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Total number of printed pages – 2

B. Tech
PCCH 4402

Seventh Semester Examination – 2011

FUNDAMENTALS OF BIOCHEMICAL ENGINEERING

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) What is a protein ?
 - (b) What is metabolism ?
 - (c) What is anabolism ?
 - (d) Is there any order, division and kingdom established for viruses ? If yes, classify the kingdom. If not, then how are named ?
 - (e) Explain solid state fermentation.
 - (f) Explain substrate and product inhibition in cell growth with suitable examples.
 - (g) What is product yield coefficient ?
 - (h) If the Michaelis – Menten equation is linearised and we plot $(1/s)$ as ordinate and $(1/v)$ as abscissa, what is the slope of the line ?
 - (i) In the case of a film theory, what is the relationship between mass transfer coefficient and diffusivity ?
 - (j) What is the composition of Gobar gas ?

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2. (a) Give an overview of the modern applications of biotechnology ? 5
 (b) What do you mean by microbial taxonomy ? 5
3. What is fermentation ? Explain in detail the design and construction of a fermentor. 10
4. Explain with a neat flow sheet the production of ethanol. 10
5. (a) Derive Michalis-Menten equation. 5
 (b) Determine the Michalis- Menten parameters v_m and k_m for the reaction,
 $\text{Urea} + \text{Urease} \leftrightarrow [\text{Urea.Urease}]^* \rightarrow 2\text{NH}_3 + \text{CO}_2 + \text{Urease}$
 The rate of reaction is given as a function of urea concentration in the following table : 5

$C_{\text{urea}}, \text{ kmol/m}^3$	0.2	0.02	0.01	0.005	0.002
$V_{\text{urea}}, \text{ kmol/m}^3\cdot\text{s}$	1.08	0.55	0.38	0.2	0.09

6. (a) Explain the kinetic models for cell growths. 5
 (b) What is Monod model ? 5
7. (a) Explain the unit operations involved in a bio-process. 5
 (b) Explain the microbial nomenclature. 5
8. Write short notes on any **two** of the following : 5×2
 (a) Fungi
 (b) Antibiotics
 (c) Vaccines
 (d) Enzymes and its characteristics.