Parvatibai Chowgule College of Arts and Science
Autonomous

B.Sc. Semester End Examination, January 2022

Semester: III
Subject: Biotechnology
Title: Metabolism of Biomolecules (Elective)
Duration: 2 Hours Max. Marks: 45

Instructions: 1. All questions are compulsory however internal choice is available.
2. Figures to the right indicate maximum marks.
3. Draw neatly labelled diagrams wherever necessary.

Q 1. Answer ANY THREE of the following: (09)

a. What are the principle fates of pyruvate generated in glycolysis?
b. Describe the basic structure and function of ATP synthase.
c. What are the recurring reactions of the oxidation of saturated fatty acids?
d. Discuss the role of hormones in mobilization of stored triacylglycerols.

Q 2. Answer ANY TWO of the following: (12)

a. Describe the fate of nitrogen that is removed when amino acids are used as fuels.
b. Explain "Krebs bicycle" and outline the reactions involved.
c. Why can't animals convert fats into glucose? Why are plants capable of such a conversion? Outline the reactions involved.

Q 3. Answer ANY TWO of the following: (12)

a. How much energy is attained with the complete oxidation of the ketone body D-β-hydroxybutyrate? Outline the reactions involved.
b. Special shuttle systems carry reducing equivalents from cytosolic NADH into mitochondria. Describe any 2 such shuttle systems.
c. i. Give the general pathway for the production of ketone bodies in humans.
ii. Explain the reason behind the formation of ketone bodies during fasting.

Q 4. Answer ANY ONE of the following: (12)

a. Maltose (or malt sugar) is an intermediate in the intestinal digestion (i.e., hydrolysis) of glycogen and starch, and is found in germinating grains.
i. Outline the reactions involved when maltose is completely oxidized to CO_2.
ii. Calculate the net yield of ATP on complete oxidation of maltose to CO_2.

OR

b. i. Explain the metabolic flexibility of the liver in absorptive and post-absorptive state.
ii. Amino acids serve as precursors of many kinds of small molecules that have important and diverse biological roles. Outline the reactions involved in the synthesis of pyrimidines from simple metabolic precursors.

****