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Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MAY 2024

Fourth Semester

Complementary Course—ADVANCED PHYSICAL CHEMISTRY–II

(For students who have opted Physical Science and Geology as main)

[2013 to 2016 Admissions]

Time : Three Hours Maximum : 60 Marks

Part A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. What is electromagnetic spectrum ?
2. What is mean by blue shift ?
3. Why is the rate of reaction important ?
4. What is fluorescence ?
5. What is the significance of Kohlrausch's law ?
6. Why is Faraday's law important ?
7. What is liquid junction potential ?
8. What is redox reaction ?

(8 × 1 = 8)

Part B

Answer any **six** *questions.*

Each question carries 2 *marks.*

9. What is molar extinction coefficient ?
10. Distinguish between symmetric and asymmetric vibrations.
11. Find the activation energy (in kJ/mol) of the reaction if the rate constant at 600K is 3.4 $M^{-1}s^{-1}$ and 31.0 at 750 K.
12. What is Frank-Condon principle ?

Turn over

13. What are the factors that affect the quantum yield ?
14. What do you mean by electrochemical equivalent ?
15. What is the standard Gibbs free energy change and the equilibrium constant for the following reaction at room temperature? Is the reaction spontaneous?

    $Sn\ (s) + 2\ Cu^{2+}\ (aq) = Sn^{2+}\ (aq) + 2Cu^{+}\ (aq)$.
16. How does concentration affect cell potential ?
17. What is a fuel cell and how does it work ?
18. What is redox titration ?

(6 × 2 = 12)

Part C

Answer any **four** *questions.*
Each question carries 4 *marks.*

19. Briefly discuss the applications of Vibrational Spectroscopy.
20. What is mean by half-life of a reaction ? How do you calculate the half-life of a reaction ?
21. What is the influence of temperature on reaction rate ?
22. What is the application of Ostwald dilution law ?
23. How do concentration cell works ?
24. What are the rules to assign oxidation states ?

(4 × 4 = 16)

Part D

Answer any **two** *questions.*
Each question carries 12 *marks.*

25. Explain UV Visible spectroscopy and its applications.
26. (a) Discuss the importances of activated complexes.
    (b) Discuss the various photochemical processes.
27. What is transport number ? What is its significance ? Explain the method of determination of transport number.
28. Explain the application of EMF measurement.

(2 × 12 = 24)