QP CODE: 20100427

Reg No   :   ....

Name   :   ....

BSc DEGREE (CBCS) EXAMINATION, MARCH 2020

Sixth Semester

Core course - CH6CRT12 - PHYSICAL CHEMISTRY - IV

B.Sc Chemistry Model I,B.Sc Chemistry Model III Petrochemicals,B.Sc Chemistry Model II Industrial Chemistry

2017 Admission Onwards

7B9663EE

Time: 3 Hours

Marks: 60

Part A

*Answer any **ten** questions.*

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

1. What is upper critical solution temperature?

2. Why is the vapour pressure of a solution of glucose in water lower than that of pure water?

3. Name the indicator electrolyte used in moving boundary method.

4. Write mathematical expression for Debye-Huckel limiting law.

5. What are reversible cells?

6. What is meant by redox electrodes?

7. The standard emf of a cell is 1.5V. Determine the maximum electrical work obtained from the cell.

8. Explain quinhydrone electrode.

9. Give any two methods used for prevention of corrosion.

10. What is meant by internal conversion?

11. Define symmetry.

12. List out five symmetry elements and their schoenflies symbols.

$(10\times1=10)$

13. State and explain Raoult's law for vapour pressure of binary solutions of volatile liquids.

14. State and explain Raoult's law and Henry's law.

15. State Kohlrausch's law of independent migration of ions and explain its applications.

16. Explain the reason for the abnormal ion conductivities of hydrogen and hydroxyl ions.

17. Given the following cell Al/Al^{3+} (0.01M) $//Fe^{2+}$ (0.03M) /Fe. Represent cell reaction and calculate E_{cell} and ΔG at 298K. Given the standard reduction potential Al^{3+}/Al = -1.66V and Fe^{2+}/Fe = -0.44V.

18. Explain how acid-base titrations can be carried out potentiometrically with a suitable example.

19. State and explain Stark- Einstein law. Define the term quantum yield of a photochemical reaction and explain the reasons why its value changes from unity.

20. Distinguish between photochemical reaction and chemiluminescence with suitable examples.

21. Explain the symmetry elements present in BF_3 molecule and identify the point group.

(6×5=30)

22. (a) Define (i) Osmosis (ii) Osmotic pressure (iii) Semipermeable membrane (iv) Reverse osmosis.
    (b) Explain how the molar mass of a solute is determined by osmotic pressure measurements.

23. Explain the applications of conductometric measurements.

24. What are concentrations cells? Derive the expression for E_{cell} of electrolyte concentration cells with and without transference.

25. Define the term point group. Explain D_{3h} , C_{2V} and C_{3V} point groups with examples.

(2×10=20)