

(Following Paper ID and Roll No. to be filled in your Answer Books)

PAPER ID : ME2

Roll No.

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**M. TECH. (Sem.II)**

**THEORY EXAMINATION 2015-16**

**BIOENERGETICS & METABOLIC ENGINEERING**

Time : 3 Hours

Total Marks : 100

**SECTION-A**

1. Attempt all parts. All parts carry equal marks.

Write answer of each part in short.

(2×10=20)

- (a) Mention the types of metabolic reactions.
- (b) Differentiate between C<sub>3</sub> and C<sub>4</sub> pathways.
- (c) If a cell is forced to metabolize glucose anaerobically, how much faster would glycolysis have to proceed to generate same amount of ATP as it would get if it is metabolized glucose aerobically.
- (d) Write the importance of phosphorylated intermediates in metabolism.
- (e) When does heat generation in mitochondria of brown adipose tissue takes place?

- (f) List the four multi-enzymed complexes in the respiratory chain of mitochondria.
- (g) Compare fatty acid synthesis and oxidation.
- (h) Which do the enzymes constitute fatty acid synthase complex?
- (i) Define signal transduction.
- (j) State about the passive diffusion across plasma membrane.

## **SECTION-B**

Note : Attempt any 5 questions from this section. (10×5=50)

- 2. Discuss Rapaport – Leubering cycle.
- 3. Illustrate the amphibolic nature of the TCA cycle
- 4. Write a short notes on
  - (i) oxidative phosphorylation (ii) ATP synthesis in bacteria
- 5. Elaborate cytochrome  $b_6f$ ,  $bc_1$  complex
- 6. Elucidate photosynthetic systems in green plants and cyanobacteria.

7. With a neat flow chart, explain the steps involved in the biosynthesis of fatty acids.
8. In brief describe the regulation of metabolism for the production of secondary metabolites with a case study.
9. Explain the protein targeting in plasma membrane.

### **SECTION-C**

Note : Attempt any 2 questions from this section. (15×2=30)

10. Elucidate in detail how can the cytosolic NADH be conveyed into mitochondria for oxidation
11. Briefly discuss the following
  - (i) Cori cycle
  - (ii) Regulation of gluconeogenesis
  - (iii) Importance of gluconeogenesis
12. (a) Describe the structure and function of plasma membrane and transport across it.  
(b) Discuss about the regulation of metabolic pathways.

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