**B. Sc. DEGREE (C.B.C.S.) EXAMINATION, MARCH 2023**
**(2020 Admission Regular, 2019, 2018 Admissions Supplementary)**
**SEMESTER VI - CORE COURSE (CHEMISTRY)**
**CH6B12B18 - PHYSICAL CHEMISTRY – IV**

**Time : 3 Hours**                                                          **Maximum Marks : 60**

## Part A

**I. Answer any Ten questions. Each question carries 1 mark**                              **(10x1=10)**

1. Define molal depression constant.

2. Quote Ohm's law.

3. Define Specific conductance.

4. Identify the electrode reaction of hydrogen-oxygen fuel cell.

5. Write an example for antirust solution.

6. Identify any two advantages of using glass electrode for pH measurements.

7. Delayed fluorescence is also called -------------------------.

8. --------------- is the generic term for the light-emitting compound found in organisms that generate bioluminescence.

9. Identify the role of photosensitizer.

10. Point group of ammonia molecule is-----------.

11. Identify number of symmetry planes in Boron trifluoride molecule.

12. Plane perpendicular to principal axis is called ----------.

## Part B

**II. Answer any Six questions. Each question carries 5 marks**                              **(6x5=30)**

13. Discuss the distillation behaviour of immiscible binary liquid system.

14. Illustrate the concept a) systems with lower CST b) systems with both upper and lower CST with the aid of suitable phase diagrams.

15. Illustrate the application of the concept of reverse osmosis in desalination of sea water.

16. Benzoic acid associates in Benzene to form dimer. 3.355g of Benzoic acid when dissolved in 100g of Benzene lowered the freezing point of Benzene by 0.75K. Calculate the van't Hoff factor and the degree of association of the solute in benzene. $K_f$ of Benzene=5.12Kkg/mol

17. Discuss reference electrode. Give an example each for (i) a metal-metal ion electrode (ii) a gas electrode (iii) a metal- metal insoluble metal salt electrode (iv) an oxidation-reduction electrode.

18. Differentiate electrochemical cell and electrolytic cell with example. ( any 5 points)

19. Draw a labelled Jablonski diagram and explain the following in it (i) Intersystem crossing (ii) Phosphorescence (iii) Internal conversion (iv) Fluorescence (v) absorption

20. Discuss systematic procedure for the determination of point group of water molecule.

21. Write a note on conditions of a point group.

**Part C**

22. Discuss the variation in freezing point of a volatile solvent when a non-volatile solute is added to it. Thermodynamically deduce the relationship between depression of freezing point and concentration of solute of a dilute solution.

23. Explain the effect of pressure on solubility of gas in liquid on the basis of Henry's law. Enumerate its limitations and applications.

24. Explain the important applications of EMF measurements.

25. Derive the relationship between ΔG, ΔH, ΔS and electrical energy using Gibbs Helmhlotz equation.