

(10% each.)

1. The lipid-bilayer of cytoplasmic membrane has been characterized by "fluid-mosaic" model. Please explain why it is fluid? How can you prove this?
2. Both cAMP and InsP_3 are second messenger in the receptor-response upon stimulation on cell membrane. Please describe how these two molecules act as the second messenger. (You may draw cartoons.)
3. The extracellular matrix of an animal cell can provide protection, communication, etc. Please draw the crosslinking of all possible components of the extracellular matrix of an animal cell.
4. Usually, a cell harbors 90-97% of the DNA to be heterochromatic region. What do you think the pay off for a cell to have this high percentage of "Junk DNA"?
5. Ribosome is involved in the protein synthesis, and is composed of both rRNA and ribosomal proteins. What are the functions of rRNA?
6. You just cloned a IS200 gene. You want to highly express this gene. How would you do?
7. T. Cech won ^{the} Nobel Prize in 1989 for his contribution in self-catalyzed splicing reactions. Please explain both group I and group II intron splicing in Tetrahymena as denoted by T. Cech.
8. Some proteins have very short half-life. How can a cell degrade these proteins in very short-time?
9. Homeotic genes are very important for development of animals and plants. What are the common features of homeotic proteins?
10. To your knowledge, what are the features of a cancer cell?