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 – 2016**

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|  |  | **Semester :** | **5** |
| **Code :** | **14BT2047** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BIOCHEMICAL ENGINEERING** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
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| Q. No. |  | Questions | Course  Outcome | Marks |
| 1. |  | Elaborately explain the difference between chemical and Biochemical process in detail. | CO-1 | 20 |
| (OR) | | | | |
| 2. |  | Describe in detail about the methods to isolate industrially important microorganisms. | CO-1 | 20 |
| 3. |  | Explain in detail how MM parameters are estimated? | CO-1 | 20 |
| (OR) | | | | |
| 4. |  | The following data have been obtained for the enzymatic reaction. Calculate and compare MM parameters using LB plot and MM plot.  k1 K3  E+ S ES E+ P  K2   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **V (hr-1)** | 2.1 | 1.8 | 1.5 | 1.2 | 0.9 | 0.6 | 0.3 | | **S (g/L)** | 14 | 12 | 10 | 8 | 6 | 4 | 2 | | CO-1 | 20 |
| 5. |  | The production of penicillin was carried out in a batch reactor and the following data were obtained.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Time (hr)** | **Glucose concentration (g/l)** | ***Penicillium notatum* concentration (g/l)** | **Penicillin concentration**  **(g/l)** | **Ethanol Concentration**  **(g/l)** | | 0 | 150 | 1.1 | 0 | 0 | | 5 | 135 | 2.5 | 2.2 | 0.15 | | 15 | 107 | 3.2 | 3.5 | 0.23 | | 30 | 89 | 6.7 | 6.1 | 0.45 | | 40 | 72 | 12.1 | 8.4 | 0.5 | | 50 | 55 | 16.8 | 10.7 | 0.77 | | 60 | 40 | 25.7 | 13.9 | 1.3 | | 70 | 22 | 29.3 | 18.5 | 2.5 |   Determine net specific growth rate, growth rate @60hrs, biomass and product yield coefficient, doubling time and max cell concentration if 12gm/l and 200 g/l of biomass and glucose are used as inital inoculum and substrate concentration. | CO-1 | 20 |
| (OR) | | | | |
| 6. |  | Elaborate on any two inhibition kinetic models for microbia growth. | CO-1 | 20 |
| 7. |  | Explain in detail about various methods to determine KLa? List out the disadvantages of using sulphite oxidation and gassing out methods. | CO-2 | 20 |
| (OR) | | | | |
| 8. |  | A fermentation process requires 7.7 liters batch of complex medium to be steam sterilized at 121 °C. Assuming that the medium before sterilization contains l06 bacterial spores of *Bacillus stearothermophilus* per ml and the probability of non-sterility after sterilization is 1 in 1000, Determine the holding time at 121°C and ▼holding. The time of heating from 100°C to 121°C is 9 min and the time of cooling from 121°C to 100°C is 11 min. Assume that the spore death below 100°C is insignificant. And the value of ▼table=12.549, A=9.5x1037min-1, E=283 KJ/mol and R=8.314 J/(mol K). | CO-1 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Explain the bioreactor consideration of any two immobilized bioreactor with a neat sketch. | CO-3 | 20 |

ALL THE BEST