

1. Depict the four ways in which a solute can cross the cell membrane. (12%).
2. Depict the three ways in which an ion channel can be gated. (12%)
3. Depict the three main mechanisms by which membrane-bounded organelles import proteins. (12%)
4. Depict the three pathways to degradation in lysosomes. Each pathway leads to the intracellular digestion of materials derived from a different source. (12%)
5. Depict functions of the three main classes of cell surface receptors. (12%)
6. Depict the roles of three types of cytoskeleton in each of five phases of mitosis. (20%)
7. Define the following structures and describe their relationships to the gene transcription (20%).
 - A. interphase chromosome
 - B. mitotic chromosome
 - C. chromatin
 - D. heterochromatin
 - E. histones
 - F. nucleosome
 - G. replication origin
 - H. centromere
 - I. telomere
 - J. nucleolus