

**Second Semester FYUGP Degree (Reg) Examination April
2026**

**KU2DSCCHE115 - FOUNDATION IN PHYSICAL,
ORGANIC AND BIOINORGANIC CHEMISTRY**

2025 Admission onwards

Time : 1.5 hours

Maximum Marks : 50

Section A

Answer any 6 questions. Each carry 2 marks.

1. Write the molecular formula of a) potassium permanganate b) potassium dichromate c) oxalic acid
2. What is iodimetry? Give one example.
3. What are heme proteins? Give examples
4. Draw the structure of porphyrine and explain how the structures of heme and chlorophyll are related to it?
5. What is meant by an isolated system? Give an example.
6. What is an acid according to the Arrhenius concept? Give any two examples.
7. Write the structural formula of ethene and ethyne.
8. What is aromaticity? Name two aromatic compounds.

Section B

Answer any 4 questions. Each carry 6 marks.

9. a) C_p is always greater than C_v . Why? b) Explain the state of chemical reactions when: (i) $\Delta G = 0$; (ii) $\Delta G < 0$; (iii) $\Delta G > 0$.
10. a) Define reversible and irreversible process b) At what temperature does the reaction $4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(l)$ become spontaneous if $\Delta H = +1212$ kJ and $\Delta S = +140 JK^{-1}$
11. Calculate the degree of hydrolysis of 0.2M sodium acetate solution in water. (K_a of acetic acid = 1.8×10^{-5} $K_w = 1 \times 10^{-14}$ Explain the term amphoteric compounds with suitable examples.
12. Explain the general characteristics of a homologous series?
13. Discuss the formation of carbocations, carbanion and free radical

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14. Which one among the following is aromatic. a) cyclopropenyl cation b) cyclopentadienyl anion c) tropylium cation. Justify your answer.

Section C

Answer any 1 questions. Each carry 14 marks.

15. (a) Distinguish between the principles and techniques of paper and thin layer chromatography.
(b) Explain the principle of permanganometry and dichrometry with proper equations.
16. Explain the biochemical importance of zinc and iron