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SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

T. Y. B.Sc. (V Semester) Examination

US05CMIC06(MICROBIOLOGY) FERMENTATION TECHNOLOGY

DATE: FRIDAY, NOVEMBER 22, 2019 TIME: 10:00 a.m. to 1:00 p.m.

Maximum Marks: 70

Q.1. Each question below gives a multiple choice of answers. Choose the most [10] appropriate one.

- 1 Identify the correct sequence during the Industrial Production of substances.
(a) Inoculum, Screening, Fermentation, Downstream processing and Removal of waste
(b) Screening, Inoculum, Fermentation, Downstream processing and Removal of waste
(c) Fermentation, Inoculum, Screening, Downstream processing and Removal of waste
(d) Fermentation Inoculum, screening, Removal of waste, and Downstream processing
- 2 Which of the following is the most important characteristic for the producing strain
(a) It should not be a high yielding strain
(b) It should have a stable biochemical characteristics
(c) It should produce undesirable products
(d) Optimum temperature of the organisms should be 20°C.
- 3 Downstream processing is done to:
(a) Separate and purify product.
(b) Eliminate pathogenic organisms
(c) Recover the unconverted substrate
(d) Acclimatize microbial cells in a medium
- 4 Which of the following is used as an agent to fuse protoplast?
(a) Sucrose
(b) Glycerol
(c) Polyethylene Glycol
(d) Glycerine
- 5 Which of the following is used as a precursor for penicillin V production?
(a) Phenyl acetic acid
(b) Phenoxy acetic acid
(c) Vinyl acetic acid
(d) Benzoic acid
- 6 _____ are the parts of aeration and agitation in a fermentor vessel
(a) Baffles
(b) Sparger
(c) Stirrer glands and bearings
(d) All of these
- 7 Oxygen electrodes measure _____ during the fermentation process.
(a) Partial pressure of Dissolved oxygen
(b) Dissolved oxygen concentration
(c) Mole fraction of oxygen
(d) All of these
- 8 Which of them is used as an antifoam agent
(a) Protein
(b) Carbohydrates
(c) Oil
(d) Amino acids.
- 9 Which of the following is the most likely to cause an increase in rate of oxygen transfer in a particular aerated fermentation system
(a) Addition of antifoams
(b) Increase in temperature
(c) Increased stirrer speed
(d) All of these

(1)

(P.T.O.)

10 Which of the following factors affects the Volumetric mass transfer coefficient?

- (a) Air flow rate (b) Degree of agitation
(c) Medium rheology (d) All of these

Q.2 Short Questions (Attempt any Ten)

20

- 1 Define the following: Screening, Upstream and Downstream process.
- 2 What is secondary screening and why is it important industrial microbiology.
- 3 What are primary and secondary metabolites give one example each.
- 4 What is electroporation? What is its role in strain improvement?
- 5 Enlist the various steps of gene technology used to obtain hyper producing strain.
- 6 What is the role of yeast mannan in the production of streptomycin?
- 7 Enlist the disadvantages of SSF.
- 8 What is foam and explain in brief how foam can be controlled.
- 9 Describe what materials can be used for the construction of fermentors with reason.
- 10 How OTR decreases on addition of antifoam agents.
- 11 Explain the terms Scale up and Scale down.
- 12 Which reactions contribute to the loss of nutrients during sterilization?

Q.3 [A] Explain the technique used for the isolation of growth factors producing organisms and enrichment culture technique [06]

[B] With the help of a flow chart explain in detail a typical industrial fermentation process. [04]

OR

Q.3 [A] What are the important characteristics of industrially important microorganisms [04]

[B] What is secondary screening and how does it differ from primary screening and explain how Secondary screening is qualitative in nature. [06]

Q.4 What are the various strategies of strain improvement and discuss the role of physical and chemical mutagen in detail with suitable examples. [10]

OR

Q.4. Enlist the Ideal characteristics of a fermentation medium. Explain the role of precursor and Inhibitor in the fermentation medium [10]

Q.5 [A] Describe batch and fed batch fermentation [06]

[B] Explain how would you monitor and control Dissolved oxygen [04]

OR

Q.5. [A] Enlist the criteria for the design of a fermentor vessel and explain a typical fermentor with its basic components. [10]

Q.6 [A] What is KLa? Explain the various factors affecting the KLa. [06]

[B] Write a note on criteria for an ideal inoculum. [04]

OR

Q.6. What is sterilization? And write a note on batch sterilization and mention its advantages and disadvantages. [10]

-X-
(2)