



KERALA AGRICULTURAL UNIVERSITY
B.Tech(Food Engg.) 2018 Admission
III Semester Final Examination-December 2019

Fdqu.2103

Biochemical Engineering (1+1)

Marks:50
Time: 2 hours

- I Fill in the blanks: (10x1=10)**
1. The enzymes hexokinase have low K_m value and glucokinase have high K_m value. The enzyme which has high affinity for the substrate glucose is _____.
 2. The substrate binding site of an enzyme is known as _____.
 3. The phenomenon in which substrates are used in a sequential manner is known as _____.
 4. Disengagement zone, air riser and down comer are generally the components of a _____ fermenter type.
 5. _____ works on the principle of maintaining the specific nutrient concentration of the culture medium in the continuous culture fermenter.
- State True or False**
6. The heat transfer rates per unit volume will be lowest in a continuous air lift bioreactor than a continuous packed bed reactor.
 7. One of the function of the draft tube in an airlift bioreactor is to even out shear conditions throughout the reactor.
 8. The Monod Model relates specific growth rate to the substrate consumption.
 9. In a continuous reactor at steady state, the rates of biomass, substrate and product concentrations do not change with time
 10. During the exponential phase the maximum specific growth rate equals specific growth rate as concentration of growth limiting substrate is much greater than the Monod constant.
- II Write Short notes on ANY FIVE of the following (5x2=10)**
1. Write on oxygen utilization rate (OUR) and oxygen transfer rate (OTR).
 2. Discuss the aseptic condition and how to achieve it.
 3. What is used to control excessive foaming in a fermentation process?
 4. Enumerate the basic techniques of cell separation.
 5. List out the techniques used to measure the cell mass in a fermentor.
 6. List the different types of impellers used in stirred tank reactor.
 7. Outline the mechanical and non-mechanical methods of cell disruption for product recovery.
- III Answer ANY FIVE of the following (5x4=20)**
1. Detail the effects of the environment on the growth of cells in a fermenter.
 2. Show the comparison between the batch and continuous culture in industrial processes.
 3. Write on the Monod growth kinetics.
 4. Explain mixing and mass transfer in a fermenter. Discuss various factors affecting the kla values in fermenters.
 5. Write briefly on common measurements and control systems in a fermenter.
 6. Write in detail on the applied enzyme catalysis in industries.
 7. Write short notes on
 - a Fed-batch culture technique
 - b Sterilization of fermenter medium

PTO

IV

Write an essay on ANY ONE of the following

(1x10=10)

1. Discuss in detail on the design and construction of an ideal fermenter detailing its configuration, instrumentation and operation with neat sketches.
2. Write a detailed account on the various downstream processing in biochemical engineering for product recovery
