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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

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

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **12BT210** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **CHEMICAL AND ENZYME REACTION ENGINEERING** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Define Molecularity. | (1) |
| 2. | State Arrhenius Equation. | (1) |
| 3. | Name the modes of operation of Bioreactor. | (1) |
| 4. | What is CSTR? | (1) |
| 5. | RTD means\_\_\_\_\_\_\_\_\_. | (1) |
| 6. | Tracer is\_\_\_\_\_\_\_\_\_. | (1) |
| 7. | List out different types of toxic compound inhibition. | (1) |
| 8. | Write the expression of MM equation. | (1) |
| 9. | Define Immobilization. | (1) |
| 10. | State any two applications of Biosensors. | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11 | Draw a fluidized bed reactor and label its parts. | (3) |
| 12 | Differentiate between pulse and step input. | (3) |
| 13 | List out the properties of a tracer. | (3) |
| 14 | Prove at low S, rate of product formation is directly proportional to Substrate concentration. | (3) |
| 15 | What are biosensors? Give examples. | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | a. | Write short notes on reversible and irreversible reaction. | (7) |
| b. | Write short notes on series and parallel reactions. | (8) |
| (OR) | | | |
| 17. |  | Write a detailed note on classification of chemical reactions. | (15) |
| 18. |  | With a neat diagram explain the working of CSTR. | (15) |
| (OR) | | | |
| 19. |  | Explain the working of Packed bed reactor and fixed bed reactor. | (15) |
| 20. |  | Elaborate on the method of determination of RTD experimentally. | (15) |
| (OR) | | | |
| 21. |  | The concentration readings in given table represent a continuous response to a pulse input into a closed vessel which is to be used as a chemical reactor. Calculate the mean residence time of fluid in the vessel *t,* and tabulate and plot the exit age distribution E.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Time *t,* min | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | | Tracer Output Concentration, Cpulse  gm/liter fluid | 0 | 3 | 5 | 5 | 4 | 2 | 1 | 0 | | (15) |
| 22. |  | Derive the expression for single enzyme substrate reaction without inhibition and arrive at MM equation. | (15) |
| (OR) | | | |
| 23. |  | What is product inhibition? Derive the expression for various types of toxic compound inhibition. | (15) |
| 24. |  | Write a detailed note on various immobilization techniques with neat diagrams. | (15) |
| (OR) | | | |
| 25. |  | Explain the principle and working of potentiometric biosensor in detail. | (15) |