

B.Sc. BIOTECHNOLOGY
FIFTH SEMESTER [SPECIAL REPEAT]
INDUSTRIAL FERMENTATION
BBT-501
[USE OMR SHEET FOR OBJECTIVE PART]

SET
A

Duration: 3 hrs.

Full Marks: 70

(Objective)

Time: 30 mins.

Marks: 20

Choose the correct answer from the following:

1 × 20 = 20

- Which of the following raw materials are important for the production of glutamic acid?
 - Glycerol
 - Corn-steep liquor
 - Tryptone
 - Biotin
- The microorganism used in the industrial production of citric acid:
 - Aspergillus nigricans
 - Rhizopus nigricans
 - Fusariummoniliformae
 - Rhizopus oryzae
- The best medium for the production of penicillin is:
 - Nutrient agar
 - Sulphite waste liquor
 - Corn steep liquor
 - Whey
- In World War II, the fermentation was used for the production of.....
 - Alcohol
 - Antibiotics
 - Wine
 - Beer
- The small-scale bioreactors have volume of.....
 - 5-10 litres
 - 10-20 litres
 - 1-10 litres
 - 1-20 litres
- Which process of enzyme production involves growth of selected microorganisms in closed containers having a rich fermentation broth of nutrients and a high concentration of oxygen?
 - Submerged fermentation
 - Solid state fermentation
 - Both of above
 - None of above
- Which of the following is not an advantage of immobilization?
 - Minimum reaction time
 - Cheap isolation of cells/enzymes
 - Can be reused
 - Less labour input
- Which enzyme is used to degrade starchy materials?
 - Proteases
 - Amylases
 - Lipases
 - Nucleases
- Find out the Dilution factor when the flowrate of a bioreactor is 10 ml where the volume of the reactor is 1000ml.
 - 10L/h
 - 0.01L/h
 - 0.05L/h
 - 20L/h
- Which of the following is used to grow anchorage-dependent cells?
 - Airlift fermenter
 - Tower fermenter
 - Hollow fibre chamber
 - Perfusion bioreactor

11. Examples of Lactic acid bacteria are:
- a. *Lactobacillus acidophilus*
 - b. *Bifidobacterium*
 - c. Both a and b
 - d. None of the above
12. A commonly used mold in citric acid manufacturing is:
- a. *Aspergillus fumigatus*
 - b. *Aspergillus terreus*
 - c. *Aspergillus flavus*
 - d. *Aspergillus niger*
13. Father of industrial fermentation is:
- a. Louis Pasteur
 - b. Alexander Fleming
 - c. Chaim Weizmann
 - d. Luwenhoek
14. Oxygen transfer and dispersions in bioreactors are provided by:
- a. Spargers
 - b. Spargers and impellers
 - c. Motor
 - d. All of the above
15. The bioreactor vessel is generally made up of:
- a. Silica
 - b. Aluminium
 - c. Stainless steel
 - d. Plastic
16. In continuous heat sterilization the medium is heated to:
- a. 120 degree, for a short period
 - b. 140 degree, for a short period
 - c. 140 degree, for a longer period
 - d. 160 degree, for a longer period
17. Example of antifoam agents:
- a. Vegetable oils
 - b. Mineral oils based on silicone
 - c. Mustard oil
 - d. Both a and b
18. Substrates used as carbon source in industrial fermentation includes:
- a. Glucose
 - b. Sucrose
 - c. Molasses
 - d. Urea
19. Corn steep liquor is rich in:
- a. C
 - b. N
 - c. S
 - d. P
20. Ultrasonication is a..... method.
- a. Concentration
 - b. Purification
 - c. Separation
 - d. Cell disruption
- - - - -

(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

[Answer question no.1 & any four (4) from the rest]

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| 1. Explain the biosynthetic pathway and production of Citric acid with a neat diagram. | 5+5=10 |
| 2. Draw the flowchart of downstream processing. Explain the solid liquid separation methods used in downstream processing. | 3+7=10 |
| 3. Define strain improvement. Discuss briefly the recombinant DNA technology for improvement of industrially important microorganisms. | 2+8=10 |
| 4. Describe the process of Microbial fuel cell and its application in Industry. | 10 |
| 5. Draw a neat labelled diagram of a conventional bioreactor. Discuss its features briefly. | 10 |
| 6. Describe bioreactor. Explain the kinetics of continuous bioreactor with a neat diagram. | 2+8=10 |
| 7. Describe the mode of action of penicillin. Describe the biosynthetic pathway and production process of penicillin with a neat diagram. | 2+8=10 |
| 8. Write short notes on: | 5+5=10 |
| a) Culture collection centres | |
| b) Features of industrially important microorganisms | |

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