

(8 pages)

Reg. No. : .....

Code No.: 7681

Sub. Code: WMBM 33/  
VMBC 33

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2025.

Third Semester

Microbiology – Core

INDUSTRY MODULE : FERMENTATION  
TECHNOLOGY AND PHARMACEUTICAL  
MICROBIOLOGY

(For those who joined in July 2023 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (15 × 1 = 15 marks)

Answer ALL questions.

Choose the correct answer:

1. The most commonly used method for strain improvement in industrial microbiology is \_\_\_\_\_.  
(a) Mutation and selection  
(b) Genetic engineering  
(c) Protoplast fusion  
(d) Hybridization

2. Which of these is a common industrial yeast?  
(a) Bacillus subtilis  
(b) Escherichia Coli  
(c) Saccharomyces cerevisiae  
(d) Aspergillus niger
3. \_\_\_\_\_ fermentation occurs in the absence of oxygen?  
(a) Aerobic fermentation  
(b) Anaerobic fermentation  
(c) Batch fermentation  
(d) Continuous fermentation
4. What is the primary purpose of aeration in aerobic fermentation?  
(a) To remove CO<sub>2</sub>  
(b) To supply oxygen  
(c) To control temperature  
(d) To control pH
5. What is the relationship between agitation and oxygen transfer?  
(a) Agitation has no effect on oxygen transfer  
(b) Agitation only effects CO<sub>2</sub> transfer  
(c) Agitation decreases oxygen transfer  
(d) Agitation increases oxygen transfer

6. What is the yield coefficient?
- (a) The ratio of product formed to substrate consumed formation per unit volume per unit time
  - (b) The ratio of substrate consumed to product formed
  - (c) The rate of product
  - (d) The efficiency of product recovery
7. \_\_\_\_\_ method is commonly used for separating biomass from fermentation broth?
- (a) Centrifugation
  - (b) Chromatography
  - (c) Electrophoresis
  - (d) Freeze drying
8. Reverse osmosis is a technique that uses
- (a) Heat
  - (b) Pressure and membranes.
  - (c) Solvents
  - (d) Enzymes

9. Which process utilizes pressure to force solvent through a semipermeable membrane, leaving solutes behind?
- (a) Ultrafiltration (b) Centrifugation
  - (c) Reverse osmosis (d) Filtration
10. \_\_\_\_\_ is the most common airborne microorganism in pharmaceutical environments?
- (a) Escherichia coli
  - (b) Staphylococcus aureus
  - (c) Bacillus spp
  - (d) Pseudomonas aeruginosa
11. Ophthalmologic preparations require strict sterility because:
- (a) They are stored at high temperatures.
  - (b) They come into direct contact with the eyes.
  - (c) They contain high concentrations of preservatives
  - (d) They are packaged in plastic containers.

12. Which microorganism is most commonly found in water used for pharmaceutical production \_\_\_\_\_.
- (a) Mycobacterium tuberculosis
  - (b) Pseudomonas aeruginosa
  - (c) Clostridium botulinum
  - (d) Streptococcus pyogenes
13. Penicillin was first discovered by
- (a) Robert Koch            (b) Alexander Fleming
  - (c) Louis Pasteur         (d) Edward Jenner.
14. \_\_\_\_\_ antibiotics is used to treat amoebiasis?
- (a) Penicillin                (b) Griseofulvin
  - (c) Metronidazole         (d) Streptomycin
15. What is the purpose of ISO certification in pharmaceutical manufacturing?
- (a) To ensure compliance with regulatory requirements
  - (b) To improve product quality and safety
  - (c) To reduce production costs
  - (d) To increase product yield

PART B — (5 × 4 = 20 marks)

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

16. (a) Write a short notes on secondary screening of industrial important microorganisms.
- Or
- (b) Explain about preservation of industrial important microorganisms.
17. (a) What are the computer application of fermentation technology?
- Or
- (b) Briefly describe aeration and agitation.
18. (a) Give an account on purification of extra cellular product.
- Or
- (b) Define the following
- (i) precipitation
  - (ii) ultrafiltration

19. (a) Write about pharmaceutical microbiology.

Or

(b) Describe the spoilage of pharmaceutical products.

20. (a) What are the type of immunoglobulin and importance?

Or

(b) Write about sterility test.

PART C — (5 × 8 = 40 marks)

Answer ALL questions by choosing either (a) or (b)

Each answer should not exceed 600 words.

21. (a) Give a detail account on surface and submerged fermentation.

Or

(b) Distinguish between batch and continuous culture.

22. (a) Describe different types of fermenter.

Or

(b) What are type of control used in the Fermenter? Explain in brief.

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23. (a) Explain in detail about role of Filtration and flocculation in biomass separation.

Or

(b) Write an essay on importance of various types of cell disintegration.

24. (a) Make a detail notes on Design and layout of sterile manufacturing unit.

Or

(b) Give general characteristics of injectable and non injectable.

25. (a) Give a brief account of various types of immunoglobulin immunodiagnostic methods.

Or

(b) Write an account on streptodornase.

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