



K23U 2336

Reg. No. : .....

Name : .....

V Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/  
Improvement) Examination, November 2023

(2019-2021 Admissions)

CORE COURSE IN CHEMISTRY/POLYMER CHEMISTRY

5B10CHE/PCH : Physical Chemistry – II

Time : 3 Hours

Max. Marks : 40

**Instruction** : Answer the questions in **English** only.

SECTION – A

Answer **all** questions. **Each** carries **1** mark.

1. What is inversion temperature ?
2. Give Gibb's-Helmholtz equation.
3. What is the relationship between  $K_p$  and  $K_c$  ?
4. Give one example each for water in oil and oil in water emulsion. (4×1=4)

SECTION – B

Answer **any 7** questions out of 10. **Each** carries **2** marks.

5. If enthalpy change of reaction for the process  $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$  is  $-85$  kJ at  $25^\circ\text{C}$ . Calculate the internal energy change for this reaction.
6. Briefly explain bond energy.
7. Define the term partial molar free energy.
8. What are exact and inexact differentials ?
9.  $K_p$  for a reversible reaction at  $25^\circ\text{C}$  was found to be 0.14. Calculate the standard Gibb's free energy for this reaction.
10. Distinguish between true equilibrium and meta stable equilibrium.

P.T.O.



11. What is meant by desilverisation of lead ?
12. Give two examples each for deliquescent and efflorescent substances.
13. What is the mathematical form of Freundlich adsorption isotherm ? Represent it graphically.
14. What is Zeta potential ? How it is calculated ? (7×2=14)

### SECTION – C

Answer **any 4** questions out of 6. **Each** carries **3** marks.

15. Derive the equation for work done in a reversible isothermal expansion of an ideal gas.
16. Explain the variation of enthalpy of reaction with temperature using mathematical equations.
17. The efficiency of a heat engine is 42%. If it absorbs 500 J from the high temperature source at 300 K, find the temperature of the low temperature sink, work done and the heat rejected.
18.  $K_p$  for a reaction at 600 K is  $1.6 \times 10^{-4}$ . Calculate the  $K_p$  at 700 K if the standard heat of reaction in this temperature range is  $-100$  kJ/mol.
19. Discuss on the two important electrokinetic phenomena of colloidal particles.
20. Explain the terms eutectic point and congruent melting point with suitable examples. (4×3=12)

### SECTION – D

Answer **any 2** questions out of 4. **Each** carries **5** marks.

21. Derive the (a) relation between temperature and pressure for a reversible adiabatic expansion of an ideal gas and (b) work done in a reversible adiabatic expansion of an ideal gas.
22. Describe the Carnot's cycle and derive an expression for efficiency of a heat engine.
23. Derive the Van't Hoff equation and from it arrive at its integrated form.
24. State Nernst distribution law and discuss its application to study association and dissociation of salt. (2×5=10)