LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **BIOTECHNOLOGY**

SECOND SEMESTER – **APRIL 2022**

PBT 2502 – FERMENTATION TECHNOLOGY

Date: 17-06-2022 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART – A

Answer ALL the Questions

I. Choose the correct answer **(5 x 1 = 5 Marks)**

1. _____ is used as a protective component during lyophilization of commercial strains.

   a) Glycerin b) Mineral Oil c) Milk d) Liquid Nitrogen

2. Fouling is associated with which type of bioreactor?

   b) Stirred tank b) Air lift c) Membrane d) Photobioreactor

3. In ion exchange chromatography, a crucial factor is

   a) pH b) size c) molecular weight d) hydrophobicity

4. What are the different substrates used for ethanol production?

   a) Starch containing substrate

   b) Juices from sugarcane or molasses or sugar beet

   c) Waste product from wood or processed wood

   d) All of the above

5. _____ is used in the dairy industry to produce stable curd with good flavour.

   a) Papain b) rennet c) pepsin d) trypsin

II. State whether the following are true or false. **(5x1=5 Marks)**

6. Silicone resin is used to control foaming.
7. Photobioreactors can use only solar light for the culture of phototrophic microorganisms.
8. Absolute filters are filters with undefined pore sizes.
9. The glucose is broken down into C3 and C2 fragments by glutamic acid producing microorganisms.
10. Bt insecticide is biodegradable.

III. Complete the following **(5 x 1= 5 Marks)**

11. _____ is the use of highly selective procedures to allow the detection and isolation of only those microorganisms which are of interest from among a large microbial population.
12. In stirred tank bioreactors, the air is introduced to the culture medium through a device called _____.
13. _____, an enzyme produced from egg white, is frequently employed for enzymatic cell disruption.
14. _____ microorganism has a high producing capacity of riboflavin.
15. _____ is a natural polymer used for immobilization of enzymes.

IV. Answer the following within 50 words **(5 x 1 = 5 Marks)**

16. Highlight the significance of enrichment.
17. Mention two advantages of solid-state fermentation.
18. Diagrammatically represent reverse osmosis.
19. How does ethanol production affect the environment?
20. Comment on rhizobium.

PART – B

Answer the following each within 500 words. **(5 x 8 = 40 Marks)**
Draw diagrams wherever necessary.

21. (a) Describe the crowded plate technique and comment on its significance.

OR

(b) Suggest and describe any method of strain improvement. Add a note on the significance of strain improvement in Fermentation Technology.

22. (a) Design an air-lift bioreactor for the production of thuringiensin. Discuss the common problem encountered with air-lift bioreactors and the strategies employed to overcome it.

OR

(b) Highlight the advantages and disadvantages of traditional solidstate fermentation.

23. (a) Write a note on scale up studies.

OR

(b) Explain liquid-liquid extraction with an example.

24. (a) Discuss the various steps involved in the production of Vitamin B12.

OR

(b) How can ethanol be derived from sugar, starchy materials or lignocelluloses?

25. (a) Outline the production of amylase and highlight its industrial applications.

OR

(b) Construct a flow chart of the production of Azotobacter as a biofertilizer.

PART – C

Answer any TWO of the following, each within 1500 words. **(2 x 20 = 40 Marks)**
Draw diagrams wherever necessary.

26. Elaborate on media formulation for industrial fermentation. Add a note on its significance.

27. Discuss in detail the basic design and components of a fermentor.

28. If there were 3 proteins A, B C of relative surface charges 1+, 2+ and 3+ respectively, comment on the order of elution using salt gradient elution via ion exchange chromatography. Discuss ion exchange chromatography and highlight its pros and cons.

29. Describe the production of penicillin.

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