

(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 154754

Roll No.

B.Tech.

(SEM. VII) THEORY EXAMINATION, 2015-16

BIOPROCESS ENGINEERING-II

[Time:3 hours]

[Total Marks:100]

Section-A

Note: Attempt **all** questions. All parts carry equal marks. Write answer of each part in short. (10x2=20)

1. (A) Indicate True (T) or False (F):
 - (a) Batch bioreactor operates at Steady state. ()
 - (b) Thermodynamically, CSTR is a Closed system. ()
 - (c) Exponential growth in a batch culture may be prolonged by the addition of fresh medium in the vessel. ()
 - (d) The destruction of microorganization by steam (moist heat) follows first order kinetics. ()

- (e) 192 grams of oxygen is required for the complete oxidation of one mole of glucose. ()
- (B) Fill in the gap by a suitable one word:
- (f) K_2a is used as a measurement of.....of the system.
- (g) Bioreactor is regarded as aof .
- (h) Batch culture system represents.....in a.....system.
- (i) Fermented broth is generally very.....containing about 5 to 20% of the.....
- (j) Liquids and gases before.....the bioreactor are.....

Section-B

Attempt **any five** questions from this section. (10×5=50)

2. How do you correlate biochemical Engg. with biotechnology?
3. Enumerate the steps in a bioprocess for the production of an industrial product with a neat flow process diagram.

4. Compare direct methods and indirect methods for estimation of microbial growth.
5. How do you differentiate between “simple type product formation” and “simultaneous type of product formation”?
6. Discuss the features of a chemostat.
7. Give a brief mention of mass transfer in a bioreactor.
8. Enumerate the methods for scale-up of bioreactor with a brief description of one of these methods.
9. Write short notes on **any two** of the following:
- (a) Residence time.
- (b) Power consumption in bioreactor.
- (c) Analysis of bioprocess experimental data.
- (d) Airlift bioreactor.

Section-C

Attempt **any two** question from this section. (15×2=30)

10. Enumerating the factors affecting ' K_2a ' and develop the following expression:

$$K_La = \frac{C_c \times C \alpha \Delta xy}{C^* - C_L}$$

11. Give an account of computer modeling and optimization in bioprocess.
12. Calculate the aeration rate with large fermentor. The data required for this are as under :
- (i) Aeration rate with
Small fermentor = 1 VVM.
- (ii) Scale up ratio = 5.0

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