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 – April/May – 2017**

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| **Code :** | **14BT2009** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BIOPROCESS PRNCIPLES** | **Max. marks :** | **100** |

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

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| Q. No. |  | Questions | Course  Outcome | Marks |
| 1. |  | Discuss in detail the basic configuration of a fermentor with a neat diagram and also outline the steps involved in the fermentation Process. | CO1 | 20 |
| (OR) | | | | |
| 2. |  | Explain in detail various stages in development of fermentation industry also tabulate various process controls, vessels used and modes of operation of these process in detail. | CO1 | 20 |
| 3. |  | Write short notes on:  a) Precurssor.  b) Chelators.  c) Inducers.  d) Inhibitors. | CO3 | 20 |
| (OR) | | | | |
| 4. |  | For the following data calculate the difference, average difference, mean square, experimental error and factors showing larger effect Where, D-1 and D-2 are dummy variables.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **Factor** | **Car** | **hor** | **Vit** | **Min** | **N2** | **D-1** | **D-2** | | **Σ(H)** | 4.9 | 24.5 | 6.7 | 9.3 | 9.7 | 13 | 9.1 | | **Σ(L)** | 14.9 | 11.3 | 9.3 | 9.8 | 5.3 | 10.8 | 9.6 | | CO3 | 20 |
| 5. |  | 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). | CO2 | 20 |
| (OR) | | | | |
| 6. |  | Classify and compare different types of continuous sterilization equipments used in media sterilization with a neat diagram. | CO2 | 20 |
| 7. |  | Explain in detail the preservation techniques followed to store isolated industrially important microbes. | CO3 | 20 |
| (OR) | | | | |
| 8. |  | Elaborate with a process flow diagram the process of development of inoculum in detail. | CO3 | 20 |
|  | | **Compulsory**: |  |  |
| 9. |  | The experimental measurement of a mixed culture of organism have shown the following reaction whose RQ is found to be 0.9  **C6H5COOH + aO2 + bNH3 cC5H7NO2 + dH2O + eCO2**  Calculate:  a) Stoichiometric coefficients a, b, c, d and e.  b) Degrees of reduction for substrate and biomass.  c) Biomass, Nitrogen and CO2 yield coefficient. | CO2 | 20 |