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



**End Semester Examination – Nov / Dec – 2019**

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|  |  |  |  |
| **Code :** | **17BT2039** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BIOCHEMICAL ENGINEERING** | **Max. Marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** |  | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Elaborate the process of isolation of Industrially important microbial strains and the primary screening techniques with neat diagram. | CO2 | 20 |
| **(OR)** | | | | |
| 2. |  | Elaborate on the overview of fermentation process and also add a note on biochemical process. | CO1 | 20 |
|  |  |  |  |  |
| 3. |  | The following data have been obtained from the enzymatic reaction. Calculate and compare MM parameters using HW plot and MM plot.  k1 K3  E+ S ES E+ P  K2   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **V (hr-1)** | 2.8 | 2.4 | 2.0 | 1.6 | 1.2 | 0.8 | 0.4 | | **S (g/L)** | 14 | 12 | 10 | 8 | 6 | 4 | 2 | | CO3 | 20 |
| **(OR)** | | | | |
| 4. |  | Derive Michealis Menten equation for single substrate reaction without inhibition. Explain the various methods to estimate MM parameters with neat graphs. | CO3 | 20 |
|  |  |  |  |  |
| 5. |  | What do you mean by unstructured and non-segregated model? Derive any two unstructured and non segregated model for growth of microbes. | CO2 | 20 |
| **(OR)** | | | | |
| 6. |  | The production of penicillin was carried out in a batch reactor and the following data were obtained.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Time (hr)** | **Glucose concentration (g/l)** | ***Penicillium chrysogenum* concentration (g/l)** | **Penicillin concentration**  **(g/l)** | **Ethanol Concentration**  **(g/l)** | | 0 | 150 | 2.1 | 0 | 0 | | 5 | 135 | 2.5 | 3.2 | 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 | 4.5 |   Determine carrying capacity coefficient, net specific growth rate, growth rate @30hrs, biomass and product yield coefficient, doubling time and max cell concentration if 50gm/l and 150 g/l of biomass and glucose are used as inital inoculum and substrate concentration respectively. | CO2 | 20 |
|  |  |  |  |  |
| 7. |  | Discuss in detail the various methods to determine KLa. List out the disadvantages of using sulphite oxidation and gassing out methods. | CO4 | 20 |
| **(OR)** | | | | |
| 8. |  | Discuss in detail the process of oxygen transfer in microbial bioreactors with its design on sterilization process. | CO5 | 20 |
|  | | **Compulsory**: |  |  |
| 9. |  | Explain the working principle, variants and applications of various immobilized bioreactors with a neat sketch. | CO6 | 20 |