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 realtive 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: 5×4=20

a) Explain the differences between RAM and ROM.

b) Derive the iteration formula for solving an algebraic equation by Newton-Raphson method.

c) Briefly explain the Least Square Method.

d) What are the errors when debugging of program?

e) For what purpose are t-test and F-test used? What is meant by 95% confidence limit?

f) Explain the differences between compiler and interpreter.

3. Answer any **one** question: 10×1=10

a) Express the van der Waals equation of state as a cubic equation of V. State and explain the Trapezoidal rule.   5+5=10

b) Estimate the degree of dissociation of acetic acid at 300k, given pKa of acetic acid as 4.74.

c) i) Calculate pH of 10^{-7}M benzoic acid (given, K_a, of benzoic acid 6.5×10^{-5})

ii) Describe Simpson's rule.   5+5=10

1. Answer any **five** questions: 2×5=10

a) Distinguish between field sample and laboratory sample.

b) Maintanance of pH in soil samples is very important- explain why?

c) What do you mean by complexometric titration?

d) BOD of a water sample is 60mg/L–what do you mean by this statement?

e) Name the composition of talcum powder.

f) What are the organic compositions of soils?

g) What do you mean by retention factor in chromatographic separation technique?

h) Why buffer solution is added during the estimation of hardness of water. Give two examples.

2. Answer any **two** questions: 5×2=10

a) Name the masking and demasking agents with respect to a complexiometric titration. What are the roles of Zno, TiO_2 and boric acid in talcum powder?   2+3

b) What is chelating agents? Give one example. State the principle of complexometric titration using this chelating agents.