2022/TDC(CBCS)/EVEN/SEM/ CHMHCC–403T/341

TDC (CBCS) Even Semester Exam., 2022

CHEMISTRY

(Honours)

(4th Semester)

Course No. : CHMHCC–403T

Full Marks : 50
Pass Marks : 20

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *ten* questions : 2×10=20

1. What is Kohlrausch law of independent migration of ions?

2. Define conductivity. Discuss its variation with concentration.

3. What is Debye-Falkenhagen effect?

4. What is ionic mobility?

5. Define and explain degree of dissociation.

6. What is the solubility product constant expression for MgF_2 and Ag_2CrO_4?

7. State Faraday's laws of electrolysis.

8. What is the criterion for spontaneous chemical change based on cell potentials? Explain.

9. Given the redox reaction :

$$Fe^{3+} + V^{2+} \rightarrow Fe^{2+} + V^{3+}$$

Which species is oxidized? Which species is reduced? Identify the oxidizing agent and reducing agent.

10. What is the cause of liquid-junction potentials?

11. What is the role of salt bridge in galvanic cells?

12. What is the relation between cell EMF and equilibrium constant?

13. What is dielectric electrostatics?

14. What type of polarization depends on temperature? Explain.

15. What are magnetic permeability and susceptibility?

SECTION—B

Answer any *five* questions : 6×5=30

16. *(a)* What is Walden's rule? What are the limitations of Walden's rule? 1+2=3

(b) Discuss the Arrhenius theory of electrolytic dissociation. 3

17. Give an account of the Debye-Hückel theory of strong electrolytes. Explain clearly, what are meant by asymmetric effect and electrophoretic effect. 2+4=6

18. Define the transport of an ion. How is it determined using moving boundary method? 2+4=6

19. *(a)* What is the principle of conductometric titration? What are the advantages of conductometric titration? 2+2=4

(b) Discuss the conductometric titration curve obtained in the titration of a mixture of HCl and CH_3COOH with NaOH. 2

20. *(a)* Derive Nernst equation and mention its application. 2+2=4

(b) How do you determine the electrode potentials of zinc? 2

21. Distinguish between reversible and irreversible cells giving one example for each.

22. Derive the expression for the EMFs of concentration cells *(a)* with transference and *(b)* without transference. 3+3=(

23. *(a)* What is potentiometric titration? Give an account on potentiometric redox titration. 1+3=

(b) Determine the pH of a solution using the hydrogen electrode.

24. What is meant by polarizability of a molecule? Derive the Clausius-Mossotti equation. 2+4=(

25. Write short notes on the following : 3+3=(

(a) Diamagnetism

(b) Paramagnetism

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