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B. TECH
(SEM IV) THEORY EXAMINATION 2017-18
MOLECULAR DYNAMICS AND BIOENERGETICS

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections.

SECTION A

1. Attempt *all* questions in brief. **2 x10 = 20**

a. Discuss the law of thermodynamics with Gibbs's free energy.
b. What are various functions of cell membrane?
c. What is P: O ratio?
d. Discuss the yield coefficient.
e. What do you understand by term bioenergetics?
f. How disposal of ammonia occurs in living organisms?
g. Define entropy.
h. What are ionophores?
i. Write a short note on amino acid pool of body.
j. What is cell crawling?

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a. Define Gibb's free energy and entropy. Illustrate how ATP is the universal currency of cell.
b. Discuss the biosynthesis of purine and pyrimidine nucleotides.
c. Derive the equation for ATP hydrolysis and equilibrium constant. What is the role of high energy phosphate as energy.
d. Explain the process of nitrogen fixation. Give the importance of nitrogenase in nitrogen fixation.
e. What is the different electron carriers associated with ETS? Discuss in detail.

SECTION C

3. Attempt any *one* of the followings: **10 x 1 = 10**

a. Describe the different models of biological membrane structure. What are the properties of biological membrane.

b. What are different transport mechanisms in plasma membrane? Describe Na/K pump and Glucose transport.

4. Attempt any *one* part of the following: **10 x 1 = 10**

a. What is the concept of action potential and signal transduction?

b. What is the site for oxidative Phosphorylation? Write a note on electron flow as source of ATP with diagram.

5. Attempt any *one* part of the following: 10 x 1 = 10

a. Discuss the structure of actin filaments. How does G actin assemble to form F actin? How does their assembly occur?

b. Explain TCA and glycolysis with regulatory and energy forming steps.

6. Attempt any *one* part of the following: 10 x 1 = 10

a. Discuss the stochimetry of growth and product formation. Define electron balance, degree of reduction, biomass yield and theoretical oxygen demand.

b. What are different proteins involved in cell movement and muscle contraction? Also explain the phenomenon of muscle contraction.

7. Attempt any *one* part of the following: 10 x 1 = 10

a. Write down the laws of thermodynamics. Derive the relationship between standard free energy and equilibrium constant.

b. What is the structural basis of the high group transfer potential of ATP?