Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

PCCH 4402

Seventh Semester Back Examination – 2014

FUNDAMENTALS OF BIOCHEMICAL ENGINEERING

BRANCH : CHEM

QUESTION CODE : L188

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 ×10

   (a) Define thermal diffusivity.

   (b) What are the different methods of cell disruption ?

   (c) In case of film theory what is the relation between mass transfer coefficient and diffusivity ?

   (d) What is enzyme specificity ?

   (e) What are the various branches of basic microbiology ?

   (f) What do you mean by lyophilization ?

   (g) Define centrifuge effect.

   (h) What do you mean by crude and synthetic media ?

   (i) What do you mean by critical and non-critical parameters for a fermentation process ?

   (j) Write some applications of heat transfer in bioprocessing.

2. With a neat flow sheet explain the industrial method of ethanol production. 10

3. (a) Explain how Michaelis-Menten equation can be derived for enzyme kinetics from first principles ? 7

   (b) What are the applications of enzyme in food and beverage industries ? 3

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4. With a neat diagram, describe the various phases of cell growth in a batch culture. 10

5. (a) Briefly explain the transfer of oxygen from the air bubble to the cell or cluster of cell in fermentation broths. 7

   (b) What are the factors affecting oxygen transfer rate in a fermentation broths ? 3

6. (a) What are the criteria of choosing a particular product recovery steps ? 5

   (b) What are the advantages of a continuous sterilization over the batch process ? 5

7. (a) Describe the taxonomical classification of five kingdoms as proposed by Whittaker ? 5

   (b) What do you mean by solid state fermentation and what are its applications ? 5

8. Write short notes on any **two** : 5×2

   (a) Activated sludge treatment

   (b) Antibiotics

   (c) Immobilization of enzyme

   (d) Rotary vacuum filter press.
