E 2140 (Pages : 2) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, APRIL 2016

Fourth Semester

Complementary Course—Chemistry

ADVANCED PHYSICAL CHEMISTRY–II

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

[2013 Admission onwards]

Time : Three Hours Maximum Marks : 60

Part A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. What is meant by red shift ?
2. What is a chromophore ?
3. Write down the integrated first order rate equation.
4. Stat Groltus-Draper law.
5. Write down the Nearnst equation for the EMF of a cell.
6. Define equivalent conductance.
7. Why direct current is not used in conductivity measurements ?
8. Show that $K_2 Cr_2 O_7$ is an oxidising agent in acid medium.

(8 × 1 = 8)

Part B

Answer any **six** *questions.*

Each question carries 2 *marks.*

9. Write an expression for the rotational energy of a diatomic molecule and explain the terms in it.
10. The bond length of HBr molecule is 1 H p.m. Calculate the wavenumber in cm^{-1} for the transition J = 0 to J = 1 for the molecule.
11. Distinguish between order and molecularity.
12. What is photosensitized reaction ? Give one example.
13. What is meant by cell constant ? How is it determined ?
14. How would you estimate KOH using standard oxalic acid solution conductometrically ?

Turn over

15. How does electrode potential originates ? Define single electrode potential.

16. What is meant by a reference electrode ? Give one example.

17. How is oxidation state determined ? Give one method.

18. Why the p^H of ammonium chloride in water is less than 7 ?

(6 × 2 = 12)

Part C

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

19. What are the factors influencing vibrational frequencies ?

20. Explain the methods to find the order of a reaction.

21. State and explain Kohlrauschst law and explain one of its applications.

22. Write note on oxygen fuel cell.

23. Explain the mechanism of the photochemical H_2 - Cl_2 reaction.

24. Explain one experimental method for oxidation reduction titrations.

(4 × 4 = 16)

Part D

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

25. Explain different types of catalysis with suitable examples. Also the factors influencing catalysis.

26. (a) Illustrate the principle of conductometric titrations with reference to any two types of acid-base titrations.

    (b) How is the p^H of a solution determined using hydrogen electrode ?

27. (a) Explain the rules to assign oxidation states in polyatomic molecules.

    (b) Explain Frank-Condon principle.

28. (a) Explain Ostwald's dilution law. Also explain hydrolysis of salts.

    (b) Write note on : (i) Flash photolysis ; and (ii) Chemi luminescence.

(2 × 12 = 24)