GUJARAT TECHNOLOGICAL UNIVERSITY

M.SC. INDUSTRIAL BIOTECHNOLOGY – SEM.– 3 • EXAMINATION – WIINTER - 2022

Subject Code:1330104   **Date: 23 Dec 2022**
Subject Name:Metabolic Engineering
Time:02:30 PM TO 05:00 PM   **Total Marks: 70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Draw neat and clean diagrams as required**

Q.1	**Write a note on following**	**(Marks-10X2=20)**

1. Define product yield.
2. Give the law of conservation of mass.
3. Any two applications of secondary metabolite.
4. Describe the truth table of AND and NOT logical gates
5. Give limitations of the Monod equation.
6. Define thermodynamic efficiency of biological process.
7. Draw a circuit of 1-bit memory.
8. Explain the Competitive inhibition of Enzymes.
9. Describe any two applications of synthetic biology in cancer.
10. Give the full form of (i) TELENS and (ii) CRISPER

Q.2	**Answer the following (Any 2 out of 3)**	**(Marks-2X10=20)**

1. Describe the basic principle and application of C13 metabolic flux analysis.
2. Discuss the role of TALENS in the manipulation of metabolic pathways.
3. Briefly explain Pathway manipulation strategies for the overproduction of ethanol.

Q.3	**Answer the following (Any 6 out of 8)**	**(Marks-6X5=30)**

1. Describe the application of synthetic biology in malaria eradication.
2. List tools of synthetic biology with examples.
3. Write a brief note on CRISPR.
4. Give a brief idea about the Minimization of Metabolic Adjustment.
5. How would you employ the knowledge of synthetic biology in the colonization of the Moon or Mars?
6. Explain the concept of gene drive with an example.
7. Explain the lac operon concept in microbes.
8. Briefly explain regulatory enzymes with their regulation in glycolysis.

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