


Name:	
Enrolment No:	

UPES
End Semester Examination, May 2024

Course: Synthetic Biology **Semester: 6**

Program: Int BMSC Microbiology **Duration: 3 Hours**

Course Code: HSMB3018 **Max. Marks: 100**

Instructions: Attempt all the questions

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	Define synthetic promoters.	1.5	CO1
Q 2	Name two other technologies besides CRISPR-Cas used for genome editing.	1.5	CO1
Q 3	What are the challenges in effectively treating human diseases using genome editing technologies?	1.5	CO1
Q 4	Name one advantage of using Golden Gate cloning for DNA fragment construction.	1.5	CO2
Q 5	Name one chemical reagent commonly used for DNA delivery in synthetic biology.	1.5	CO2
Q 6	Define biosensor construction.	1.5	CO3
Q 7	Name one application of biosensors.	1.5	CO3
Q 8	What are the components of a biosensor?	1.5	CO4
Q 9	Name one challenge associated with biosensor development.	1.5	CO4
Q 10	Which of the following methods is used for designing and constructing DNA fragments in synthetic biology? a) PCR b) Western blotting c) Gibson assembly d) Gel electrophoresis	1.5	CO4
Q 11	Golden Gate cloning is primarily used for: a) Amplifying DNA fragments b) Protein purification c) Cloning DNA fragments d) DNA sequencing	1.5	CO2
Q 12	Which of the following is a method for DNA delivery in synthetic biology? a) PCR b) DNA microarray	1.5	CO2

	c) Viruses d) ELISA		
Q 13	What role do chemical reagents play in synthetic biology? a) Amplifying DNA fragments b) Delivering DNA c) Analyzing DNA sequences d) Enhancing protein expression	1.5	CO1
Q 14	Gibson assembly is best described as: a) A method for constructing DNA fragments b) A method for protein purification c) A technique for PCR amplification d) A method for DNA sequencing	1.5	CO1
Q 15	Biosensors are primarily used for: a) DNA sequencing b) Environmental monitoring c) Protein purification d) Cell culture	1.5	CO2
Q 16	What are the components of a biosensor? a) Antibodies and PCR primers b) Detector and microarray c) Receptor and transducer d) Gel electrophoresis apparatus	1.5	CO2
Q 17	Biosensors contribute significantly to which field? a) Robotics b) Agriculture c) Nanotechnology d) Medical diagnostics	1.5	CO3
Q 18	How do biosensors function? a) By amplifying DNA sequences b) By detecting biomolecules and converting them into measurable signals c) By separating proteins in a gel d) By analyzing RNA expression levels	1.5	CO4
Q 19	What is a common application of biosensors? a) Gene editing b) Food testing c) Cell culture d) Immunofluorescence	1.5	CO4
Q 20	The main principle behind biosensor operation involves: a) Protein folding b) Signal amplification c) Specific biomolecule detection d) DNA replication	1.5	CO2
Section B (4Qx5M=20 Marks)			
Q 1	Explain the concept of synthetic transcription factors.	5	CO4
Q 2	How are synthetic RNA regulations engineered?	5	CO4
Q 3	Describe the mechanism of protein regulation.	5	CO3
Q 4	What is CRISPR-Cas, and how has it revolutionized genome editing?	5	CO3

Section C (2Qx15M=30 Marks)			
Q 1	What are Gibson assembly and Golden Gate cloning, and how are they used in the design and construction of DNA fragments?	15	CO2
Q 2	Explain the significance of genome engineering in synthetic biology, and how are advanced methods employed in this field.	15	CO1
Section D (2Qx10M=20 Marks)			
Q 1	Discuss the advantages and limitations of using viruses for DNA delivery in synthetic biology research.	10	CO1
Q 2	Describe the components of a biosensor and their respective functions.	10	CO2