

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

PAPER ID : 9591

Roll No.

B.Tech
(SEMESTER-III) THEORY EXAMINATION, 2012-13
MOLECULAR DYNAMICS & BIO-ENERGETICS

Time : 3 Hours]

[Total Marks : 100

Section – A

1. Attend all the questions. **2 × 10 = 20**
- Define a state function. Name three thermodynamic quantities that are state functions and three that are not.
 - What is a photosystem ?
 - Define the term catabolism and anabolism.
 - Define gluconeogenesis.
 - What is chemiosmosis ?
 - Name aromatic amino acids.
 - Define thermodynamics & Bioenergetics.
 - Name any six major pathways of carbohydrate metabolism.
 - Name essential amino acids.
 - In terms of thermodynamic concepts, why is it more difficult to park a car in a small space than it is to drive it out from such a space?

Section – B

2. Attempt any **three** parts. **10 × 3 = 30**
- Describe the C-4 Pathway of CO₂ Fixation.
 - Differentiate between following :
Substrate level phosphorylation & Oxidative phosphorylation
 - Enzymes don't affect the state of equilibrium but affect the rate of the reaction. Explain.

- (d) What is entropy? Discuss the 2nd law of thermodynamics and also explain why the living systems don't seem to follow it.
- (e) Describe the structure of ATP along with diagram. Why ATP is considered as effective energy currency?
- (f) Describe the process of ATP synthesis in mitochondrion, aerobic bacteria and chloroplasts.

Section – C

Note : Attempt any **four** questions from the following.

12.5 × 4 = 50

- 3. What are the metabolic roles of ATP, NAD⁺ and NADPH ?
 - 4. Describe the structure and action of the Na⁺/K⁺-ATPase.
 - 5. Describe any **one** of the following :
 - (i) Enzyme-linked receptors
 - (ii) G protein-coupled receptors
 - 6. Describe the regulation of glycolysis.
 - 7. The standard free-energy change is directly related to the equilibrium constant. Standard free-energy changes are additive. Explain both the statements.
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