

BSc DEGREE END SEMESTER EXAMINATION MARCH 2016
SEMESTER - 4 : COMPLEMENTARY COURSE FOR B.SC
PHYSICS

COURSE: **U4CPCHE5 - ADVANCED PHYSICAL CHEMISTRY II**

Time: Three Hours

Max. Marks: 60

Section A

(Answer **all** questions, each question carries **1 mark**)

1. State Beer-Lamberts law
2. Calculate the rate constant of a first order reaction of $t_{1/2} = 10$ minutes
3. Write an example for a heterogeneous catalysis.
4. What is chemiluminescence?
5. State Faradays first law of electrolysis
6. What is concentration cell? Write an example.
7. Find the oxidation number of Cr in $K_2Cr_2O_7$
8. State Frank-condon principle. (1 × 8 = 8)

Section B

(Answer **any six** questions, each question carries **2 marks**)

9. Distinguish between chromophore and auxochrome.
10. Explain red shift and blue shift.
11. How will you distinguish ethanol and acetone by ir spectroscopy
12. The rate constant of a reaction doubles when the temperature changes from $25^\circ C$ to $35^\circ C$ Calculate the activation energy. ($R=8.314JK^{-1}mol^{-1}$)
13. What is pseudo first order reaction? Write two examples.
14. Explain the term quantum yield? Why some reactions show high values of quantum yield?
15. Write two applications of Kohlrausch's law
16. Explain redox titration with an example. (2 × 6 = 12)

Section C

(Answer **any four** questions, each question carries **5 marks**)

17. 50% of a first order reaction is complete in 23 minutes. Calculate the time required to complete 90% of the reaction.

18. When a substance A was exposed to light, .002 mole of it reacted in 20 minutes and 4 seconds. In the same time A absorbed 2×10^6 photons of light per second. Calculate the quantum yield of the reaction (Avogadro number $N = 6.02 \times 10^{23}$)

19. Calculate the emf of the cell $\text{Zn} / \text{Zn}^{2+}(0.001\text{M}) // \text{Ag}^+(0.1\text{M}) / \text{Ag}$

The standard potential of Ag/Ag^+ half cell is +0.80 V and Zn/Zn^{2+} is -0.76 V

20. An electric current is passed through three cells in series containing respectively solution of copper sulphate, silver nitrate and potassium iodide. What weights of silver and iodine will be liberated when 1.25g of copper being deposited? (atomic mass of $\text{Cu} = 63.4$, $\text{Ag} = 108$, iodine = 127)

21. What is meant by electrochemical series? Write any three applications of it

22. Explain the different types of electronic transitions. (5 x 4 = 20)

Section D

(Answer **any two** questions, each question carries **10 marks**)

23. Write an essay on methods for determining the order of a reaction.

24. Explain the principle, theory and applications of IR spectroscopy.

25. Explain the working of Daniel cell with a diagram

26. Write an essay on principle, diagram and working of $\text{H}_2\text{-O}_2$ fuel cell with advantages of Fuel cells (10 x 2 = 20)
