

Cell Biology (LS3102) End-semester Exam Full Marks: 50, Times 3 hours

SECTION A (Answer All Questions) (3X5=15)

1. Explain with appropriate examples how ubiquitine-proteasome system can play major role in regulating LPS-mediated inflammatory signaling and also in protection from ER stress. **2.5 + 2.5**
2. Why termination of a cell signaling event is important? Explain with two examples how GPCR signaling is terminated. **1 + 4**
3. In a mammalian cell, where the lysosomal enzymes are synthesized and how they are trafficked to the lysosome? Explain using a flow chart. Mutation of which enzyme/s can cause a global defect in lysosomal trafficking and would eventually lead to a lysosomal storage disease? Explain with proper justification. **3 + 2**

SECTION B: Answer Any Five Question (5X7=35)

4. What is the actin filament polarity? What is the significance of actin filament polarity in cell function? What are the cellular mechanisms of actin filament polymerization? The concentration of actin in cells is 50 times greater than the critical concentration for actin polymerization observed for pure actin in a test tube. What prevent the actin subunits in cells from polymerizing into filaments? What do we mean by "capping" of actin filaments? Give example of two capping proteins. **1+1+2+1+1+1=7**
5. What is a kinetochore? Explain the difference between kinetochore and nonkinetechore microtubules. What is the function of each? What happens if all the chromosome kinetochores are not attached to spindle fibers? What kind microtubule of structure present in Basal bodies, Cilin and Cell Cytosol? Why some cilia are motile and why other cilia are non motile? Explain with example. **1+1+1+1+1+2=7**
6. What is catastrophe in microtubule Dynamics? How stabilization and destabilization of microtubule structure are regulated inside cells? What are mechanisms of microtubule mediated transport? Explain with example. What are the roles of actin in cellular transport? **1+2+2+2=7**
7. What is stress fiber (Is it forms due to stress)? Why it is necessary for the cells and how it is forms? What is focal adhesion? What are the molecular constituents of focal adhesion? What is the role of focal adhesion in cell migrations? **1+2+1+2+1=7**
8. Why the activity of CDKs rises and falls? What are the different modes of regulations of CDK activity? What is perfect totipotent stem cell? What are the sources of stem cells? How self renewal of stem cell is regulated? **1+2+1+1+2=7**
9. What are intermediate filaments? Explain why intermediate filaments cannot be used to generate force for cell motility? Classify intermediate filament with their functions? Discuss mechanism of disassembly of intermediate filaments? Give example to show that intermediate filaments are also dynamic. **1+2+2+1+1=7**
10. What is apoptosis and why it is important? Explain role of mitochondria in cell death. What is autophagy? What are the functions of p53 and Rb protein in cell cycle regulation? **2+2+1+2=7**

Rupam Sarin 1/12/18
Santosh Mishra 1/12/18