

U.G. 3rd Semester Examination - 2024

CHEMISTRY

[HONOURS]

Skill Enhancement Course (SEC)

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

[CBCS]

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
- a) Sketch the curve $y=x^2 - 9$.
 - b) What is the relation between standard error and standard deviation?
 - c) What are the full forms of COBOL and Fortran?
 - d) Explain the term relative error with an example.
 - e) The normality of a solution is determined by four separate titrations, the results being 0.2041, 0.2049, 0.2039 and 0.2043. Calculate the standard deviation.

[Turn over]

- f) Classify as legitimate real and integer variables: ABCD, EFGH, IJKL, MNOP, QRST, UVWX, YZ12.
- g) Write the characteristics of the Gaussian distribution curve.
- h) What do you mean by source code and object code? How do they differ?
2. Answer any **four** questions: $5 \times 4 = 20$
- Explain the differences between RAM and ROM.
 - Derive the iteration formula for solving an algebraic equation by Newton-Raphson method.
 - Briefly explain the Least Square Method.
 - What are the errors when debugging of program?
 - For what purpose are t-test and F-test used? What is meant by 95% confidence limit?
 - Explain the differences between compiler and interpreter.
3. Answer any **one** question: $10 \times 1 = 10$
- Express the van der Waals equation of state as a cubic equation of V. State and explain the Trapezoidal rule. $5 + 5 = 10$
 - Estimate the degree of dissociation of acetic acid at 300K, given pK_a of acetic acid as 4.74.
 - Calculate pH of 10^{-7} M benzoic acid (given, K_a of benzoic acid 6.5×10^{-5})
 - Describe Simpson's rule. $5 + 5 = 10$

OPTION-B
CHEM-H-SEC-T-1B

(Basic Analytical Chemistry)

1. Answer any **five** questions: $2 \times 5 = 10$
- Distinguish between field sample and laboratory sample.
 - Maintenance of pH in soil samples is very important- explain why?
 - What do you mean by complexometric titration?
 - BOD of a water sample is 60mg/L-what do you mean by this statement?
 - Name the composition of talcum powder.
 - What are the organic compositions of soils?
 - What do you mean by retention factor in chromatographic separation technique?
 - Why buffer solution is added during the estimation of hardness of water. Give two examples.
2. Answer any **two** questions: $5 \times 2 = 10$
- Name the masking and demasking agents with respect to a complexometric titration. What are the roles of ZnO, TiO₂ and boric acid in talcum powder? $2 + 3$
 - What is chelating agents? Give one example. State the principle of complexometric titration using this chelating agents.

- c) What is permutit process? How can you make hard water to soft water by employing permutit it process? 3+2
- d) Name the metal ion indicator used for the estimation of hardness of water. Draw its structure. Write down the name and structure of a penta dentate ligand. 3+2
3. Answer any two questions: 10×2=20
- a) What do you mean by food-flavouring agent and food-colouring agent? Give examples for each agent. How can you determine the BOD of a water sample? How does BOD differ from COD? 4+3+3
- b) What is Ion-exchange capacity? What do you mean by antiperspirants and what are their uses? How can you determine iron in vitamin tablets by using spectrophotometric methods. 2+3+5
- c) What do you mean by exchange affinity of an ion exchange resin? Discuss the sequence of separation of hydrated alkali metal ions by using through a cation exchange resin. What do you mean by back titration? Give one example. 3+3+2+2
- d) What is chemical oxygen demand of a water sample? Write all chemical reactions involving in determination of COD. How it is differ from BOD? 3+4+3

U.G. 3rd Semester Examination - 2024

CHEMISTRY

[HONOURS]

Skill Enhancement Course (SEC)

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

[CBCS]

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
- a) Sketch the curve $y=x^2 - 9$.
 - b) What is the relation between standard error and standard deviation?
 - c) What are the full forms of COBOL and Fortran?
 - d) Explain the term relative error with an example.
 - e) The normality of a solution is determined by four separate titrations, the results being 0.2041, 0.2049, 0.2039 and 0.2043. Calculate the standard deviation.

[Turn over]