

(6 pages)

Reg. No. : .....

Code No. : 7984

Sub. Code : PMBM 42

M.Sc.(CBCS) DEGREE EXAMINATION,  
NOVEMBER 2019.

Fourth Semester

Microbiology – Core

FERMENTATION AND INDUSTRIAL  
MICROBIOLOGY

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer:

1. Which of the following is an upstream process?
  - (a) Product recovery
  - (b) Product purification
  - (c) Media formulation
  - (d) Cell lysis

2. Primary screening of acid producing micro organisms can done by
  - (a) Incorporation of neutral red in buffered agar nutrient medium
  - (b) Incorporation of bromothymol blue in buffered agar nutrient medium
  - (c) Incorporation of CaCO<sub>3</sub> in the agar medium
  - (d) (a) and (c)
3. Bacterial inoculum is transferred to production media when bacteria are
  - (a) Metabolically active
  - (b) In dormant stage
  - (c) In sporulating stage
  - (d) None of the above
4. Which of the following is used for agitation and vigorous stirring of media?
  - (a) Spindle
  - (b) Sparger
  - (c) Motor
  - (d) Impeller
5. Which type of fermenter is used in laboratory scale?
  - (a) Stirred tanks
  - (b) Shake - flask
  - (c) Bubble columns
  - (d) Air- left fermentor

6. Which of the following is an antifoam agent?

- (a) Cotton seed oil
- (b) Methanol
- (c) Chloroform
- (d) Ethyl acetate

7. The stage wise operation of adsorption is called

- (a) Contact filtration
- (b) Conventional adsorption
- (c) Affinity adsorption
- (d) Ion exchange

8. The chemical reaction in which solid gets formed in a solution or inside another solid is

- (a) Filtration      (b) Precipitation
- (c) Centrifugation      (d) None of the above

9. Industrial production of vitamin B<sub>12</sub> is from

- (a) *Propionibacterium* spp
- (b) *Pseudomonas* spp
- (c) *Pseudomonas* spp and *Propionibacterium* spp
- (d) *Candida* sp

10. Penicillin is recovered from the fermentation broth by

- (a) Precipitation
- (b) Solvent extraction
- (c) Chromatography
- (d) Adsorption on charcoal

PART B — (5 × 5 = 25 marks)

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

11. (a) Note on culture collection.

Or

(b) Write an essay on industrial sterilization of equipments.

12. (a) Comment on scale up of fermentation.

Or

(b) Write about the basic components and functions of fermentor.

13. (a) Explain bubble column reactor.

Or

(b) Write about fluidized bed reactor.

14. (a) What are the methods adopted for cell disruption to bring out endo cellular products.

Or

(b) Write note on solvent extraction.

15. (a) Explain about industrial production of vinegar.

Or

(b) List out the process involved in the production of wine.

PART C — (5 × 8 = 40 marks)

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

16. (a) Explain the way by which industrial strains could be improved.

Or

(b) Explain the various substrates used in the formulation of fermentation media

17. (a) Discuss about basic principle and factors affecting fermentor design.

Or

(b) Describe preservations for large scale fermentation

18. (a) Write a detailed essay on types of fermentor.

Or

(b) Write about process control in fermentation.

19. (a) Explain the downstream processing of extra cellular products.

Or

(b) Explain different chromatographic technique used in product recovery.

20. (a) Explain the process involved in the production of L-lysine.

Or

(b) With neat diagram explain, industrial production of penicillin.

---