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Reg. No.....

Name.....

**M.Sc. DEGREE (C.S.S.) EXAMINATION, MAY 2020**

**Fourth Semester**

Faculty of Science

Branch III—Chemistry—Pure Chemistry

CH4E03—ADVANCED PHYSICAL CHEMISTRY

(2012 Admission onwards)

Time : Three Hours

Maximum Weight : 30

**Section A**

*Answer any **ten** questions.*

*Each question carries a weight of 1.*

1. How 100 % current efficiency will be achieved in coulometric titration ?
2. Define Screw axis.
3. Explain anodic stripping voltammetry.
4. Write Wierl's equation ? Explain the terms.
5. What are lattice planes and Miller indices ? Explain how the Miller indices of a lattice planes are calculated.
6. Write a note on glide planes.
7. Define the terms mean free path and collision diameter. How are they related ?
8. Distinguish between Voltammetry and Polarography.
9. What are the advantages of amperometric titrations ?
10. What is Wien effect ?
11. Explain the term "asymmetry effect".
12. How would you modify Debye-Huckel limiting law to more concentrated solutions? Explain.
13. What is decomposition potential ?

(10 × 1 = 10)

**Turn over**





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### Section B

*Answer any **five** questions.*

*Each question carries a weight of 2.*

14. What is a reciprocal lattice ? Explain.
15. Write down four advantages of DME.
16. Calculate the activity coefficient of  $\text{Ca}^{2+}$  and  $\text{Cl}^-$  in 0.01 molal  $\text{CaCl}_2$  in water. The 'A' value in the Debye-Huckel equation is 0.509.
17. What are liquid crystals ? How are they classified ? Explain the structural features of each class.
18. Derive the Bragg's law and discuss its applications.
19. Write a note on Fourier synthesis.
20. Discuss the significance of Maxwell's equation for the distribution of molecular velocities and the effect of temperature on such distribution.
21. Define overvoltage. What are the factors contributing to overvoltage ? Discuss.

(5 × 2 = 10)

### Section C

*Answer any **two** questions.*

*Each question carries a weight of 5.*

22. Discuss briefly the theory of polarography.
23. Explain the principle and Instrumentation of fluorescence spectroscopy.
24. Discuss the powder method for the X-ray diffraction studies of crystals and the analysis of the diffraction patterns for the cubic lattices.
25. Give an account of the principle and instrumentation of FES. Discuss the important applications of FES.

(2 × 5 = 10)

