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



**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **17CH3001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CHEMICAL KINECTICS AND 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 rate expression for second order reaction when the two reactants are different. | CO1 | 7 |
| b. | Discuss the activated complex theory (ACT) of bimolecular reaction (thermodynamic treatment). | CO1 | 10 |
| c. | The gas phase thermal decomposition of one mole of di-tert-butyl peroxide in a constant volume apparatus yields two moles of acetone and one mole of ethane. If the reaction obeys first order kinetics develop expression for the rate constant as a function of time, initial pressure and total pressure.  (CH3)3C-O-O-C(CH3)3 2(CH3)2C=O + C2H6 | CO1 | 3 |
| (OR) | | | | |
| 2. | a. | Describe the kinetics of opposing reaction in detail | CO1 | 10 |
| b. | Discuss the collision theory of bimolecular reactions. | CO1 | 8 |
| c. | Calculate the activation energy of a reaction whose rate constant is doubled by a 10˚ C rise in temperature in the vicinity of 27˚ C. | CO1 | 2 |
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| 3. | a. | Derive Debye-Smoluchowski equation for diffusion controlled reactions. | CO2 | 7 |
|  | b. | Discuss the effect of ionic strength on rate of ionic strength (salt effect). | CO2 | 8 |
|  | c. | Derive Taft equation. | CO2 | 5 |
| (OR) | | | | |
| 4. | a. | Derive the relationship between the dielectric constant and the rate constant of the reaction. | CO2 | 7 |
|  | b. | Explain flash photolysis method with a neat sketch. | CO2 | 7 |
|  | c. | Derive Hammett equation. | CO2 | 6 |
|  |  |  |  |  |
| 5. | a. | Describe the kinetics of acid catalyzed reaction. | CO3 | 10 |
|  | b. | Discuss the Langmuir-Hinshelwood mechanism in detail. | CO3 | 10 |
| (OR) | | | | |
| 6. | a. | Discuss the kinetics of enzyme catalyzed reaction (Michaelis-Menton equation). | CO3 | 10 |
|  | b. | Write a note on Hammett acidity function. | CO3 | 5 |
|  | c. | For a weak base 2-nitroaniline B, in 0.02 M HClO4, the ratio of [BH+] to [B] is found to be 0.01. Calculate i. the pKBH+ for the 2-nitroanilinium ion and ii. the ratio of [BH+] to [B] in 0.05 M HClO4 using the same indicator. | CO3 | 5 |
|  |  |  |  |  |
| 7. | a. | Compare chemisorption process with Physisorption. | CO4 | 5 |
|  | b. | Discuss the origin of charge on colloidal particles with a suitable example. | CO4 | 10 |
|  | c. | Describe the ultrafiltration method of colloidal purification. | CO4 | 5 |
| (OR) | | | | |
| 8. | a. | List out the application of colloids in various fields. | CO4 | 10 |
|  | b. | Describe the electrophororesis and electro-osmosis processes with a neat sketch. | CO4 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Discuss the Jablonski diagram in detail. | CO5 | 10 |
|  | b. | Describe the kinetics of the anthracene reaction. | CO5 | 10 |

ALL THE BEST