JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION-2026

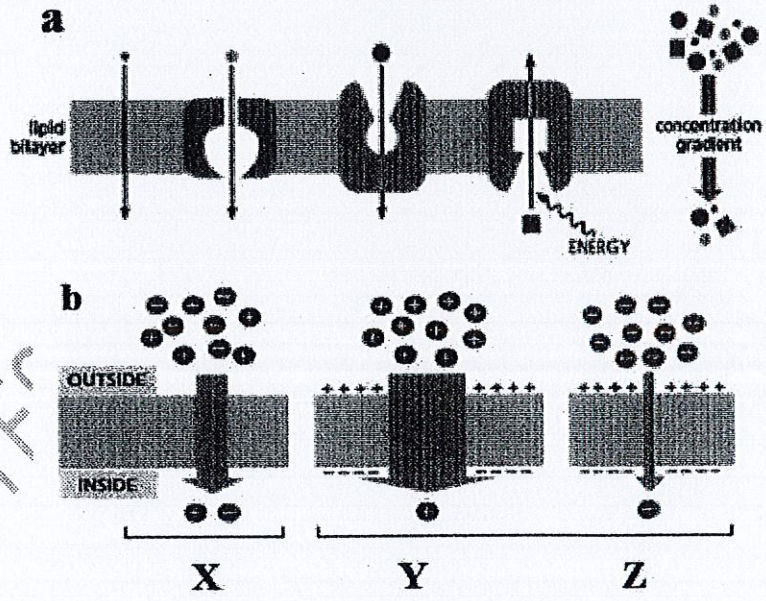
MSc-I Semester (BT)

Course Code(Credits): 20MS1BT112 (3) Max. Marks: 15

Course Name: Cell and Molecular Biology

Course Instructors:Dr. Abhishek Chaudhary Max. Time: 1 Hour

***Note:*** *All questions are compulsory. Marks are indicated against each question in square brackets.*

| Q.No | Question | Marks |
|---|---|---|
| Q1 | **a.** A mutation alters the phospholipid composition of a cell membrane, making it more rigid at physiological temperature. Predict how this change would affect membrane function and explain your reasoning.<br><br>**b.** Further researcher removes most of the cholesterol from the plasma membrane of animal cells. Predict two major consequences of this change and justify your answer. | 5 |
| Q2 | Study the following diagrams showing molecules crossing the plasma membrane through different pathways.<br><br>**a.** Identify the transport mechanisms represented in Diagram **a**. Classify each mechanism as passive or active transport.<br><br>**b.** Explain in detail the mechanism of transport represented in Figure **b**. Based on the properties of the transported molecules, explain why Y transport is the most feasible, whereas Z transport is the least feasible | 5 |

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(16)

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|---|---|---|
| Q3 | a. Explain how a β-barrel membrane protein is structurally adapted to the lipid bilayer. Also signify the importance of ***maltoporin and FepA protein in*** molecular transportation.<br><br>b. A mutation replaces several hydrophilic amino acids lining the pore of a β-barrel with hydrophobic amino acids. Predict how this mutation would affect membrane transport and explain your reasoning. | 3+ 2 |

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