



Fdqu.2103

KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Food Engg.) 2016 Admission
III Semester Final Examination-January-2018
Biochemical Engineering (1+1)

Marks:50

Time: 2 hours
(10x1=10)

I Fill in the blanks:

- 1 A type of bacterial growth where the cells never reach its stationary phase is called _____ culture.
- 2 The type of curve obtained for the kinetics of allosteric enzymes is _____.
- 3 The efficient utilization of physical, chemical and biological processes to convert raw materials into useful products, at minimal cost, energy and impact on the environment is _____.
- 4 _____ inhibitors have identical affinities for E and ES and they do not change K_m , but decreases V_{max} .
- 5 Wash out in steady state fermentation occurs when _____ rate is less than maximum specific growth rate.

State True or False

- 6 Bubble column reactor has large height to diameter ratio.
- 7 The double reciprocal of Michealis – Menton is known as Eadie- Hofste Plot.
- 8 The correct sequences during the industrial production of substances are: inoculation, screening, fermentation, downstream processing and removal of wastes.
- 9 For the reaction $A \rightarrow B$, $\Delta G = - 60 \text{ KJ/mol}$. The reaction is started with 10 mmol of A; no B is initially present. After 24 h, 2 mmol of B, 8 mmol of A are present. The most likely explanation is that the formation of B is kinetically slow; equilibrium has not been reached in 24h.
- 10 Enzymes are proteins that lower the activation energy of a reaction and in doing this enzymes increase the rate of a reaction, helping it to occur faster.

II Write Short notes on ANY FIVE of the following

(5x2=10)

- 1 Briefly write on the factors which affect enzyme activity.
- 2 Outline the range of fermentation processes.
- 3 Give the applications of fermenter in food industries.
- 4 Explain the importance of Fed batch reactor.
- 5 Write in brief on common on-line instrumentation used on bioreactor?
- 6 Briefly explain the role of biochemical engineering with reference to cell as reactors.
- 7 List the various methods of cell disruption for product recovery operation.

III Answer ANY FIVE of the following

(5x4=20)

- 1 What are the considerations for design and construction of a fermenter?
- 2 Give an account on the working and application of continuous flow stirred tank reactors.
- 3 State the factors affecting oxygen transfer in a fermentation process.

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- 4 State various methods of sterilization. Discuss batch and continuous sterilization process.
- 5 Explain the various methods involved in downstream processing.
- 6 How do agitation and aeration affect microbial growth? How does aeration help agitation and mixing? Explain.
- 7 Describe the kinetic classification of fermentation process with suitable examples and also describe them mathematically.

IV

Write an essay on ANY ONE of the following

(1x10=10)

- 1 Derive Michaelis - Menten equation for a single substrate enzymatic biochemical reaction stating all the assumptions. How are the parameters in the above equation evaluated? Explain with neat sketches.
2. Describe with a neat sketch an ideal fermenter for an aseptic process. Bring out the process considerations in a typical fermentation. Discuss the various problems associated with the scale up of fermenters
