

B.TECH DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

Fifth Semester

BIOTECHNOLOGY

BTY114: Bio process Principles

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The micro-organism having an optimum temperature above ____ reduces the cooling costs considerably in fermentation process.
 - a) 50°
 - b) 30°
 - c) 40°
 - d) 70°
2. The potential productivity of the micro-organism is controlled by which of the following
 - a) Temperature
 - b) Pressure
 - c) Culture media
 - d) Genome
3. Which is the most common carbon source used in the plant cell culture media?
 - a) Sucrose
 - b) Glucose
 - c) Fructose
 - d) Maltose
4. Toxicity due to accumulation of ammonia can be overcome
 - a) by substituting glutamine by glutamate
 - b) by adding buffers
 - c) by avoiding amino acid addition
 - d) by adding urease
5. The Del factor is calculated as _____ when the unsterile broth was shown to contain 10^{11} viable organisms.
 - a) 32.2
 - b) 45
 - c) 67
 - d) 89.7
6. Continuous sterilization process involves _____ for sterilization
 - a) Steam
 - b) Hot water
 - c) Heat exchanger
 - d) Hot air
7. The Monod model predicts that the specific growth rate
 - a) will increase with the concentration of the growth limiting substrate until it reaches a maximum value
 - b) will decrease with the concentration of the growth limiting substrate
 - c) will increase with the concentration of the growth limiting substrate
 - d) does not depend on growth limiting substrate
8. Stationary phase is described as
 - a) no further increase in the cell population after a maximum value
 - b) deceleration of growth and division rate after the growth rate reaches a maximum

- c) acceleration of growth and division rate after the growth rate reaches a maximum d) deceleration of growth and division rate after the growth rate reaches a minimum
9. Yield Coefficient represents
- a) total biomass or product produced b) conversion efficiency of a substrate into product
- c) conversion rate of a substrate into product d) production time of biomass or product
10. The lowest yield of ATP is in
- a) Fermentation b) Aerobic respiration
- c) Anaerobic respiration d) metabolic activities

PART B (10 x 2 = 20 Marks)

11. List out the essential requirements of fermentation processes.
12. Give a checklist of the main parameters to be monitored in fermentation processes.
13. Write all the possible criteria for the medium preparation.
14. Differentiate between simple and complex media for microbes.
15. What is thermal death kinetics?
16. Mention the advantages of batch sterilization over continuous sterilization process.
17. What is Monod model?
18. Recall the significance of Leudeking – pirt model.
19. Tabulate an energetic analysis of microbial growth.
20. Define yield coefficient of biomass production.

PART C (5 x 14 = 70 Marks)

21. a) (i) Summarize the industrially important microbes and their products in fermentation Industry. (7)
- (ii) Explain the basic configuration of stirred tank reactor and ancillaries. (7)
- (OR)
- b) Classify the types of bioreactors used in fermentation processes.
22. a) Outline the criteria involved in simple and complex media for Plant & Animal cells

(OR)

- b) What are the various medium optimization methods can be applied to bioprocesses?

23. a) (i) Explain the kinetics of cell death (7)
(ii) Outline the filter sterilization process of liquid media (7)

(OR)

- b) Discuss in detail about the design aspects of sterilization equipment for batch and continuous process.

24. a) Compare and contrast fed-batch and continuous cultivation processes.

(OR)

- b) Discuss about the simple unstructured kinetic models for growth of filamentous organisms and yeast.

25. a) Explain yield coefficients of biomass and product formation.

(OR)

- b) Summarize the energetic analysis of microbial growth and product formation.
