



Name :

Roll No. :

Invigilator's Signature :

CS / B.TECH(BT-NEW) / SEM-4 / BT-402 / 2012

2012

INDUSTRIAL MICROBIOLOGY AND ENZYME TECHNOLOGY

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

(i) Citric acid production is the example of

- a) Bacterial Fermentation
- b) Mold Fermentation
- c) Both
- d) None of these.

(ii) Xanthan is

- a) Homo polysaccharide
- b) Hetero polysaccharide
- c) Both
- d) None of these.



- (iii) Vitamin B12 is produced as the by product of
- a) Streptomycin production
 - b) Lysine production
 - c) Glutamic acid production
 - d) none of these.
- (iv) To be suitable for industrial use, a microorganism should
- a) be genetically stable
 - b) grow rapidly and produce product in a relatively short period of time
 - c) be capable of growth and product formation in large scale culture
 - b) all of these.
- v) The media for large scale industrial fermentation processes usually
- a) use highly purified carbon sources
 - b) don't require a nitrogen source because the atmosphere provides nitrogen
 - c) consist of waste products from other processes, such as grain milling
 - d) all of these



- vi) The term primary metabolite refers to
- a) a product that is produced during the primary stage of growth
 - b) a product that is produced during the end of the growth phase, frequently at or near stationary phase
 - c) the major waste product produced during growth of a culture
 - d) more than one of the above, but not all
 - e) All of these.
- vii) Citric acid is produced by
- a) *Aspergillus niger*
 - b) *Candida utilis*
 - c) *Trichoderma utilis*
 - d) *Saccharoyces cerevisiae*.



- viii) β amylase can hydrolyse starch to produce
- a) glucose and maltose b) glucose
c) lactose d) maltose .
- ix) commercial Streptomycin production is carried out by using
- a) *S. Aurens* b) *S. Griseus*
c) *S. Pyogenes* d) *Streptococcus* sp.
- x) The cutting site for α -amylase on the starch is
- a) α -1,4 glycosidic bond b) α -1,6 glycosidic bond
c) Amide bond d) Diester bond.
- xi) A synchronous culture is the type of culture in which
- a) all cells are in the different stage of development and divide simultaneously
b) all cells are in the same stage of development but divide at different stage
c) all cells are in the same stage of development and divide simultaneously
d) all cells are in all stages of development and divide simultaneously.



xii) Which of the following enzyme is used in detergent ?

- a) Alkaline Phosphatase b) alkaline lipase
c) Acidic Phosphatase d) Alkaline amylase.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Write about the importance of strain selection in fermentation process with a given example ? 5
3. What are differences between surface fermentation and submerged fermentation, batch and continuous fermentation ? 5
4. Why cellulase enzyme cannot be dialyzed using dialysis membrane ? What is a seed culture ? $3 + 2$
5. Outline the microbial process for the production beer with reference to substrate, microbial strain, fermentation process. $1 + 1 + 3$



6. Discuss the following in terms of enzymes :

- a) Induced fit model, and
- b) Lock and key model.

5

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Write briefly the process of industrial production of tetracycline the particular reference about microbial strain, inoculum preparation, production medium, fermentation parameters, fermentation process, recovery and yield ?

1 + 3 + 3 + 2 + 3 + 2 + 1

8. How are Cellular controls regulating production of microbial Primary metabolites governed ? Site an example of a fermentation process to elucidate the process ? $12 + 3$

9. Describe the process of extraction of a crude enzyme from bacteria. What is the basic difference between a primary and secondary metabolite. $12 + 3$



10. What do you mean by immobilization of enzymes ? What are advantages and disadvantages of the process ? What are different techniques available for immobilization of enzyme (name only). Compare merits and demerits of methods used for immobilization of enzyme on solid insoluble matrix. Name a few inert and ionic matrices used for enzyme immobilization. 2 + 5 + 5 + 3

11. Write short notes on any *three* of the following : 3 × 5

- a) Downstream processing
- b) Sterilization of Industrial medium
- c) Protoplast fusion technique
- d) Protein engineering.

=====