K22P 1570

Reg. No. : .....

Name : .....

I Semester M.Sc. Degree (CBSS – Reg./Sup./Imp.) Examination, October 2022
(2019 Admission Onwards)
CHEMISTRY
CHE 1C.04 : Physical Chemistry – 1

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **all** questions in **one** word or sentence. **Each** question carries **1** mark. **(8×1=8)**

1. State third law of thermodynamics.
2. State the principle of microscopic reversibility.
3. Define residual entropy.
4. What is the condition for equilibrium between phases ?
5. Write the general form of Tafel equation and explain the terms.
6. Explain the origin of single electrode potential.
7. What is the significance of half wave potential ?
8. Define corrosion current.

SECTION – B

Answer **any eight** questions. Answer in **one** or **two** sentences. **Each** question carries **2** marks. **(8×2=16)**

9. What is the physical significance of partial molar property ?
10. Explain the term 'excess functions'.
11. What are phase diagrams ? What is a ternary phase diagram ?
12. Explain Debye – Falkenhagen effect.

P.T.O.

13. Derive an equation for mean activity coefficient and mean molal activity coefficient of electrolyte M_xA_y.

14. Explain the origin of liquid junction potential.

15. What is Onsagar equation ?

16. How is activity coefficient calculated from solubility measurements ?

17. Write a note on osmotic coefficient.

18. Explain electrochemical theory of corrosion.

19. Write the definitions for anode and cathode. Write one example for each.

20. Write a brief note on corrosion rate and free energy change.

SECTION – C

Answer **any four** questions. **Each** question carries **3** marks. **(4×3=12)**

21. Describe the determination of partial molar volume of liquids in a binary solutions.

22. Discuss the application of phase rule to three component system.

23. What are the factors which influences over voltage ?

24. Write a note on decomposition voltage.

25. What are the essential stages in hydrogen discharge ?

26. Write a note on electrical double layer.

27. Write a brief note on cathodic protection.

28. Explain pitting corrosion.

SECTION – D

Answer '**a**' or '**b**' of **each** question. **Each** question carries **6** marks. **(4×6=24)**

29. a) Explain thermoelectricity using the concepts of irreversible thermodynamics.

OR

b) Draw and discuss the phase diagram of a ternary system with three pairs of partially miscible liquids.

30. a) Derive Debye Huckel limiting law and write Debye-Huckel equation for appreciable concentration.

OR

b) Derive Debye Huckel Onsager equation and explain its qualitative validity.

31. a) Explain the various currents that influences polarogram, using single electro active species.

OR

b) Write the advantages and disadvantages of dropping mercury electrode.

32. a) What are Pourbaix Diagrams ? Explain the Pourbaix Diagram for water.

OR

b) Discuss about Evan's diagram and kinetics of corrosion.

———————