

Code No: 07A72312

**R07****Set No. 2****IV B.Tech I Semester Examinations, November 2010****METABOLIC ENGINEERING****Bio-Technology****Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Distinguish between primary and secondary metabolites? Write about prophase idophase relationship and explain the manipulation of primary metabolism for secondary metabolite over production. [4+8+4]
2. Explain some of the pathway manipulations in metabolite production by metabolic engineering? Explain with different examples. [16]
3. What is induction? How metabolic pathway enzymes be induced, explain with respect to Lac operon. [16]
4. Explain the metabolic engineering in *Zymomonas mobilis* for the production of ethanol from xylose. [16]
5. Explain metabolic flux analysis of citric acid fermentation of *Candida lipolytica* proposed by Aiba and Matsuoka. [16]
6. Write short notes on the following:
  - (a) How specific rates and yields are related?
  - (b) Explain the calculation of yields and specific rates. [8+8]
7. Write short notes on:
  - (a) What is metabolic pathway modeling?
  - (b) Explain why metabolic engineering is depends on pathway modeling. [8+8]
8. Explain biodegradation of BTX mixtures? Explain role of metabolic mixtures. [16]

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**Set No. 4**

**IV B.Tech I Semester Examinations, November 2010**

**METABOLIC ENGINEERING**

**Bio-Technology**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

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1. Explain various applications of metabolic engineering. [16]
2. Explain the role of metabolic engineering in prevention of harmful acidic byproducts in the cell to improve protein production. [16]
3. Write a review on thermodynamic principles. [16]
4. Briefly describe the biosynthesis of essential amino acids from carbon and nitrogen source in microorganisms, explain with flow chart. [16]
5. Define isoenzymes? Explain differential regulation by isoenzymes. [16]
6. How metabolic control is applied for systemic design of molecular breeding? [16]
7. Explain the strategies of metabolic engineering for overproduction of secondary metabolites by manipulation of regulatory genes. [16]
8. Write short notes on the following:
  - (a) Biotransformation of D-sorbitol to L-sorbose for the production of Vit C
  - (b) Biotransformation of antibiotics. [8+8]

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**R07**

**Set No. 1**

**IV B.Tech I Semester Examinations, November 2010**

**METABOLIC ENGINEERING**

**Bio-Technology**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Explain role of metabolic engineering for the improvement of crop quality and quality. [16]
2. What are secondary metabolites? List out the organisms involved in production of secondary metabolites and explain their applications. [16]
3. Explain the use of mutants for the determination flux distribution around 2-oxoglutarate ( $\alpha$ -KG) branch point in glutamate production. [16]
4. Explain the generation of cellular energy and reducing power. [16]
5. Write short notes on:
  - (a) Glucose effect
  - (b) Isoenzyme regulation. [8+8]
6. Briefly explain two fundamentally different ways in which a cell might control the rate of an enzyme reaction. [16]
7. How do mutants effect the enzyme production? List out the aspects involved in optimization of mutants for high yield protein production. [16]
8. Explain the metabolic pathway manipulations to improve the production of 1, 3 propanediol. [16]

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**Set No. 3**

**IV B.Tech I Semester Examinations, November 2010**

**METABOLIC ENGINEERING**

**Bio-Technology**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Define primary and secondary metabolites? Explain auto regulation of secondary metabolite production. [16]
2. What do you understand by feedback regulation? Explain this with special reference to amino acid biosynthetic pathways. [16]
3. How can one improve the yield of a desired product by both genetic and fermentation methods? [16]
4. Write short notes on:
  - (a) Origin of capacity to degrade xenobiotics by microorganisms
  - (b) Use of mixed microbial populations. [8+8]
5. How bioinformatics fortified metabolic engineering? [16]
6. Explain how metabolic engineering is involved in the manipulation of metabolic pathways explain with examples. [16]
7. Write short notes on:
  - (a) aerobic biodegradation of pollutants
  - (b) anarobic biodegradation of pollutants. [16]
8. Explain briefly how radiolabel materials are utilized in experimental determination of metabolic flux. [16]

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