

S.NO: 22N1-UCH

Course Code: BQI

A.D.M.COLLEGE FOR WOMEN, NAGAPATTINAM

(AUTONOMOUS)

B. Sc. (Chemistry) Degree Examination

V Semester – November – 2022

CC IX – PHYSICAL CHEMISTRY I

Time: 3 hours

Maximum Marks: 75

Section –A

10X2=20

Answer **ALL** the Questions:

1. What is Chemiluminescence ? Give one example.
2. Write all the symmetry operations present in H_2O molecule ?
3. What are the need for the second law of thermodynamics?
4. Calculate the increase in entropy of vaporization of two mole of water at $100^\circ C$. Heat of vaporization of water is $2259 J/g$.
5. Give the relationship between K_p and K_c . Calculate K_c for the synthesis of ammonia if $K_p = 4 \times 10^4$
6. State third law of thermodynamics. What are its limitations?
7. State Raoult's law. What are its significance?
8. When 0.5 gram of nonvolatile solute of molecular mass $180 g/mole$ is dissolved in 5 gram of solvent, the reduction of freezing point is 4 degree. Determine the K_f value of solvent.
9. Define phase and component.
10. What do you mean by Eutectic Point ?

Section -B

5X5=25

Answer **ALL** the Questions:

11. a) Derive Lambert's Beer Law of photochemistry. What are its drawbacks?

(or)

- b) Discuss all the postulates of group. Give the importance of Commutation rule

12. a) Derive Gibbs – Helmholtz equation.

(or)

- b) Derive any two Maxwell relations.

13. a) Discuss the Le-chatlier's principle for the decomposition of PCl_5

(or)

- b) Derive Clausius –Clapeyron equation.

14. a) Derive the expression for Gibbs- Duhem- Margules equation.

(or)

- b) What are azeotropes? Discuss the pressure temperature diagram for ethanol- water system.

15. a) Draw schematically the phase diagram for one component system using Water as example.

(or)

- b) Draw and explain the phase diagram of sulfur system.

Section -C

3 X 10 = 30

Answer any **THREE** Questions:

16. With neat diagram discuss radiative and non radiative transition of electronically excited molecule.
17. What do you meant by cyclic process? Describe in detail with Carnot reversible cycle.
18. What is chemical potential? How the chemical potential varies with
(i) Temperature (ii) Pressure (2+4+4).
19. (i) What do you meant by upper and lower CST ? Discuss the effect CST by adding electrolyte of Phenol- Water system. (6)
(ii) Construct phase diagram of Trimethylamine-Water (4)
20. What is desilverisation of lead? With neat diagram discuss the phase diagram of Lead -Silver system.