

2025

M.Sc. 3rd Semester Examination

HUMAN PHYSIOLOGY

Paper : PHY - 303C.1/303C.2

(Old Syllabus)

Full Marks : 25

Time : One Hour

*The figures in the margin indicate full marks.
Candidates are required to give their answers
in their own words as far as practicable.*

Sp. Paper : Biophysics and Electrophysiology

Structural Biology

PHY - 303C.1

Group - A

Answer any *two* questions : $2 \times 2 = 4$

1. How do you quantify the rate of diffusion? 2
2. Describe the reaction rate in terms of concentration and time. 2
3. What is partition coefficient? 2
4. What is electronegativity and electron affinity? 2

P.T.O.

(2)

Group - B

Answer any *two* questions : $4 \times 2 = 8$

5. Express the equation of Fick's second law of diffusion.
Mention the physics of osmosis. $2+2$
6. With an example, state the nature of 2nd order of reaction. Write down the differences between osmotic pressure and oncotic pressure. $2+2$
7. What is the difference between stacking gel and separation gel in SDS-PAGE? Why is the protein heated for 5 mins before loading into a gel? $2+2$
8. What are the main components of a UV-Vis spectrophotometer? Name any two solvents used in UV visible spectroscopy. $2+2$

Group - C

Answer any *one* question : $8 \times 1 = 8$

9. Write a short note on protein folding with suitable diagram. Write down the principles of 'Ramachandran Plot' for explaining protein structure. $4+4$
10. What is chirality? Give an example. Write the principle of pulsed field gel electrophoresis. Mention its applications. $2+2+2+2$

Internal Assessment : 5 marks

(3)

PHY - 303C.2

Group - A

Answer any *two* questions : $2 \times 2 = 4$

1. State different forms of energy. 2
2. Define zeta potential. 2
3. Mention the thermodynamic principles that govern passive transport versus active transport across cell on embrane. 2
4. Write down the biological importance of carbohydrates present in the cell membrane. 2

Group - B

Answer any *two* questions : $4 \times 2 = 8$

5. Describe the different components present in an enzyme with a suitable diagram. What is the allosteric site of an enzyme? 3+1
6. Describe briefly the Stern model for membrane potential. What are the limitations of Gouy-Chapman's model? 2+2
7. Explain the allosteric regulation in carrier proteins and how it relates to saturation kinetics. 2+2
8. With a suitable diagram, briefly describe the features of amphipathic lipids present in the cell membrane. Mention the functions of cholesterol in biological membranes. 3+1

P.T.O.

(4)

Group - C

Answer any *one* question :

8×1=8

9. Write down the development of the proton pump mechanism during oxidative phosphorylation through Complex V. Describe the structure and functions of Complex III in ETC. (2+2)+4
10. Write a note on the physical properties of water with reference to its structure. What is membrane impedance? 6+2

Internal Assessment : 5 marks
