

Reg. No. :

Name :

Second Semester B.Sc. Degree Examination, September 2022

Career Related First Degree Programme under CBCSS

Chemistry

Complimentary Course for Biochemistry & Industrial Microbiology

CH 1231.7 : PHYSICAL CHEMISTRY

(2020 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION - A

(Answer **all** questions. Answer in **one** word to maximum **two** sentences. Each question carries **1** mark.

1. Example for a lyophilic colloid.
2. Explain the term entropy.
3. Name one method for purification of colloids.
4. What is the relation between K_p and K_c ?
5. Colloid with liquid dispersed phase and solid dispersion medium is called?
6. Briefly explain enthalpy of neutralization.
7. What is Gibbs-Helmholtz equation?
8. Work done is maximum in a _____ process.
9. Unit of rate constant for a zero order reaction.
10. Give an example of an acid buffer.

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

(Short answer type. Answer **any eight** questions from the following.
Each question carries **2** marks)

11. Define the term state function and path function.
12. Derive the half-life of a second order reaction.
13. What is meant by electrophoresis?
14. A first order reaction with the half life time of 2 min. Calculate the rate constant for this reaction.
15. What is Tyndall effect?
16. What is Hardy and Schulz rule?
17. Define rate of a reaction and rate constant.
18. Write any two mechanisms by which a colloid attains charge.
19. Define Van't Hoff factor.
20. What is a buffer solution? Explain with example.
21. Define osmotic pressure.
22. When a real gas is subjected to adiabatic expansion below a particular temperature, the gas gets cooled why?
23. Explain third law of thermodynamics.
24. What is azeotrope? Explain with an example.
25. What is meant by an extensive property? Give an example for extensive property.
26. What is meant by a closed and isolated system?

(8 × 2 = 16 Marks)

SECTION – C

(Short essay type. Answer **any six** questions from the following. Each questions carries 4 marks)

27. Mention the factors that affect the rate of a reaction.
28. Briefly explain the applications of coagulation of colloids.
29. Derive the relation $C_p - C_v = R$.
30. State Beer-Lamberts law and explain its application.
31. Explain various application of colloids.
32. Discuss the transition state theory of reaction rate.
33. Derive Kirchhoff equation.
34. Write any two methods to find the order of a reaction.
35. Discuss the various theories on Catalysis.
36. Derive an expression for V_{\max} in a reversible isothermal expansion of an ideal gas.
37. Explain what is meant by Joule-Thomson effect?
38. Explain the following :
 - (a) Fluorescence
 - (b) Phosphorescence.

(6 × 4 = 24 Marks)

SECTION – D

(Answer **any two** question. Each question carries 15 marks)

39. (a) Derive the Henderson's equations for acidic and basic buffer.
(b) Define molal depression constant. Explain the principle behind the determination of molar mass of a solute from the depression in freezing point.

40. (a) Derive the integrated rate expression for a second order reaction of the type $2A \rightarrow \text{products}$.
- (b) Write short notes on
- (i) Electrical properties of colloids
 - (ii) Grothus Draper law.
41. What are protective colloids? Explain how a lyophilic colloid can stabilize a lyophobic colloid. What is meant by delta formation?
42. State Le Chatelier principle and apply it to the equilibrium in the Haber process for the manufacture of NH_3 .
43. Discuss in details Lindemann theory of unimolecular reactions.
44. How will you construct the phase diagram by cooling curve method? Explain steam distillation process.

(2 × 15 = 30 Marks)