Exam.Code:0908
Sub. Code: 6704

1058

B.E. (Biotechnology) Fourth Semester

BIO-414/404: Industrial Biotechnology

Time allowed: 3 Hours | Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

1. Compulsory Question

(a) Name two microorganisms that can be used as probiotics.

(b) Name the largest antibiotic producing genus.

(c) Define synthetic media. Give an example.

(d) Give examples of commonly used inorganic and organic nitrogen sources in fermentation industries.

(e) Name the methods of strain improvement.

(f) Why is distillation required for producing certain alcoholic drinks?

(g) Who discovered antibiotics?

(h) Name the organism used for dextran production.

(i) Name two microbial Carotenoids produced by yeast.

(j) What temperature and pH should be maintained in the fermenter for citric acid production? (10x1=10)

SECTION- A

2. (a) What do you mean by isolation of microorganisms? Discuss the methods of isolation and maintenance of pure culture.

(b) Discuss culture media. Explain characteristics and types of culture media. (5, 5)

3. (a) What is difference between an industrial fermenter and Erlenmeyer flask or culture vessel?

(b) How will you design and construct a fermenter? Enlist the characteristics of a fermenter.

(c) Describe in brief about different types of bioreactors. Which type of bioreactor is recommended for cultivation of *Spirullina*?

(2, 4, 4)

4. (a) Define microbial metabolites. Discuss various types of microbial metabolites giving examples of each type.

(b) Discuss in detail the methods of strain improvement. (4, 6)

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SECTION B

5. (a) Describe in brief about the production of Beta-lactam antibiotics.

   (b) List different types of enzymes produced commercially. Describe the process of manufacturing any one enzyme.

   (c) What is the difference between penicillin and semi-synthetic penicillin? (3, 5, 2)

6. (a) Define microbial bioconversion. Explain the importance of microbial reaction over chemical reactions.

   (b) Discuss the types of biotransformation reactions.

   (c) Give an account of biological catalysts that can be used for biotransformation. (3, 3, 4)

7. (a) Discuss in detail the immobilization methods of enzymes.

   (b) Enlist the advantages of using immobilized enzymes.

   (c) Discuss the analytical and commercial applications of immobilized enzymes. (4, 2, 4)

x-x-x