



# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

## M.Sc.DEGREE EXAMINATION –BIOTECHNOLOGY

SECOND SEMESTER – APRIL 2019

### 16/17/18PBT2MC02– FERMENTATION TECHNOLOGY

Date: 05-04-2019

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

#### PART – A

#### Answer ALL the Questions

##### I. Choose the correct answer

(5 x 1 = 5 Marks)

- Mechanical agitation is required only in \_\_\_\_\_  
a) Packed bed      b) Airlift reactor      c) Stirred tank      d) Bubble column
- When energy depleted elements associated with a proton are accepted by an organic molecule, the process is called  
a) Fermentation      b) Respiration      c) Anabolism      d) Catabolism
- Yield coefficient represents  
a) total biomass or product produced      b) conversion efficiency of a substrate into product  
c) conversion of a substrate into biomass      d) production time of biomass or product
- The strain of bacteria used for large scale production of L-lysine is,  
a) *Corynebacterium glutamicum*      b) *Bacillus subtilis*  
c) *Mycobacterium smegmatis*      d) *Bacillus thuringiensis*
- Amino acids need not to be taken in the diet are termed  
a) Essential      b) Polar      c) Non polar      d) Non essential

##### II. State whether the following are true or false.

(5x1=5 Marks)

- Mechanical foam breaker is generally preferred over antifoam agents.
- Biomass yield from substrate and fermentative metabolism are same.
- During fermentation the yield of ATP is very low.
- Bacillus megaterium* is a microbe involved in production vitamin B<sub>12</sub>.
- Protease is an enzyme used to degrade starchy material.

##### III. Complete the following

(5 x 1= 5 Marks)

- Antifoam agents lower \_\_\_\_\_.
- Metal strips attached to inner surface of fermenters to prevent vortex is called \_\_\_\_\_
- Enzyme which converts fructose 6 phosphate to glyceraldehyde phosphate is \_\_\_\_\_.
- Alcoholic fermentation is carried out by \_\_\_\_\_.
- \_\_\_\_\_ is used for aeration in a fermentor.

##### IV. Answer the following within 50 words

(5 x 1 = 5 Marks)

- What is lyophilization?
- Define isopycnic sedimentation
- What is first falling-rate period
- What are the substrates used for ethanol production?
- Mention the role of lipase in industry.

## PART B

Answer the following each within 500 words.

(5 x 8 = 40 marks)

Draw diagrams wherever necessary.

21. (a) Give an account of the carbon sources in fermentation media.

(OR)

(b) Write in detail about the maintenance of industrially important microbes.

22. (a) Give the structural details and application of fluidized bed reactor and tower fermenter.

(OR)

(b) Explain photobioreactor and membrane bioreactor.

23. (a). Write briefly on the physical methods of cell disruption in downstream processing.

(OR)

(b) What is scaling up in fermentation? Explain.

24. Give a short note on production of vitamin C.

(OR)

Write a brief note on biosynthesis of citric acid.

25. Briefly explain the role of cellulase in paper industry.

(OR)

Give a note on enzyme immobilization and its uses.

## PART – C

Answer any TWO of the following, each within 1500 words.

(2 x 20 = 40 Marks)

Draw diagrams wherever necessary.

26. What is a fermenter? Give the basic structure of a fermenter.

27. How is chromatography used in downstream processing? Explain.

28. Write an account on the production techniques of streptomycin.

29. Discuss in detail on production, recovery and scaling up of enzymes and their role in industry.

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