

U.G. 3rd Semester Examination - 2020

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

[Turn over]

- 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: 5×4=20
- What are the differences between AND and NAND logical operators?
 - Explain the curve fitting problem.
 - “It is not advisable to compute differentiation using interpolation”– Justify this statement.
 - Explain the differences between compiler and interpreter.
 - 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: 10×1=10
- What is the pH of 0.4 (M) CH_3COOH ? pK_a of Acetic acid = 4.75.
 - Describe Bragg’s Law.
 - What do you mean by standard deviation? Calculate the value of standard deviation for the following results: 70.2, 70.12, 70.18.
 - Discuss Newton-Raphson method to find a root of an equation.

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

1. Answer any **five** questions: 2×5=10
- i) Write down the name of two metal ion indicator.
 - ii) What do you mean by chromatography?
 - iii) Write the name of preservatives which is used for protect food from fungus.
 - iv) What types of adulterants are used in chilli and turmeric powder?
 - v) What is the full name and structure of EDTA.
 - vi) Give the example of one monodentate and one bidentate ligand.
2. Answer any **two** questions from the following: 5×2=10
- i) What do you mean by biological oxygen demand? What are the methods for purification of water in rural areas? 3+2
 - ii) What are the role of ligand for stability of complex compound? What are the role of magnesium carbonate and ZnO in talcum powder. 3+2
 - iii) Why colours are used in food? What are edible colours? How they are differ from chemical colours? 2+1+2

- iv) How TLC differ from paper chromatography? Why R_f value is less than 1 in paper chromatography? 3+2
3. Answer any **two** questions from the following: 10×2=20
- i) What is the basic principle of chromatography? Write down the structure of Ca-EDTA. How can you determine Iron in vitamin tablets by spectro photometrically?
 - ii) What is the condition for use of metal ion indicator in complexometric titration? What are the merits for use of EDTA in complexometric titrations? Why buffer solution is used for EDTA titration?
 - iii) How can you calculate ion exchange capacity? What is retention factor? What is the main advantage of use paper chromatography? What do you mean by adulterants?
 - iv) How can you separate Fe^{3+} and Al^{3+} by using paper chromatography? What will be happen if we add at first small amount of KCN solution and then add excess amount of KCN solution with the $AgNO_3$ solution?