

U.G. 1st Semester Examination - 2021
Molecular Biology & Biotechnology
[PROGRAMME]

Course Code : MBG-CC-T-1

(Biological Chemistry)

Full Marks : 40

Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **five** of the following: $2 \times 5 = 10$
- What is mutarotation?
 - What is the significance of transamination reaction?
 - Write down the name of vitamin required for bone development, vision, immunity and blood clotting.
 - Draw the structure of a triglyceride.
 - Name one coenzyme and its biochemical function.
 - What is zwitterion?

- Draw the structure of 1 purine and 1 pyrimidine nucleotide.
 - What is a photosystem? What is the role accessory pigment in photosynthesis?
2. Answer any **two** of the following: $5 \times 2 = 10$
- Discuss briefly the mode of action of thyroid hormone. Is sunlight required for synthesis of vitamin D? Justify your answer. $3 + 2$
 - State the structural differences between starch and cellulose. Draw the Haworth projection for β -D glucose. Why 1 mole of fat gives more energy than 1 mole of carbohydrate? $2 + 1 + 2$
 - How ATP is produced in mitochondria?
 - Schematically explain the urea cycle and its regulation.
3. Answer any **two** of the following: $10 \times 2 = 20$
- How C4 plants minimize photorespiration? Compare C4 and CAM plants. What is quantum yield of photosynthesis and why it drops beyond the wavelength greater than 680nm? $3 + 3 + 4$
 - Describe the formation of osazone from glucose. With a schematic diagram show how

gluconic acid and glucouronic acids are formed? How the structures of saturated and unsaturated fatty acids regulate their packing, melting point and solubility? 2+4+4

- c) Explain the statement 'The active site of an enzyme is not complementary to the substrate'. Explain the change in K_M and V_{max} , if any, and write the Michaelis-Menten equation for a reaction in presence of a competitive and a non competitive inhibitor. How binding energy influences the reaction specificity and catalysis? What is the significance of Lineweaver Burk equation? 2+3+3+2
- d) Schematically explain the steps of Krebs cycle. Explain the regulation of glycolysis. Explain the steps of β oxidation of fatty acids. 4+2+4
