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 – Nov/Dec – 2017**

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|  |  |  |  |
| **Code :** | **14BT2019** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CHEMICAL REACTION ENGINEERING** | **Max. marks :** | **100** |

*(additional graph sheets are permitted)*

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Elaborate the rate of reaction and define the various forms of rate of reaction? | CO1 | 10 |
|  | b. | Distinguish elementary and non-elementary reactions? | CO1 | 10 |
| (OR) | | | | |
| 2. |  | Explain the classification of chemical reactions with suitable examples? | CO1 | 20 |
|  |  |  |  |  |
| 3. |  | At 500 K the rate of a bimolecular reaction is ten times the rate at 400K. Find the activation energy for this reaction i.from Arrhenius law ii.from collision theory iii.What is the percentage difference in rate of reaction at 600K predicted by these two methods? | CO1 | 20 |
| (OR) | | | | |
| 4. | a. | Derive the performance equation for 3A P | CO1 | 10 |
|  | b | Derive the performance equation for “nth ”order reaction? | CO1 | 10 |
|  |  |  |  |  |
| 5. | a. | Derive the performance equation for steady state mixed flow reactor. | CO2 | 15 |
|  | b. | Explain Damkohler number. | CO2 | 5 |
| (OR) | | | | |
| 6. |  | Briefly explain the pulse input experiment? | CO3 | 20 |
| 7. |  | A sample of tracer hytane was injected as a pulse into a vessel and the effluent concentration is measured as a function of time. The following data are obtained.   |  |  | | --- | --- | | t (min) | C (g/m3) | | 0 | 0 | | 1 | 1 | | 2 | 5 | | 3 | 8 | | 4 | 10 | | 5 | 8 | | 6 | 6 | | 7 | 4 | | 8 | 3 | | 9 | 2.2 | | 10 | 1.5 | | 12 | 0.6 | | 14 | 0 |   Construct the C and E curves and determine the fraction of material leaving the vessel that has spent between 3 and 6 min in the vessel and the fraction of material leaving that has spent between 7.75 and 8.25 min in the vessel. | CO2 | 20 |
| (OR) | | | | |
| 8. |  | Briefly explain tank in series model. |  | 20 |
|  | |  |  |  |
|  | | **Compulsory:** |  |  |
| 9. | a. | Derive the performance equation for ideal batch reactor. | CO2 | 10 |
|  | b. | Derive the performance equation for plug flow reactor. | CO2 | 10 |

ALL THE BEST