Reg No :  ....................

Name :  ....................

# B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, MARCH 2023

## Sixth Semester

### CORE COURSE - CH6CRT12 - PHYSICAL CHEMISTRY - IV

Common for B.Sc Chemistry Model I, B.Sc Chemistry Model II Industrial Chemistry & B.Sc Chemistry Model III Petrochemicals

2017 Admission Onwards

3D33804E

Time: 3 Hours

Max. Marks : 60

**Part A**

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Define upper critical solution temperature and lower critical solution temperature.

2. What is osmotic pressure? How is it related to concentration of a solute in a solution?

3. State Walden's rule.

4. Calculate the ionic strength of 0.1 molal NaCl solution.

5. What is meant by electrochemical cells.

6. Give two examples for redox electrodes.

7. Represent the electrode reactions of a cell $Al/Al^{3+}// Ni^{2+}/Ni$.

8. Represent Nernst equation for reduction of $Cr^{3+}$.

9. Give any two methods used for corrosion monitering.

10. What is meant by chemiluminescence?

11. What do you mean by symmetry operation?

12. Identify the point group to which $H_2$ belongs.

(10×1=10)

## Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Discuss the variation of vapourpressure of completely miscible liquid pairs with composition.

14. What are azeotropes? Describe various types of azeotropic mixtures.

15. The same quantity of electricity was passed through solutions of i) silver nitrate and ii) nickel sulphate. The respective masses of silver and nickel deposited were 4.316 g and 2.348 g. Calculate the equivalent weight of nickel.[ Equivalent weight of Ag = 108]

16. Sketch and explain conductometric titration curve for the titration between HCl and NaOH and $CH_3COOH$ and NaOH.

17. Explain any one application of emf measurements.

18. What are potentiometric titrations? Explain how an acid base titration can be followed by potentiometrically.

19. State and explain the law of photochemical equivalence. How is it useful in explaining primary and secondary process?

20. Draw Jablonsky diagram and explain the various processes.

21. Identify the point group to which $BF_3$ and $NH_3$ belong and explain why.

(6×5=30)

## Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. State and explain Henry's law. Discuss its applications and limitations.

23. Explain the term transference number. Discuss Hittorf method used for the determination of transference number.

24. (a) Derive the expression for $E_{cell}$ of concentration cells with transference. (b) Derive the general equation for the EMF of an electrode concentration cell.

25. What is a point group? Discuss the conditions that must be satisfied for a point group. Illustrate how the $C_{2v}$ point group obeys these conditions.

(2×10=20)