**Karunya University**

**(Karunya Institute of Technology and Sciences)**

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

**Supplementary Examinations – June 2016**

**Subject Title: BIOREACTOR ENGINEERING Time : 3 hours**

**Subject Code: 14BT2015 Maximum Marks: 100**

**Answer ALL questions (5 x 20 = 100 Marks)**

1. .

Determine: (i) a, b, c, d & e when RQ = 0.9; (ii) & (iii) &

**(OR)**

2. a.

Find the stoichiometric coefficients for the given biological reaction when RQ=1.44?

(16)

b. Write the elemental balance for the following equation &

(4)

3. a. Derive the expression for competitive substrate inhibition model. (12)

b. Ethanol formation from glucose is accomplished in a batch culture the following data were obtained. Find the carrying capacity coefficient using logistic equation. (8)

|  |  |  |  |
| --- | --- | --- | --- |
| Time (hrs) | Glucose (g/l) | Biomass (g/l) | Ethanol (g/l) |
| 0 | 100 | 0.5 | 0.0 |
| 2 | 95 | 1.0 | 2.5 |
| 5 | 85 | 2.1 | 7.5 |
| 10 | 58 | 4.8 | 20.0 |
| 15 | 30 | 7.7 | 34.0 |
| 20 | 12 | 9.6 | 43.0 |
| 25 | 5 | 10.4 | 47.5 |
| 30 | 2 | 10.7 | 49.0 |

**(OR)**

4. Explain detail about batch growth kinetics of microorganisms and derive the kinetic equation for various stages?

5. What are the methods to quantify the cell concentration? Explain with suitable examples.

**(OR)**

6. a. Prove (15)

b. Write short notes on CSTR, advantages and its disadvantages? (5)

7. Write about Chemostat reactor and derive the expression for chemostat with recycle reactor?

**(OR)**

8. a. Derive the expression for the growth of filamentous organisms and prove that biomass increases linearly with time? (12)

b. List out the experimental methods to find . Explain sulphite oxidation method. (8)

**Compulsory:**

9. Write in detail about basic configuration of fermenter and its ancillaries.