Name of student..... Roll No.....

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

DEPARTMENT OF BIOLOGICAL SCIENCE & ENGINEERING

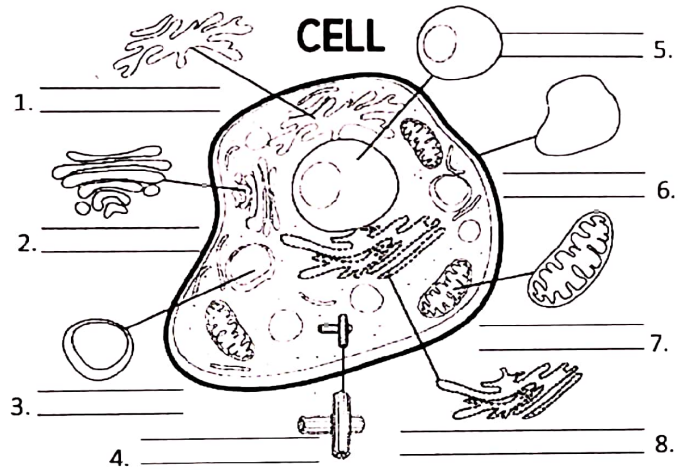
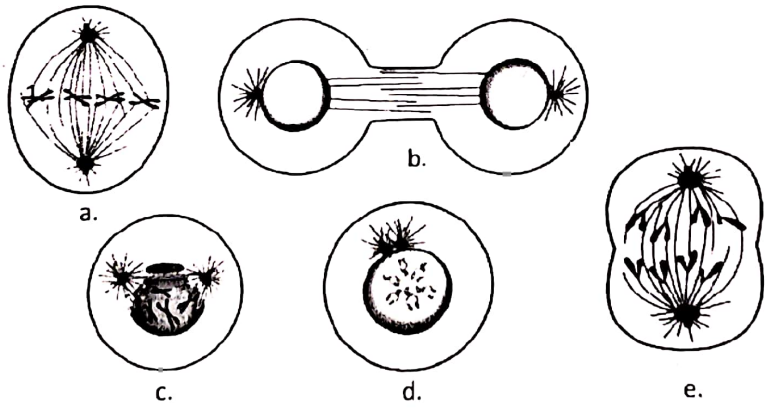
MID-TERM EXAMINATION JULY-DEC. 2023

Program: B.Tech Semester: I Branch: Biological Science & Engineering

Sub Code: BSE 24111 Subject: Biology for Engineers

Time: 09:30-10:30AM Max. Marks: 20

NOTE: Answer all questions. Use illustrations wherever required.

Q.No.	Questions	Marks	CO
1	Biological systems operate with precision much like engineered systems. The cell diagram provided below is missing labels for its components. Analyze the structure, match each number to the appropriate organelle, and complete the mapping.  	2.5	CO1
2	 The diagram provided above shows different stages of mitosis, each labeled with a number. Analyze the diagrams carefully and identify the stage of mitosis for each numbered diagram.	2.5	CO1

3	Explain the analogy between the function of mitochondria and an automobile engine or turbine. Describe how the processes occurring in mitochondria resemble the steps involved in energy production in these mechanical systems. **Hint:** Consider the role of the electron transport chain (ETC) in mitochondria and how it parallels components in an engine or turbine that are critical for energy conversion.	5	CO2
4	a. Describe the main types of biosensors and explain the key elements that make up a biosensor. How are biosensors revolutionizing the food industry? Provide examples of their applications in food safety. b. Explain the risks posed by environmental pollution to ecosystems and human health. How does bioremediation work to reduce pollution, and what are its limitations?	2.5X2	CO5
5	Jaspreet Bumrah's unique bowling style relies on the precise coordination of various joints in the skeletal system. Discuss the types of joints and their roles in enabling key movements such as gripping the ball, wrist rotation, and arm delivery during his bowling action. How do these joints work together to generate the speed, spin, and accuracy that define his performance? Use examples from the elbow, wrist, and finger joints to illustrate your explanation.	5	CO3