Printed Page:- 04 **Subject Code:- ABT0401**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: IV - THEORY EXAMINATION (2023 - 2024)

Subject: Fermentation Engineering

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION A **20**

1. Attempt all parts:-

1-a. Which of the following instrument works on the principle of batch sterilization? (CO1) 1

(a) Incubator

(b) Autoclave

(c) Centrifuge

(d) LAF

1-b. The highest feasible temperature for batch sterilization is _____ (CO1) 1

(a) 124°C

(b) 120°C

(c) 122°C

(d) 121°C

1-c. Which of the following does not include in the range of fermentation processes? (CO2) 1

(a) Microbial Enzymes

(b) Microbial metabolites

(c) Biotransformation

(d) Recombinant DNA

1-d. Cyclic Fed-Batch culture has been used for the production of _____ (CO2) 1

(a) Bovine serum albumin

(b) Penicillin

(c) Human serum albumin

(d) Cheese Production

1-e. Enzymes are..... (CO3) 1

(a) Lipids

(b) proteins

(c) polysaccharides

(d) Lipoproteins

1-f. Metabolism can be ..... (CO3) 1

(a) Anabolism

(b) Catabolism

(c) Both

(d) None of the above

1-g. Fermentation is derived from the word ..... (CO4) 1

(a) Fervere

(b) Fermentation

(c) fervoos

(d) None of the above

1-h. Acetic acid is an ..... Acid. (CO4) 1

(a) Organic

(b) Inorganic

(c) Neutral

(d) None of the above

1-i. How is a protease produced industrially? (CO5) 1

(a) submerged fermentation

(b) solid-state fermentation

(c) Both of these

(d) None of the above

1-j.	Where are proteases found in the cell? (CO5) (a) Cytosol (b) lysosomes (c) Both of these (d) none of the above	1

2. Attempt all parts:-

2.a.	Give four advantages of submerged state fermentation. (CO1)	2
2.b.	Enlist any four methods of product recovery in downstream process. (CO2)	2
2.c.	Define trp operon. (CO3)	2
2.d.	Why is it called IMFL? (CO4)	2
2.e.	Five two uses of acetone. (CO5)	2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a.	Explain a generalized schematic representation of a typical fermentation process. (CO1)	6
3-b.	Discuss in detail the historical advancements in fermentation engineering. (CO1)	6
3-c.	Describe continuous culture culture technique for the cultivation of bacteria. (CO2)	6
3-d.	Diagramatically explain fed batch fermentation process. (CO2)	6
3.e.	What would happen if the bacterium was grown in limiting amounts of glucose and lactose? (CO3)	6
3.f.	Enlist several modes of sterilization. (CO4)	6
3.g.	Define the following: (a) organic solvents (b) Amino acids (C) Interferons (CO5)	6

SECTION C **50**

4. Answer any <u>one</u> of the following:-

4-a.	Describe the significance of biochemistry, microbiology and bioprocess engineering in fermentation process.(CO1)	10
4-b.	Draw the diagram of solid state fermentation process and write its advantages. (CO1)	10

5. Answer any <u>one</u> of the following:-

5-a.	Define the term agitation and explain its significance in continous fermentation process.(CO2)	10

5-b.	Explain batch culture and continious culture technique for the cultivation of bacteria. (CO2)	10

6. Answer any <u>one</u> of the following:-

6-a.	Explain catabolite repression? Why is its regulation important in microorganisms? (CO3)	10
6-b.	Differentiate between feedback repression and feedback inhibition. (CO3)	10

7. Answer any <u>one</u> of the following:-

7-a.	Diagrammatically explain dhokla fermentation process and give its advantages. (CO4)	10
7-b.	Describe mushroom cultivation in detail. (CO4)	10

8. Answer any <u>one</u> of the following:-

8-a.	Write short note on the following: (a) Acetone fermentation (b) Antibiotics. (CO5)	10
8-b.	Explain the methods of fermentation used for enzyme production. (CO5)	10