

Roll No.

Total Printed Pages -08

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**M.Sc. (Fourth Semester)
EXAMINATION, May - June, 2022
MICROBIOLOGY
Paper Fourth
(Industrial Microbiology)**

Time : Three Hours]

[Maximum Marks:80

Note: Attempt all sections as directed.

(Section-A)

(Multiple Choice Questions)

(1×20 each)

1. In world war II the fermentation was used for the production of
 - (A) Alcohol
 - (B) Antibiotic
 - (C) Wine
 - (D) Cheese

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2. The pilot scale bioreactors have volume of
 - (A) 1-3 Ltrs.
 - (B) 3-10m³
 - (C) 2-500m³
 - (D) 7500m³
3. Which of the following fermenter are characterised by the height to diameter ratio?
 - (A) Packed bed reactor
 - (B) Tower Reactor
 - (C) Hollow fiber reactor
 - (D) Perfusion bioreactor
4. In which of the fermentor the impellers are replaced by constant flow of gas.
 - (A) Tower fermentor
 - (B) Hallow fiber
 - (C) Packed bed reactor
 - (D) Air life fermentor
5. What is the function of carbon in stainless steel?
 - (A) Improves ductility
 - (B) Improves halogen resistance
 - (C) Reduce sensitization
 - (D) resistance to corrosion

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6. Which of the following is not a carbon source
- (A) Corn molasses
 - (B) Beat molasses
 - (C) Sulfite waste liquor
 - (D) Yeast extract
7. The Maillard reaction is a chemical change between_ and
- (A) Amino acid & carboxylic acid
 - (B) Amino acid & Reducing sugar
 - (C) Carboxylic Acid and reducing sugar
 - (D) None of the above
8. Sulfite waste liquor is obtained from
- (A) Wood Industry
 - (B) Liquor Industry
 - (C) Sulfur Industry
 - (D) Paper Industry
9. Which of the following is not present in Beat Molasses
- (A) Biotin
 - (B) Thiamine
 - (C) Inositol
 - (D) Cobalamine

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10. Which is the final e^- acceptor in Lactic Acid fermetation
- (A) Lactic Acid
 - (B) Oxygen
 - (C) Pyruvate
 - (D) NAD
11. What do you mean by dissolved oxygen tension
- (A) Force
 - (B) Density
 - (C) Partial pressure
 - (D) Volume
12. What is proportional Integral derivative (PID)
- (A) Bioreactor
 - (B) Controller
 - (C) Mathematical Integration
 - (D) Mathematical differentiation
13. Crabtree effect is which type of process
- (A) Anaerobic
 - (B) Aerobic
 - (C) Biomass yield
 - (D) Oxidative Phosphorylation

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14. Flow injection Analysis (FIA) a sampling handling technique used to remove
- (A) Analyte
 - (B) Electrolyte
 - (C) Cell free medium
 - (D) Cells
15. Which of the following is not criterion for the choice of the recovery process
- (A) Location of product
 - (B) Price of the product
 - (C) Use of product
 - (D) Source of organism
16. Which of the following is used in the precipitation of dextran
- (A) Methanol
 - (B) PEG
 - (C) Ammonium Sulfate
 - (D) Sodium Sulfate
17. Which method is suitable for separation of bacterial cells from fermentation broth.
- (A) Filtration
 - (B) Centrifugation
 - (C) Cell disruption
 - (D) precipitation

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18. Which of the following is used as filter aids?
- (A) Sand
 - (B) Diatomaceous earth
 - (C) Silica
 - (D) All of the above
19. The Largest diameter of glass fermenter is
- (A) 50 cm
 - (B) 70 cm
 - (C) 60 cm
 - (D) 80 cm
20. Which of the following is used to produce a cooling effect on the vessel?
- (A) Baffles
 - (B) Sparger
 - (C) Impellor
 - (D) Stirrer glands

(Section-B)

(Very Short Answer Type Questions)

(2×8=16)

1. Define fed batch fermentation process with example.
2. Differentiate solid state fermentation from submerged fermentation

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3. Define air lift fermentor.
4. Differentiate between rushton turbine and marine propellor.
5. Comment on the use of corn steep liquor as fermentation media component.
6. Define Lyophilization.
7. Define solvent extraction methods used in recovery of fermentation product.
8. Define Ultrafiltration.

(Section-C)

(Short Answer Type Questions)

(3×8=24)

1. Differentiate between submerged and stationary liquid state fermentor.
2. Enlist few techniques used under secondary screening methods.
3. Enlist the general requirements for an ideal bioreactor (fermentor).
4. Enlist the type of seals used in construction of fermentor.
5. What are precursor and how they differ from inducers used in fermentation media?
6. Describe the use of antifoams agents in fermentation processes.
7. Describe use of precipitation methods in various stage of product recovery.
8. What is the role of solvent recovery plant?

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(Section-D)
(Long Answer Type Questions)

5×4=20

Note- Attempt all questions using 150 words.

1. Describe in detail major groups of commercially important fermentation process.

OR

Describe the basic difference between batch and continuous fermentation process.

2. Describe in detail various fermentor design available and their distinct advantages.

OR

Enlist the dimension and key importance of lab, pilot and production scale fermentor

3. Describe in detail steps involved in developing industrially important strain.

OR

Describe process involved in monitoring and control of temperature.

4. Describe in detail recovery methods involved in separation of solids from liquid.

OR

Describe in detail methods involved in cell disruption and extraction of fermentation of products.

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