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**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA****(An Autonomous Institute Affiliated to AKTU, Lucknow)****B.Tech****SEM: IV - THEORY EXAMINATION (2022-2023 )****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 is not a type of sterilization? (CO1) 1
- (a) Batch
- (b) Continuous
- (c) Filter
- (d) Submerged
- 1-b. Which of the following instrument works on the principle of batch sterilization? (CO1) 1
- (a) Incubator
- (b) Autoclave
- (c) Centrifuge
- (d) LAF
- 1-c. The agitator is required to \_\_\_\_\_. (CO2) 1
- (a) Provide air
- (b) Mixing objectives

- (c) Purify the product
- (d) Sterilize the media
- 1-d. A period during which the growth rate of cells gradually increases is known as \_\_\_\_\_. (CO2) 1
- (a) Lag phase
- (b) Log phase
- (c) Stationary phase
- (d) Deceleration phase
- 1-e. What do you mean by "Nutrient repression"? (CO3) 1
- (a) Inhibition of unwanted enzyme production
- (b) Production of unwanted enzymes
- (c) Inhibition of cell nutrients
- (d) Production of waste
- 1-f. What are the non-substrate molecules binding to the allosteric sites called? (CO3) 1
- (a) allosteric substrate
- (b) reactants
- (c) allosteric modulators
- (d) inhibitors
- 1-g. The French word for cheese is \_\_\_\_\_. (CO4) 1
- (a) Formaticum
- (b) Fromage
- (c) Formaggio
- (d) Kaas
- 1-h. Crop in fermentation process means. (CO4) 1
- (a) Plants in the field
- (b) Harvested yeast from previous fermentation broth
- (c) Both 1 and 2
- (d) None of the above
- 1-i. ....is absent in mature insulin. (CO5) 1
- (a) Lipid
- (b) A-peptide
- (c) C-peptide

(d) Sequence

- 1-j. Which of the following fungi produces  $\alpha$ -amylase? (CO5) 1
- (a) Bacillus subtilis
  - (b) Penicillium
  - (c) Bacillus diastaticus
  - (d) Bacillus megaterium

**2. Attempt all parts:-**

- 2.a. Write any four objectives of fermentation process. (CO1) 2
- 2.b. What should be the basic points of consideration while designing a fermenter? (CO2) 2
- 2.c. Define lac operon. (CO3) 2
- 2.d. What is meant by Auxotrophic Mutation? (CO4) 2
- 2.e. Define antibiotics. (CO5) 2

**SECTION B**

**30**

**3. Answer any five of the following:-**

- 3-a. Explain the kinetics of microbial growth. (CO1) 6
- 3-b. Differentiate between submerged and solid state fermentation process.(CO1) 6
- 3-c. What are Batch, Fed-batch and Continuous Types of Fermentation? (CO2) 6
- 3-d. What points should be taken into account while designing a fermenter? (CO2) 6
- 3.e. Briefly explain the importance of catabolite repression. (CO3) 6
- 3.f. Discuss in detail about the sterilization of fermentor. (CO4) 6
- 3.g. Write short on biopharmaceuticals and its uses. (CO5) 6

**SECTION C**

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**4. Answer any one of the following:-**

- 4-a. Define metabolism and explain primary and secondary metabolites with suitable examples.(CO1) 10
- 4-b. Describe the significance of biochemistry, microbiology and bioprocess engineering in fermentation process. .(CO1) 10

**5. Answer any one of the following:-**

- 5-a. Define the term agitation and explain its significance in continuous fermentation process..(CO2) 10
- 5-b. Define continuous batch fermentation process and give any four points that should be considered while designing a fermenter: .(CO2) 10

**6. Answer any one of the following:-**

- 6-a. Explain lac operon and its controlling elements. .(CO3) 10
- 6-b. Describe the regulatory mechanism involved in controlling the anabolic process of microbes with suitable examples.(CO3) 10

**7. Answer any one of the following:-**

- 7-a. Describe the fermentative production of alcoholic beverages with suitable diagram. (CO4) 10
- 7-b. Discuss the historical overview of Industrial Fermentation Process with advantages and disadvantages. (CO4) 10

**8. Answer any one of the following:-**

- 8-a. Write short note on the following: (a) amino acid fermentation (b) Lysine fermentation. (CO5) 10
- 8-b. Define interferon. Explain the method of interferon production with a suitable diagram. (CO5) 10

2022-23 Jan\_June