

**Shree Manibhai Virani and Smt. Navalben Virani Science College (Autonomous)**  
Affiliated to Saurashtra University, Rajkot

**SEMESTER END EXAMINATION APRIL – 2017**

**M. Sc. Biotechnology**

**16PBTCC07 - BIOENERGETICS AND CELLULAR METABOLISM**

*Duration of Exam – 3 hrs*

*Semester – II*

*Max. Marks – 70*

**Part A (5x2= 10 marks)**

Answer **ALL** questions

1. Write the formula for standard free energy?
2. Explain amphibolic nature of TCA cycle?
3. Write the importance of  $\beta$ -oxidation of fatty acid?
4. Define  $K_m$  value and its significance?
5. Importance of Xanthine oxidase enzyme? Which metal ion is associated with it?

**Part B (5x5= 25 marks)**

Answer **ALL** questions

- 6a. Write the equation of first law of thermodynamics? Derive the work done equation in thermodynamics process?

**OR**

- 6b. Write the name of five energy rich compound with their function?

- 7a. Write the reactions catalyzed by the following enzymes.

i). Pyruvate carboxylase                      ii). Glucose-6-phosphate dehydrogenase.

**OR**

- 7b. Write the mechanism of pyruvate to Acetyl coenzyme-A conversion? Mention all the enzymes and coenzymes.

- 8a. Explain glucose-alanine cycle? Write importance of glucose-alanine cycle?

**OR**

- 8b. Write regulatory step of cholesterol biosynthesis? Write the name of five cholesterol derived compound & its function precisely?

- 9a. With one example explain covalent regulation of enzyme action?

**OR**

- 9b. Write the function of ADH hormone in relation with osmoregulation?

- 10a. Write the name of five important glycogen storage diseases along with affected enzyme?

**OR**

- 10b. Write the pathway for important enzyme affected and relevant disease in phenylalanine breakdown?

**Part C (5x7= 35 marks)**

Answer **ALL** questions

11a. Give the detail account of second law of thermodynamics?

**OR**

11b. What is the role of free energy? Establish the relationship between equilibrium constant &  $G^{\circ}$ ?

12a. Write the pathway of gluconeogenesis? Highlight the three major differences between glycolysis and gluconeogenesis?

**OR**

12b. Write the biochemical role of Transketolase and Transaldolase? Give the pathway of Hexose Monophosphate shunt with intermediate structure?

13a. Describe how a saturated even numbered fatty acid undergoes beta-oxidation and work out energetics for palmitic acid undergoing complete oxidation.

**OR**

13b. How urea is synthesized in the liver? Explain the reactions of Krebs-Henseleit cycle.

14a. With one example of each explain the different types of enzymes classified based on their function?

**OR**

14b. Write four differences in working pattern of plant and animal hormone? Give the detail account of Gibberellins?

15a. Give the details of Type-1 and type –II diabetes? Write the Biochemical role of insulin in treatment of diabetes?

**OR**

15b. Discuss the affected enzyme and implication of Gout & Lesch-Nyhan syndrome? Write the mechanism of action of Allopurinol in gout treatment?

---