Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May – 2017**

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| **Code :** | **15CH3001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CHEMICAL KINETICS & PHOTOCHEMISTRY** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | Derive the integrated rate expression for first order reaction. | CO1 | 10 |
| b. | In a first order reaction, it takes 40.5 minutes to be 25% decomposed. Calculated the rate constant of the reaction. | CO1 | 5 |
| c. | The half-life of the homogeneous gaseous reaction SO2Cl2  SO2 + Cl2 which obeys first order kinetics is 8.0 minutes. How long it take for the concentration of SO2Cl2 to be reduced to 1 % of the initial value. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Write a short note on order and molecularity of complex reactions. | CO1 | 5 |
| b. | Derive an expression for a second order reaction, when the two reactants are different. | CO1 | 10 |
| c. | The rate constant of a second order reaction is 5.70 x 10-5 dm3 mol-1 s-1 at 25˚ C amd 1.64 x 10-4 dm3 mol-1 s-1 at 40˚ C. Calculate the activation energy and the Arrhenius pre-exponential factor. | CO1 | 5 |
| 3. | a. | Explain the Lindemann theory of unimolecular reactions. | CO1 | 10 |
|  | b. | Describe the kinetics of chain reactions with a suitable example. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Discuss the Activated Complex Theory (ACT) of bimolecular reactions. | CO1 | 10 |
|  | b. | What is branching chain reaction? Explain its characteristics. | CO1 | 10 |
| 5. | a. | Derive the kinetics of fast reaction. | CO1 | 10 |
|  | b. | What is Hammet relationship equation? Discuss its importances. | CO1 | 10 |
| (OR) | | | | |
| 6. | a. | Explain the kinetics of enzyme catalysed (Michaelis Menten) reaction. | CO1 | 10 |
|  | b. | Discuss the kinetics of bimolecular surface reactions. | CO1 | 10 |
| 7. | a. | Derive BET isotherm equation. | CO1 | 10 |
|  | b. | Explain the kinetics of acid-base catalysed reaction. | CO1 | 10 |
| (OR) | | | | |
| 8. | a. | Derive the Langmuir theory of adsorption. | CO1 | 10 |
|  | b. | Write a note on effect of temperature on enzyme catalysed reaction. | CO1 | 5 |
|  | c. | Differentiate between chemisorption and physisorption. | CO1 | 5 |
|  | | **Compulsory**: |  |  |
| 9. | a. | What are fluorescence and phosphorescence processes? Explain. them with Jablonski diagram. | CO1 | 10 |
|  | b. | Describe the kinetics of Hydrogen-Chlorine photochemical reaction. | CO1 | 10 |

ALL THE BEST