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



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

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| **Code :** | **17BT2011** | **Duration :** | **3hrs** |
| **Sub. Name :** | **BIOPROCESS PRINCIPLES** | **Max. Marks :** | **100** |

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

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| --- | --- | --- | --- | --- |
| **Q. No.** |  | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Elaborate on the basic configuration of a fermentor with a neat diagram and outline the steps involved in the fermentation process. | CO1 | 20 |
| **(OR)** | | | | |
| 2. |  | Summarize five groups of commercially important fermentation process available and relate them with examples. | CO1 | 20 |
|  |  |  |  |  |
| 3. |  | Explain in detail the process of medium formulation and the important constituents need to be added for formulating an industrial scale medium for Penicillin production. | CO2 | 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 | | CO2 | 20 |
|  |  |  |  |  |
| 5. |  | Air is sterilized through a depth filter and is sent at an flow rate of  17 m3/min for an fermentation process for 460x105 min with a linear velocity of 0.17m/min. The value of the rate constant is 1.54 m1. Calculate,  a) Initial number of microorganism present in air.  b) Radius of the filter. c) Length of the filter.  d) Cross sectional area of filter. | CO3 | 20 |
| **(OR)** | | | | |
| 6. |  | Derive and explain the different steps in designing the sterilization holding time for an industrial scale batch medium sterilization process with an example. | CO3 | 20 |
|  |  |  |  |  |
| 7. |  | Elaborate the primary screening techniques for isolation of industrially important microorganisms. | CO4 | 20 |
| **(OR)** | | | | |
| 8. |  | Describe with a neat diagram the process of inoculum development for brewing process. | CO5 | 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:   1. Stoichiometric coefficients a, b, c, d and e. 2. Degrees of reduction for substrate and biomass. 3. Biomass, Nitrogen and CO2 yield coefficient. | CO6 | 20 |