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

Paper Name: **CELLULAR BIOLOGY AND BIOMOLECULES**
 Time: **3: Hours**

Paper Code: **MBT-OE104**
 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.

COURSE LEARNING OUTCOME

Upon completion of the course, the student shall be able to:

CLO104.1: Gain insight on the basic functionalities of the cell as the unit of life and its growth phases and communication mode by various cellular signaling pathways. (Cognitive Level: Understand)

CLO104.2: Comprehend the structure and functions of the major classes of the biomolecules and their significance. (Cognitive Level: Remember)

CLO104.3: Analyze the significance and mechanisms of major metabolic pathways and their regulation and their role in metabolic disorders. (Cognitive Level: Analyze)

CLO104.4: Comprehend the principles and applications of protein purification and molecular biology techniques. (Cognitive Level: Apply)

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

Q. No	Question	Total Marks [10]	BTL	CO
1.	What are CDKs and Cyclins in the cell cycle?	1	1	1
2.	Draw the structure of Maltose showing its linkage.	1	3	2
3.	What is the difference between D glucose and L glucose?	1	4	2
4.	Why Proline is known as an imino acid?	1	2	2
5.	Give two differences between a healthy cell from and a cancerous cell.	1	4	1
6.	Differentiate between cationic and anionic exchangers.	1	3	4
7.	Give two examples each of non -polar and charged amino acids.	1	2	2
8.	Draw a peptide bond.	1	6	2
9.	Name the enzymes involved in Von-Gierke and Mc'Ardles disease.	1	1	2
10.	Name the coenzymes related to the vitamins Thiamin and Vitamin B6. What reactions do they catalyze?	1	1	4

SECTION B: Long type Questions (Attempt ANY TWO out of four)

Q. No	Question	Marks [30]	BTL	CO
11.	Explain in detail the RTK OR GPCR pathway of cell signaling?	15	2	1
12.	What are the various steps involved in the Krebs cycle. Write down the overall reaction of this cycle. Briefly discuss its regulation at various steps.	15	5	2
13.	Which pathway is utilized by our body to remove the excess of ammonia? Discuss in detail the various steps involved in this pathway?	15	3	3
14.	What are the differences between non competitive and Uncompetitive inhibition. Create the Lineweaver Burk and Michaelis Menten plot for the same.	15	6	4

SECTION C: Short-type Questions. (Attempt all)

Q. No	Question	Marks [20]	BTL	CO
15.	Give a brief explanation of the IP3-DAG GPCR pathway and the RTK pathway of cell signaling OR Describe hydrophobic and hydrophilic receptors and their associated molecules with examples	4	2	1
16.	What are the important features of a Glycosaminoglycan? Cite two examples OR Briefly discuss the structure of Complex V and give its significance	4	4	3
17.	Discuss the regulation of glycolysis by PFK. OR What is a Q cycle and how it helps in transfer of electrons?	4	5	3
18.	Briefly discuss the mechanism of chaperone assisted folding? OR Differentiate between the parallel and anti parallel beta sheet. What is the significance of a Ramachandran Plot?	4	3	3
19.	Differentiate a catalyst from an enzyme. Give the significance of Km. OR Discuss the principle and application of the following (i) Salt fractionation (ii) Affinity chromatography	4	3	4

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

Unit	Questions Numbers	Total Marks
1	1,5,11,15	21
2	2,3,9,12,16,17	26
3	4,7,8,13,18	22
4	6,10,14,19	21

Table 2: Mapping between COs and questions

COs	Knowledge level (BTL)	Questions Numbers	Total Marks
CO1	K1,K4,K2,K2	1,5,11,15	21
CO2	K3,K4,K2,K2,K6,K1,K5	2,3,4,7,8,9,12	21
CO3	K3,K4,K5,K3	13,16,17,18	27
CO4	K3,K1,K6,K3	6,10,14,19	21