**FIRST SEMESTER 2021-2022**

**BIO F213, Cell Biology**

**Mid semester Examination**

**(Closed book)**

**TOTAL MARKS = 60 Date: 02.11.2022 DURATION: 90min**

Write answer of all parts of one question together.

1. Electron microscopy is a powerful tool for detection and supervision of all key cell differentiation processes of in vivo neovascularisation. You are suggested to study differentiation processes in normal tissue as well as cancer tissue (tumor).

* 1. How will you prepare sample for electron microscopy to compare normal and cancer tissue differentiation? Write the steps involved in the process.
  2. How is the embedding for electron microscope different from embedding for light microscopy?
  3. After disaggregation of normal tissue, cells were propagated in T25 flask. How will you determine that a monolayer of culture must be sub-cultured?
  4. After 30 divisions, this culture could not divide. What is the reason behind this?

**4 X 3M**

1. A. Suggest a reason why it would be advantageous for eukaryotic cells to evolve elaborate internal membrane systems that allow them to import substances from the outside as in case of endocytosis.

B. As you know, a lipid bilayer in plasma membrane can be fluid, but yet asymmetrical. Is it logical? Explain.

C. Protein in the lipid bilayer is static or move laterally. Explain with suitable example.

D. Why does a red blood cell plasma membrane need transmembrane proteins?

**4 X 3M**

3. A. Name the three ways in which an ion channel can be gated.

B. How does an electrical signal convert into a secreted chemical signal at a nerve terminal? Explain

C. Some proteins shuttle back and forth between the nucleus and the cytosol. They need a nuclear export signal to get out of the nucleus. How do you suppose they get into the nucleus? **3 X 3M**

4. A. How does ER recognize misfolded protein and ensure the protein quality?

B. How does protein enter into mitochondria and chloroplast?

**2 X 3M**

5. Name at least one similarity and at least one difference between the following.

A. Symport and antiport

B. Active transport and passive transport

C. Membrane potential and electrochemical gradient

D. Pump and transporter

**4 X 2M**

6. Which of the following statements are correct? **6 X 1M**

1. Lipids in a lipid bilayer spin rapidly around their long axis
2. Hydrogen bonds that form between lipid head groups and water molecules are continually broken and re-formed.
3. Channels have specific binding pockets for the solute molecules they allow to pass.
4. Transporters allow solutes to cross a membrane at much faster rates than do channels.
5. All transport vesicles in the cell must have a v-SNARE protein in their membrane.
6. Transport vesicles deliver proteins and lipids to the cell surface.

7. Fill in the blank with appropriate word(s) **7 X 1M**

* Term “cell” for tiny units of life was coined in 1665 by \_\_\_\_\_\_(i)\_\_\_\_\_
* The membranes of the endoplasmic reticulum divide the cytoplasm into \_\_\_(ii)\_\_\_\_phase and \_\_\_\_\_(iii)\_\_\_\_\_\_\_phase.
* Size of a typical eukaryotic cell is in the range of \_\_(iv)\_\_\_\_ um in comparison to the size of bacterial cell \_\_\_(v)\_\_\_ um and mycoplasma cell \_\_\_\_(vi)\_\_ um.
* The lipids are arranged in two closely apposed sheets, forming \_\_\_\_\_(vii)\_\_\_\_