

25U213

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Name :

Reg. No :

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2026

(FYUGP)

(Regular/Supplementary/Improvement)

CC24UCHE2MN106 - FUNDAMENTALS OF PHYSICAL CHEMISTRY

(Chemistry - Minor Course)

(2024 Admission onwards)

Time: 2.0 Hours

Maximum: 70 Marks

Credit: 4

Part A (Short answer questions)

Answer *all* questions. Each question carries 3 marks.

1. What does "universe" mean in thermodynamics? [Level:1] [CO1]
2. Mention the significance of the term entropy. [Level:2] [CO1]
3. Give the relationship between the internal energy change and enthalpy change in process. [Level:3] [CO1]
4. Define Gibbs phase rule. [Level:1] [CO2]
5. What is K_b and pK_b ? [Level:1] [CO2]
6. Define common ion effect. [Level:1] [CO2]
7. Draw the graph comparing the reaction with and without a catalyst. [Level:3] [CO3]
8. If the rate does not depend on the concentration of a reactant, what would be the order of this reaction? [Level:1] [CO3]
9. Give one limitation of Beer-Lambert law. [Level:1] [CO4]
10. Define photosensitization and give an example of a photosensitizer. [Level:1] [CO4]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

Answer *all* questions. Each question carries 6 marks.

11. Discuss the physical significance of Gibbs energy. [Level:2] [CO1]
12. Explain the conditions for equilibrium based on Gibbs free energy. [Level:2] [CO1]
13. What is the buffer index? How is it calculate. [Level:1] [CO2]

14. Explain the process of hydrolysis for salts of strong acids and weak bases. Provide an example and describe the effect on the pH of the solution. [Level:2] [CO2]
15. The time required to decompose SO_2Cl_2 to half of its initial amount is 60 minutes. If the decomposition is a first order reaction, calculate the rate constant of the reaction. [Level:1] [CO3]
16. Explain initial concentration method for the determination of order of a reaction. [Level:2] [CO3]
17. Describe the Stark-Einstein law of photochemical equivalence. [Level:2] [CO4]
18. Explain the Jablonski diagram, showing the different processes involved in the absorption and emission of light. [Level:2] [CO4]

(Ceiling: 36 Marks)

Part C (Essay questions)

Answer any **one** question. The question carries 10 marks.

19. Discuss the phase changes in terms of entropy. [Level:2] [CO1]
20. Define activation energy of a reaction and how it is calculated using Arrhenius equation. [Level:2] [CO3]

(1 × 10 = 10 Marks)
