B. Tech.
(SEM. VI) EXAMINATION, 2006-07
INDUSTRIAL FERMENTATION TECHNOLOGY - I

Time : 3 Hours] [Total Marks : 100

Note : Attempt all questions. All questions carry equal marks.

1. Attempt any four parts of the following : 5x4=20

(a) Enumerating the steps involved in an industrial fermentation process, give a neat flow diagram for this.

(b) How do you define the term 'fermentation'? Compare between aerobic and anaerobic fermentation processes.

(c) Give various groups of industrial fermentation products with three members of each group.

(d) Highlight the basic requirements of aerobic fermentation process with a neat diagram of submerged fermentation vessel.

(e) Name any three industrial enzymes with their applications.

(f) Give a brief account of microbial transformation processes.

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2. Attempt any four parts of the following:
   (a) Compare between batch process and continuous process.
   (b) Give a brief account of growth kinetics of microbial cell in a batch system.
   (c) Compare the direct and indirect methods for estimating bacterial population on the basis of advantages and limitation of uses.
   (d) What do you understand by the term "Brewing"? Enumerate the steps involved in beer production with a neat process flow sheet.
   (e) What is meant by "Fed batch culture"? Give the application of fed batch culture with examples.
   (f) Discuss biomass productivity and metabolite productivity with mathematical expressions.

3. Attempt any two parts of the following: \(10 \times 2 = 20\)
   (a) Enumerating the methods of isolation of pure culture, discuss any one of the methods of your choice.
   (b) Discuss the criteria for selecting the microorganisms for industrial production.
   (c) Give a brief outline of presentation and maintenance of microbial cultures.

4. Attempt any two parts of the following: \(10 \times 2 = 20\)
   (a) Medium formulation is an essential stage in the design of successful laboratory experiments pilot plant development and manufacturing process. Discuss the statement.

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(b) Give a brief account of various raw materials used for industrial alcohol production by fermentation.

(c) The medium may influence the oxygen availability in the fermentor. Explain.

5. Attempt any two parts of the following:

(a) What are design criteria for sterilization? Give a brief account of design of batch sterilization process.

(b) What is the significance of residence time in continuous sterilization process? Draw a neat diagram of direct infection type sterilizer.

(c) Give a brief account of inoculation of a plant fermentor from spore suspension vessel.