 10$
- Which numerical integration method is efficient to process/handle heat capacity data?
  - Write the characteristics of Gaussian distribution curve.
  - Explain the term relative error with example.
  - Write four statistical analysis tools used in Chemistry.
  - How many loops are required for matrix addition and matrix multiplication?

- What do you mean by cell address in Excel?
- $f(x) = 108 + 5x^2 + 2x^3$ . Find  $f'(-3)$ .
- Convert  $(187)_{10}$  into the binary number.

2. Answer any **four** questions:  $5 \times 4 = 20$
- Explain the curve fitting problem.
  - Explain the differences between compiler and interpreter.
  - “It is not advisable to compute differentiation using interpolation”– Justify this statement.
  - What are the differences between AND and NAND logical operators?
  - When ice melts what happens to the entropy of the system and why?
  - What are the errors when debugging a program.
3. Answer any **one** question:  $10 \times 1 = 10$
- What do you mean by standard deviation? Calculate the value of standard deviation for the following results: 70.2, 70.12, 70.18.
  - What is the pH of 0.4 (M)  $\text{CH}_3\text{COOH}$ ?  $\text{pK}_a$  of Acetic acid = 4.75.
    - Describe Bragg’s Law.
  - Discuss Newton-Raphson method to find a root of an equation.

[Turn over]

**OPTION-B**  
**CHEM-H-SEC-T-1B**  
**(Basic Analytical Chemistry)**

1. Answer any **five** questions:  $2 \times 5 = 10$
- a) Why EDTA solution is not used as a primary standard solution?
  - b) What is the importance of sampling in analytical Chemistry?
  - c) What is the limitation of TLC?
  - d) Why the  $R_f$  value is less than 1 in paper chromatography?
  - e) In which unit we can determine the hardness of water?
  - f) What are the compositions of soil?
  - g) In a water sample BOD is 60 mg/L - what do you mean by it?
  - h) Write the name of one cation and one anion exchange resin.
2. Answer any **two** questions:  $5 \times 2 = 10$
- a) Write down the structure of Zn-EDTA. What are the benefits for use of EDTA in complexometric titration?  $3+2$
  - b) Why Polydentate ligands are formed more stronger complexes than monodentate ligands? What is the role of magnesium carbonate and ZnO in Talcom powder?  $3+2$

- c) What do you mean by masking and demasking reagents? What is Complexone? Give example.  $2+2+1$
  - d) What are called metal ion indicators? Give two examples of metal ion indicators.  $3+2$
3. Answer any **two** questions:  $10 \times 2 = 20$
- a) What is permutit? How can you make hard water to soft water by using permutit? What is the use of this water. What is adulterant? Which adulterants are found in turmeric powder?  $2+3+2+2+1$
  - b) Write down the five methods for purification of water. How can you determine the BOD of water sample? What is its importance? How BOD is differ from COD?  $3+3+1+3$
  - c) What do you mean by ion exchange capacity? What is deodorant and what is its composition? What do you mean by antiperspirants and what is its use? What are the difference between edible colours and chemical colours?  $2+3+3+2$
  - d) How you can calculate total hardness of water? What is the normal pH of drinking water? How can you determine iron in vitamin tablets by using spectro photometric method?  $4+1+5$