

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, MARCH/APRIL 2015

(UG-CCSS)

Core Course

Chemistry

CH6 B17—PHYSICAL CHEMISTRY—III

Maximum : 30 Weightage

Time : Three Hours

Section A

*Answer all questions.**Each question carries $\frac{1}{4}$ weightage.*

Fill in the blanks :

1. The molecularity of the reaction $A + B + C \rightarrow D$ is _____.
2. The number of photons passing through unit distance in unit time is called _____.
3. Hittorff's method is used to determine _____ of ions.
4. According to Lowry Bronsted theory acid is a _____.

Answer in a word or a sentence :

5. The rate constant of a reaction is 0.154 min^{-1} . Find the order of the reaction.
6. Write the equation for Lambert's law.
7. Define cell constant.
8. Write an example for a Lewis acid.
9. Define pH of a solution.
10. Give *one* example for a redox indicator.
11. Calculate the hydrogen ion concentration of a solution having pH 4.
12. What is steady-state approximation ?

 $(12 \times \frac{1}{4} = 3 \text{ weightage})$

Section B

*Answer all questions.**Each question carries 1 weightage.*

13. Distinguish between photochemical and thermochemical reactions.
14. Define photosensitisation.
15. The specific conductance of a 0.01 M solution of KCl is $1.4 \times 10^{-3} \text{ ohm}^{-1} \text{ cm}^{-1}$ at 298 K. Calculate its equivalent conductance.

Turn over

16. What is Wein effect ?
17. What is meant by levelling effect of a solvent ?
18. Write Henderson equation and explain the terms.
19. Write the cell reaction for the cell $\text{Zn}, \text{Zn}^{2+} // \text{Fe}^{2+}, \text{Fe}$.
20. Calculate the potential of an electrode consisting of Zn metal in ZnSO_4 solution. $[\text{Zn}^{2+}] = 0.01 \text{ M}$.
 $E_0 = -0.76 \text{ V}$.
21. What do you mean by conditional statement in C program language ?

(9 × 1 = 9 weightage)

Section C

*Answer any five questions.
Each question carries 2 weightage.*

22. Explain the adsorption theory of catalysis.
23. The rate constant of a second order reaction is $5.70 \times 10^{-5} \text{ dm}^3 \text{ mol}^{-1} \text{ s}^{-1}$ at 25°C and $1.66 \times 10^{-4} \text{ dm}^3 \text{ mol}^{-1} \text{ s}^{-1}$ at 40°C . Calculate the activation energy and Arrhenius pre-exponential factor.
24. With the help of Jablonsky diagram explain phosphorescence and fluorescence.
25. State and explain Kohlrausch's law.
26. How does a solution of weak acid and its salt with strong base act as a buffer ?
27. What is dropping mercury electrode ? Write the advantages and limitations of DME in polarography.
28. Write the algorithm for finding out molecular mass of an organic compound containing only carbon and hydrogen in C program.

(5 × 2 = 10 weightage)

Section D

*Answer any two questions.
Each question carries 4 weightage.*

29. Write the electrochemical theory of corrosion.
30. Derive the rate equation for bimolecular reaction using collision theory.
31. (a) Give an account of Debye-Huckel theory of strong electrolytes ?
(b) Write the theory and advantages of conductometric titrations.

(2 × 4 = 8 weightage)