(6 pages) Reg. No. : .....

Code No. : 10560 E **Sub. Code : CMMI 62**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2024.

Sixth Semester

Microbiology – Core

INDUSTRIAL MICROBIOLOGY AND BIOPROCESS TECHNOLOGY

(For those who joined in July 2021-2022 only)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. What is the primary goal of strain improvement?
   (a) Increase the yield of the desired product
   (b) Decrease the fermentation time
   (c) Reduce the cost of production
   (d) All of the above

2. What is the basic function of the fermentor?
   (a) To sterilize the medium
   (b) To recover the product
   (c) To provide optimum growth conditions to organisms and obtained the desired product
   (d) To purify the product

3. Which of the following is not the component of aeration and agitation system?
   (a) Impeller
   (b) Baffles
   (c) Stirrer gland and bearing
   (d) Thermometer

4. What type of bioreactor uses a stirrer to mix the contents?
   (a) Stirred tank bioreactor
   (b) Air lift bioreactor
   (c) Bubble column bioreactor
   (d) Fluidized bed bioreactor

5. Which of the following is not a nitrogen source?
   (a) Waste liquor (b) Corn steep
   (c) Peptones (d) Yeast extract

6. In batch culture for yeast inoculum development what is typically monitored to determine the growth phase?

(a) pH (b) Temperature

(c) Cell density (d) All of the above

7. Which drying method is best suited for heat-sensitive materials?

(a) Spray drying (b) Freeze drying

(c) Vacuum drying (d) Boiling drying

8. What is the primary purpose of disintegrating micro organisms in downstream processing?

(a) To remove unwanted cellular debris

(b) To increase cell density

(c) To enhance cell growth

(d) To prevent contamination

9. Which process is commonly used to extract citric acid from the fermentation broth?

(a) Filtration (b) Distillation

(c) Precipitation (d) Decantation

10. What is the primary substrate used in the industrial production of penicillin?

(a) Glucose (b) Lactose

(c) Starch (d) Glycerol

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Explain briefly about solid and liquid state fermentations.

Or

(b) What is cryopreservation of industrial strains? Add its significance.

12. (a) Explain the role of antifoaming agents in fermentation process with example.

Or

(b) What are the basic components of a bioreactor? Add their applications.

13. (a) Explain the importance of media composition in fermentation process. Give three examples of components commonly found in fermentation media.

Or

(b) Give a brief account on sterilization of fermentation media.

14. (a) Explain the difference between centrifugation and sedimentation in the context of biomass separation.

Or

(b) Outline the application of chromatography in downstream processing.

15. (a) Write the steps involved in the microbial production of xanthan.

Or

(b) Brief out the production of glutamic acid and its applications.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Give a brief account on history and development of industrial microbiology.

Or

(b) Write briefly about screening techniques.

17. (a) Compare and contrast Solid State Fermentation (SSF) and Sub Merged Fermentation (SMF) processes, including their advantages, disadvantages and applications.

Or

(b) Describe the parameters that need to be monitored and controlled in a bioreactor for optimal performance.

18. (a) Give a brief account on types of fermentation media.

Or

(b) Give a detailed account on inoculum development for bacteria.

19. (a) Elaborate different techniques used to disintegrate micro organisms in downstream processing.

Or

(b) Describe in detail the various driers used in downstream processing of biomolecules.

20. (a) Elaborate the microbial production of vinegar.

Or

(b) Explain the industrial production of amylase.

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