

**B. Sc. DEGREE END SEMESTER EXAMINATION MARCH 2017**  
**SEMESTER - 4: CHEMISTRY (COMPLEMENTARY COURSE FOR**  
**PHYSICS)**

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

*(Supplementary for 2014 Admission)*

Time: Three Hours

Max. Marks: 60

**PART A**

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

1. A dye solution of concentration 0.04 M shows absorbance of 0.045 at 530nm. While a test solution of same dye shows absorbance of 0.022 under the same conditions. Find the concentration of test solution.
2. Which region of electromagnetic spectrum a radiation of wave length 450nm belongs?
3. Write an example for a heterogeneous catalysis.
4. Why catalyst increases the rate of the reaction?
5. In a beaker A , Zinc rod is dipped in copper sulphate solution abd in beaker B a copper Rod is dipped in zinc sulphate solution . Which will undergo chemical reaction and why
6. Write two advantages of Fuel cells.
7. Find the oxidation number of Cl in  $\text{HClO}_4$
8. What is quantum yield? (1 × 8 = 8)

**PART B**

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

9. Write a spectroscopic method for distinguishing intermolecular and intramolecular hydrogen bonding.
10. Explain the term chromophore with an example.
11. How will you distinguish ethane and ethanol by ir spectroscopy ?
12. The rate constant of a reaction quadraples when the temperature changes from  $25^\circ\text{C}$  to  $45^\circ\text{C}$  Calculate the activation energy.
13. Why temperature increases the rate of the reaction?
14. Write two examples of first order reaction?

15. Draw the graph showing variation of molar conductivity with concentration of strong electrolyte and weak electrolyte.
16. How will you represent the cell involving the following reaction
- $$\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2 \quad (2 \times 6 = 12)$$

### PART C

Answer **any four** questions. Each question carries **5** marks

17. 90% of a first order reaction is completed in 25 minutes. Calculate the time required to complete 99% 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  $2 \times 10^6$  photons of light per second. Calculate quantum yield of the reaction (Avogadro number  $N = 6.02 \times 10^{23}$ )
19. Calculate the emf of the cell  $\text{Zn} / \text{Zn}^{2+}(0.001\text{M}) // \text{Cu}^{2+}(0.1\text{M}) / \text{Cu}$   
The standard potential of  $\text{Cu}/\text{Cu}^+$  half cell is +0.34 V and  $\text{Zn}/\text{Zn}^{2+}$  is -0.76 V
20. An electric current is passed through two cells in series containing respectively solution of copper sulphate, silver nitrate. What weights of silver liberated when 2.25g of copper being deposited? (atomic mass of  $\text{Cu} = 63.4$ ,  $\text{Ag} = 108$ ,]
21. What is meant by electro chemical series? Write any three applications of it.
22. Explain the different types of vibrations of a molecule.
- (5 x 4 = 20)

### PART D

Answer **any two** questions. Each question carries **10** marks

23. Write an essay on conductometric titration and its applications.
24. Explain the different types of electrodes.
25. Derive the integrated rate equation for first order reaction and its  $t_{1/2}$
26. Explain:
- Fluorescence
  - Phosphorescence

- c) Photosensitization
- d) chemiluminiscence.

(10 x 2 = 20)

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