

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2015**Fourth Semester**

Complementary Course—Chemistry

ADVANCED PHYSICAL CHEMISTRY—II

(For Students who have opted Physical Sciences and Geology as Main)

[2013 Admissions]

Time : Three Hours

Maximum : 60 Marks

Part A*Answer all questions.**Each question carries 1 mark.*

1. What is the useful range of IR radiation in Spectroscopy ?
2. What is Beer Lambert's law ?
3. Write down the Arrhenius equation.
4. Define Quantum efficiency.
5. What is meant by specific conductance ?
6. What are weak electrolytes ? Give one example.
7. What is a Galvanic cell ?
8. Show that KMnO_4 is an oxidising agent in acid medium.

(8 × 1 = 8)

Part B*Answer any six questions.**Each question carries 2 marks.*

9. What is the principle of UV spectroscopy ?
10. Which of the following molecule will give :—
 - (a) rotational spectrum ;
 - (b) IR spectrum Br_2 , HBr , CS_2 , CCl_4 .
11. Explain half life of a chemical reaction.
12. Distinguish between Fluorescence and Phosphorescence.
13. Explain Kohlrausch's law.
14. How is the conductivity of an electrolyte solution determined ?
15. What is electrochemical series ? Briefly explain two of its uses.

Turn over

16. What is meant by standard electrode potential ? How it measured ?
17. Explain Reduction reaction with two example.
18. State the principle of quantum activation.

(6 × 2 = 12)

Part C

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

19. The force constant of HCl is 480 Nm^{-1} . Calculate the fundamental stretching frequency of HCl and the wave number of the absorbed radiation.
20. How does a catalyst help in speeding up a chemical reaction ? Explain.
21. Define molar conductance and explain its variation with dilution.
22. Distinguish between an electrode concentration cell and an electrolyte concentration cell.
23. Discuss the photochemistry of $\text{H}_2 - \text{Br}_2$ reaction.
24. Explain the determination of Oxidation states.

(4 × 4 = 16)

Part D

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

25. Derive an integrated equation for the rate constant of a first order reaction. Obtain an expression for half life.
26. Write notes on :
 - (i) Liquid junction potential ;
 - (ii) Fuel cells ;
 - (iii) Glass electrode ;
 - (iv) Oxygen fuel cell.
27. Explain the theory and characteristics of IR and visible spectroscopy. Also discuss various applications.
28. Discuss the applications of e.m.f. measurements.

(2 × 12 = 24)