

MAHATMA GANDHI UNIVERSITY, KOTTAYAM MGU-UGP (HONOURS)
EXAMINATION October 2026
III SEMESTER
Elective Course- MG3DSEPHYA02- BIOPHYSICS & PHYSIOLOGICAL SYSTEMS
(2025 ADMISSION ONWARDS)

Duration: 1.5 hours

Maximum Marks: 50

*Remember(K), Understand(U), Apply(A), Analyse(An), Evaluate(E), Create(C), Skill(S),
Interest(I) and Appreciation (Ap)*

Students should attempt at least one question from each course outcome to enhance their overall outcome attainability.

Part A

Short Answer Questions

Answer any 10 questions

Each question carries 2 marks

1. State the two conditions that must be satisfied for a body to be in static equilibrium. [U/CO1]
2. State the condition for equilibrium of a lever. [U/CO1]
3. How does the radius of a blood vessel affect the rate of blood flow? [U/CO2]
4. How does narrowing of an artery affect blood flow? [U/CO2]
5. What are photons? State the relation between the energy of a photon and the frequency of radiation. [K/CO3]
6. Why is vision blurred when the human eye is under water? [K/CO3]
7. For a myopic eye with a far point of 2 m, what should be the focal length of the corrective lens? [U/CO4]
8. What type of lens is used to correct hyperopia? [U/CO4]
9. Name the two optical instruments discussed in the textbook that extend the range of vision. [U/CO4]
10. What are Nodes of Ranvier? What is their significance? [K/CO5]
11. What is the permeability of the axon membrane to potassium and sodium ions in the resting condition? [K/CO5]
12. What is the approximate maximum positive potential reached during an action potential? [U/CO5]
13. What is meant by a synapse? [K/CO5]
14. What is the significance of the T wave in an electrocardiogram? [U/CO5]

(10x2=20)

Part B

Short Essay Type Questions

Answer any 6 questions

Each question carries 5 marks

15. Explain the mechanical forces acting at the hip joint during standing. Why can the force exerted on the hip joint be considerably greater than the body weight? [U/CO1]
 16. Explain the control of skin temperature. Discuss the roles of blood circulation, conduction, convection and radiation in maintaining the temperature of the skin. [U/CO1]
 17. Explain turbulent flow in the circulatory system. Discuss the conditions that lead to turbulence in blood vessels and distinguish turbulent flow from smooth (laminar) flow. [U/CO2]
 18. Explain the clinical uses of ultrasonic waves. [K/CO2]
 19. Draw a neat labelled diagram of the human eye and explain the functions of the major optical components involved in vision. [U/CO3]
 20. Explain why the microscope is important in the life sciences. Discuss the role of diffraction in determining the resolution of a modern microscope. [U/CO4]
 21. Describe the applications of an EEG in the diagnosis of brain disorders. [U/CO5]
 22. Distinguish between a hearing aid and a cochlear implant. [K/CO5]
- (6x5=30)