

**M. Sc. DEGREE END SEMESTER EXAMINATION - NOVEMBER  
2016**

**SEMESTER - 1: BOTANY**

**COURSE: 16P1BOTT04 -: CELL BIOLOGY**

Time: Three Hours

Max. Marks: 75

I. Answer **any Eight** questions briefly; each question carries 2 marks

1. Citing one example explain lysosomal storage diseases? How the study of lysosomal storage disease enriched our knowledge about lysosomal sorting pathway?
2. Write an account on the major group of proteins present in nuclear pore complex.
3. A diploid plant has  $2n=44$  and approximately  $1.6 \times 10^{10}$  bp of DNA. How much DNA is in a nucleus of the plant at (a) Mitotic metaphase (b) Meiotic metaphase I (c) Mitotic telophase (d) Meiotic telophase II
4. Several human neuromuscular disorders results from mutations in mtDNA. Explain.
5. 'Mitochondria are highly dynamic cell organelles and the dynamism is essential for its normal function'. Justify the statement.
6. Describe the basic structure of microtubule.
7. What is 'actin treadmilling'? Name the two proteins presumed to be involved in actin treadmilling
8. Explain the mechanism used in the production of induced pluripotent stem cells.
9. 'Protein kinases and protein phosphatases are two common components in virtually all signaling pathways'. Specify the roles of these molecules.
10. Write an account on receptor tyrosine kinase.
11. Citing one example each differentiate between the two different types of cotransporters.
12. What is 'histone code'? List out the post-translational modifications that cause histone code.

(2 x 8 = 16)

II. Answer **any Seven** questions; each question carries 5 marks

13. What are proto-oncogenes? With the help of a suitable example explain how a proto-oncogene is converted to an oncogene.
14. What are apoptosomes? Explain their function.
15. Citing any one molecule as examples explain the concept of 'second messengers'.
16. Write an account on the structure and functions of kinesins and dyneins.

17. Which are the membrane bound spaces in the chloroplast? How chloroplasts develop in cells?
18. What are coated vesicles? How coated vesicles are classified according to their coat? Mention the functions of the different types of coated vesicles.
19. Write an account on the cell cycle checkpoints.
20. Explain the structure of nucleosomes.
21. Describe the structure and properties of the principal classes of proteins contained in biomembranes.
22. List out the basic structural properties shared by G protein coupled receptors.

(5 x 7 = 35)

III. Answer **any Two** questions; each question carries 12 marks

23. Name the three different types of filaments that make up the animal cell cytoskeleton. Describe the structure and major functions of the different types of filaments. Cell cycle checkpoints can prevent the propagation of mutations into the next cell generation and thereby preserve the fidelity of the genome'. Justify the statement.
24. Differentiate between nuclear localization signals and nuclear export signals. How the cell uses nuclear localization signals for protein transport.
25. Write an account on early Metazoan embryo development. Add a note on the factors controlling the pluripotency of embryonic stem cells.  
(12 x 2 = 24)

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