

Name of student.....		Roll No.....
MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL DEPARTMENT OF BIOLOGICAL SCIENCE & ENGINEERING END-TERM EXAMINATION DEC. 2024		
Program: B.Tech.		Semester: I
Sub Code: BSE 24111		Time: 09:30-11:30AM
Subject: Biology for Engineers		Max. Marks: 40
Q. No.	Questions	Marks
Q1	1. Which of the following is termed as the powerhouse of the cell? a) Golgi apparatus b) Ribosome c) Mitochondria d) Endoplasmic reticulum 2. Which phase of the cell cycle is associated with DNA replication? a) G1 phase b) G2 phase c) S phase d) M phase 3. The main storage form of carbohydrates in animals is: a) Cellulose b) Starch c) Glycogen d) Glucose 4. Which of the following is an example of a disaccharide? a) Glucose b) Fructose c) Sucrose d) Glycogen 5. What is the main mineral stored in bones? a) Sodium b) Calcium c) Iron d) Magnesium 6. Which part of the neuron receives signals from other neurons? a) Axon b) Soma c) Dendrite d) Myelin sheath 7. The enzyme used to cut DNA at specific locations in recombinant DNA technology is called: a) Ligase b) Helicase c) Restriction enzyme d) Polymerase 8. Which of the following is an example of a biosensor application? a) Monitoring blood glucose levels b) Photosynthesis in plants c) Protein synthesis d) Digestion of food 9. The BCG vaccine is used to protect against: a) Hepatitis b) Tuberculosis c) Malaria d) Influenza	10

	<p>10. Which of the following is the main greenhouse gas responsible for global warming?</p> <p>a) Oxygen b) Methane c) Nitrogen d) Carbon dioxide</p>	
Q2	<p>A) A group of young scientists has been tasked with studying living beings from different water reservoir. During their research, they collected samples from different lakes. Under the microscope, they observed two types of cells.</p> <p>Cell Type A: This cell was very small (1-2 μm), lacked a distinct nucleus, and had no membrane-bound organelles. The genetic material was found in a specific region called the nucleoid. The cell also had a simple structure and a rigid cell wall.</p> <p>Cell Type B: This cell was larger (10-50 μm), with a clearly visible nucleus enclosed by a nuclear membrane. It contained several membrane-bound organelles, such as mitochondria and the endoplasmic reticulum, and showed complex internal organization.</p> <p>a. Identify the type of organism represented by Cell Type A and Cell Type B. Provide reasoning for your answer.</p> <p>b. List at least three structural differences between Cell Type A and Cell Type B, referring to their cellular components.</p> <p>c. Explain why the structural differences between these two cell types are significant for their respective functions.</p> <p>d. Give an example of an organism that could correspond to each cell type based on the observations.</p> <p style="text-align: center;">OR</p> <p>Tabulate the stages appear in Meiosis I along with the characteristic features associated with each stage. How it is unique in comparison with mitosis?</p> <p>B) (What are energy-giving / body building biomolecules (Carbohydrates / Proteins). Classify any one of them and explain their role in the human body. Support your answer with suitable example)</p>	(5)
Q3	<p>(Analyze the concept of appendicular appendages in the context of biomechanical design (Types of Joints). Discuss their structural components and functional mechanisms in the human body.) Illustrate with a well-labeled diagram.</p> <p style="text-align: center;">OR</p> <p>Draw a well labeled diagram of digestive system. Give a detailed illustration on digestive physiology in organs and glands associated with it.</p>	(10)
Q4	<p>A) What is recombinant DNA technology? Explain its applications in any field of your choice (hint given for support). (Hint: Vaccine production, Transgenic organism, Gene therapy)</p> <p>B) Discuss the applications of biosensors in the field of biotechnology, providing suitable examples. (Hint: electronic tongue, electronic nose, Bio - chip).</p> <p style="text-align: center;">OR</p> <p>•(Submit a hypothesis / concept note or understanding for the application of biomaterials as biological agents or bioinspired devices (Biotechnological solutions) to create a sustainable environment and human health) (Hint: Bioremediation, Bioleaching, Biofuel, etc.)</p>	(5)