

Roll No. ....

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**F - 824**  
**M.Sc. (THIRD SEMESTER)**  
**EXAMINATION, Dec. - Jan., 2021-22**  
**BIOTECHNOLOGY**  
**Paper XI**  
**(Bioprocess Engineering and Technology)**

[ Time : Three Hours ]

[ Maximum Marks : 80 ]

[ Minimum Pass marks : 16 ]

**Note : Attempt all sections as directed.****Section - A****(Objective/Multiple Choice Questions)****(1 mark each)****Note : Attempt all questions.****Choose the correct answer:**

1. The long exposure of batch sterilization may lead to.....
- (A) Purification of media.  
 (B) Recovery of media.  
 (C) Degradation  
 (D) Good quality of product

2. Magnesium is required in the medium for.....
- (A) Membrane stabilization  
 (B) Production of ATP  
 (C) Membrane structure and function  
 (D) Amino acid synthesis
3. The exponential phase may be described by the equation .....
- (A)  $dx/dt = \mu x$   
 (B)  $dt/dx = \mu$   
 (C)  $dx/dt = \mu t$   
 (D)  $dx^2/dt^2 = \mu$
4. Which of the following devices is not used for pressure measurement?
- (A) Diaphragm gauge  
 (B) Pressure bellows  
 (C) Strain gauge  
 (D) Dynamometer
5. The Continuous culture is a/an.....culture system.
- (A) Open  
 (B) Closed  
 (C) Isolated  
 (D) Semi-closed

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6. Which of the following is a type of Fed-Batch culture?
- (A) Variable volume
  - (B) External Feedback
  - (C) Internal Feedback
  - (D) Chemostat
7. In which of the following bioreactors, the particles are not immersed in liquid?
- (A) Air-lift reactor
  - (B) Stirred vessel
  - (C) Sparged tank reactor
  - (D) Trickle-bed
8. In process modeling, experimental observations provide:
- (A) Structure of the model
  - (B) Non-numerical values of coefficients
  - (C) Non-numerical values of variables
  - (D) Numerical values of coefficients
9. Tube settlers are classified as which type of treatment?
- (A) Tertiary treatment
  - (B) Secondary treatment
  - (C) Preliminary treatment
  - (D) Primary treatment

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10. The intraparticle mass transfer resistance can affect the rate of cell reaction, if cells are immobilized by.
- (A) Copolymerization or microencapsulation.
  - (B) Crosslinking using multifunctional reagents
  - (C) Adsorption
  - (D) All of the above
11. What is the minimum quantity of dissolved oxygen that should be present in the treated sewage?
- (A) 6 ppm
  - (B) 4 ppm
  - (C) 1ppm
  - (D) 10ppm
12. Citric acid is a.....acid.
- (A) Monobasic
  - (B) Dibasic
  - (C) Tribasic
  - (D) Monoprotic
13. Industrial alcohol will be produced by using starter culture -
- (A) Top yeast
  - (B) Middle yeast
  - (C) Bottom yeast
  - (D) Feeder yeast

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14. Which of the following is considered as a disadvantage to the adsorption method of immobilization?
- (A) It is possible to separate and purify the enzymes while being immobilized
  - (B) The enzymes are not usually deactivated by adsorption
  - (C) The adsorption is a reversible process
  - (D) State of immobilization is very sensitive to solution PH, ionic strength and temperature.
15. The bench-top bioreactor comes under which type of bioreactor?
- (A) Solid-state bioreactor
  - (B) Photo bioreactors
  - (C) Stirred tank bioreactors
  - (D) Airlift bioreactors
16. The del factor ( $\Delta$ ) increases as the final number of cells.
- (A) Decreases
  - (B) Increases
  - (C) Zero
  - (D) Constant

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17. Which of the following centrifugation is used to separate certain organelles from whole cell?
- (A) Rate-zonal centrifugation
  - (B) Normal centrifugation
  - (C) Differential centrifugation
  - (D) Isopycnic centrifugation
18. The destruction of microorganisms by moist heat is described by.....
- (A) Zero-order reaction
  - (B) First-order reaction
  - (C) Third-order reaction
  - (D) Second-order reaction
19. Which of the following is not a property of antifoams?
- (a) It should be active at low concentrations
  - (B) It should have fast action on an existing foam
  - (C) It should be non-toxic to micro-organism
  - (D) It need not be sterilized

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20. In the high-temperature short-time (HTST) method of pasteurization, milk is exposed to a temperature of .....

- (A) 131 degree F
- (B) 145 degree F
- (C) 161 degree F
- (D) 120 degree F

**Section - B**

**( Very Short Answer Type Questions )**

**(2 marks each)**

**Note : Answer all questions.**

1. Define sub culturing.
2. Write different sterilization techniques.
3. Define Centrifugation.
4. Define microbial consortium and their importance.
5. Effluent disposal.
6. Define BOD.
7. What is bioleaching?
8. Write different methods of food preservation.

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**Section - C**

**(Short Answer Type - Questions)**

**(3 marks each)**

**Note : Answer all questions in 75 words.**

1. Write different types of media.
2. Explain different screening tests to identify industrial important microorganisms.
3. What is continuous culture?
4. Define Photo bioreactor.
5. Explain Secondary method of effluent treatment.
6. Write on methods of drying.
7. What is Pasteurization?
8. Write down the methods of bread making.

**Section - D**

**(Long Answer Type Questions)**

**(5 Marks each)**

**Note : Answer all questions in 150 Words.**

1. Explain microbial growth kinetics and its importance.

or

Explain different methods of microbial preservation.

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2. Write notes on different bioprocess parameters and their importance.

or

Define fluidized bed bioreactor and describe its typical structure, use and importance.

3. Explain process of cell removal and purifications of product.

or

Explain different techniques of cell immobilization and its advantage.

4. Write a brief note on industrial Antibiotic production technology.

or

Describe industrial process of cheese making.