07/12/23

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SEMESTER-END TERM EXAMINATION (2023)
M.SC. BIOTECHNOLOGY (SEMESTER I)

Paper Name: **CELLULAR BIOLOGY AND BIOMOLECULES** Paper Code: **MBT-OE104**
Time: **2.5 Hours** Maximum Marks: **60**

Note: *This paper has 3 sections A, B, and C. Attempt all the three sections. Section A: Answer all the questions; Section B: Answer any 2 out of 4; Section C: Answer all the questions, each question has an internal choice*

Abbreviations Used CO- Course Outcome, PO- Program Outcome, BTL- Bloom Taxonomy Level; BT level 1-Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate; BT level 6-Create.

SECTION A: Very Short Type Questions (Attempt all) **[1 mark × 10 =10]**

Q. No	Question	Marks	BTL	CO
1.	What is the primary function of ligands in cell signaling process?	1	1	1
2.	Define the term "receptor" in the context of cellular signaling?	1	1	1
3	What is an epimer. Give examples.	1	3	2
4.	Draw the structure of sucrose.	1	2	2
5.	What are dihedral angles?	1	2	3
6.	Draw the structure of an amino acid. Give one example each of positively and negatively charged amino acid.	1	1	2
7.	What is a proteoglycan. Give one example.	1	2	2
8.	Write down the overall reaction of a TCA cycle.	1	5	3
9.	What are the important components of a Pyruvate dehydrogenase complex?	1	4	3
10.	What is Anfinsen Hypothesis.	1	4	4

SECTION B Long type Questions (Attempt <u>ANY TWO</u> out of four) **[15 marks × 2 =30]**

Q. No	Question	Marks	BTL	CO
11	Explain the Receptor Tyrosine Kinase (RTK) OR c-AMP GPCR pathway, emphasizing the pivotal elements in its activation, the key components involved, and the subsequent cellular responses that occur downstream of this pathway?.	15	2	1
12	What are the various steps involved in the Glycolysis? Briefly discuss its regulation at various steps.	15	3	3
13	Discuss in various steps of urea cycle and its regulation. What is hyperammonemia.	15	1	3
14	What are the various types of enzyme inhibitors? Differentiate between competitive and non-competitive inhibition. Draw the Lineweaver Burk and Michaelis Menten plot for the same.	15	4	4

SECTION C: Short-type Questions. (Attempt all; Every question has an internal choice) **[5 marks × 4 =20]**

Q. No	Question	Marks	BTL	CO
15	Explain, the interaction between receptors and ligands in cellular signaling. Include the definition and types of receptors, the role of ligands? **OR** Explain briefly the various check points in a cell cycle.	5	2	1
16	Discuss in brief the steps involved in beta oxidation of fatty acids. **OR** How does the transfer of electrons from Complex I to Complex III?	5	3	3
17	Briefly discuss the GROEL and GROES mechanism of chaperone assisted folding? **OR** Explain the structure of ATP synthase. Briefly explain the binding change mechanism of ATP synthesis.	5	4	3
18	What are cofactors and how they are related to vitamins. Explain the role of TPP as a cofactor. **OR** Discuss the principle and application of the following (i) Size exclusion Chromatography (ii) SDS PAGE	5	3	4

Table1: Distribution of question & marks among the Units of syllabus

Unit	Questions Numbers	Total Marks
1	1,2,11,15	22
2	3,4,7,9,8,12,16	25
3	5,6,13,17	22
4	10,14,18	21

Table 2: Mapping between COs and questions

COs	Knowledge level (BTL)	Questions Numbers	Total Marks
CO1	K1,k1,k2,k2	1,2,11,15	22
CO2	K3,k2,k2,k4,k5,k3,k3	3,4,7,9,8,12,16	25
CO3	K2,k1,k3,k4	5,6,13,17	22
CO4	K4,k4,k3	10,14,18	21