বিদ্যাসাগর বিশ্ববিদ্যালয়

VIDYASAGAR UNIVERSITY

M.Sc. Examinations 2020
Semester IV
Subject: HUMAN PHYSIOLOGY
Paper: PHY - 402
(Theory)

Full Marks: 40 **Time: 2hrs.**

Candidates are required to give their answers in their own words as far as practicable.

Unit: PHY 402.1

*Answer any **One** of the following questions*

1. Write on membrane fluidity including the factors affecting it. Write an experiment in support of lateral diffusion of membrane proteins. What is GPI anchor?
2. Write down varied types of cell membrane receptors according to their mechanism of action with example for each type. Discuss the interplay of G protein linked signal transduction pathway acting through inositol. Write down the role of calcium as intracellular messenger.
3. Write down the mechanism of action of the signaling pathway involving RTK. What is trans-autophosphorylation? Give a schematic presentation of MAP-Kinase pathway with brief statement about its significance.
4. Define the three major structural components of cytoskeletal system and their specific roles in cellular activities. Describe the actin-binding proteins with their differential actions in cell. Differentiate Myosin I and Myosin II.
5. Differentiate pleuripotent stem cells and adult stem cells with examples for each type. Write down the properties of stem cells. What do you understand by 'commitment' in terms of stem cell physiology. What are myosatellite cells?
6. Write notes on:
   A. Check points in cell cycle.
   B. Role of NO as signaling molecule.
   C. Epigenetic control of differentiation.
   D. Phospholipids in plasma membrane of human cells.

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Unit: PHY 402.2

*Answer any **One** of the following questions*

1. a) What do you know about the important features of a cloning vector? b) Write down a note on a plasmid vector. c) What do you know about multiple cloning site of a cloning vector? d) State the significance of using bacteriophages in cloning.
   e) What is YAC?
2. a) Mention the types and applications of restriction enzymes. b) Discuss the properties and mechanism of action of restriction enzymes.
3. a) What is natural transformation? Describe the methods and mechanisms of bacterial transformation in laboratory. b) Mention the practical aspects of transformation in molecular biology. c) What is chemical-based transfection?
4. a) What is chimeric DNA? b) Discuss the tools and detailed steps of recombinant DNA technology. c) What is DNA probe and where does the probe DNA come from? d) What is Positional cloning
5. a) What are adult stem cells and human embryonic stem cells? b) Write notes on stem cell therapy used in diabetes mellitus and heart diseases.
6. a) What do you know about site-directed mutagenesis? b) Write down briefly on PCR site-directed mutagenesis and whole plasmid mutagenesis. c) Mention the applications of site-directed mutagenesis.

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