

QP Code: _____

MAHATMA GANDHI UNIVERSITY, KOTTAYAM
MGU-UGP (HONOURS) REGULAR PRACTICAL EXAMINATION MODEL
QUESTION PAPER

BIOPHYSICS & PHYSIOLOGICAL SYSTEMS

(MG3DSEPHYA02 | 2025 ADMISSION ONWARDS)

Duration: 2 Hours

Maximum Marks: 35

Record: 5 Marks

1. Determine the centre of mass of the given regular/irregular object using the prescribed experimental method. Verify its relation to the stability of the object. Record observations, show calculations and state the final result with suitable units. [A]/[CO6]
2. Using the given object and experimental arrangement, determine the centre of mass and discuss how its position affects the stability of the object. Include the observation table, calculations and graphical representation if required. [A]/[CO6]
3. Using a force transducer/spring balance and suitable weights, determine the torque produced by the biceps at the given elbow angle. Calculate the mechanical advantage of the human lever system and show all relevant steps. [A]/[CO6]
4. Study the variation of torque produced by the biceps with elbow angle using the prescribed experimental data. Tabulate the observations, calculate the torque and mechanical advantage, and represent the variation graphically. [A]/[CO6]
5. Using the given heated phantom, determine the rate of cooling and study the heat loss under the prescribed conditions. Record the temperature at suitable time intervals, plot the cooling curve and determine the required thermal parameter(s). [A]/[CO6]
6. Investigate heat loss from the given model system by considering conduction, convection and radiation. Using the supplied experimental observations, compare the modes of heat transfer and determine the rate of cooling. [A]/[CO6]
7. Using the variable-diameter tube arrangement, verify Poiseuille's law and study the effect of tube radius on the flow rate of a viscous fluid. Tabulate the observations, perform the required calculations and plot the appropriate graph. [A]/[CO6]
8. Using the given experimental setup, investigate the dependence of fluid flow on the radius of the tube as a model for arteriosclerosis. Determine the relevant flow parameter(s) and discuss the observed variation. [A]/[CO6]
9. Using a sphygmomanometer and stethoscope, determine the systolic and diastolic blood pressure from the observed Korotkoff sounds. Record the observations and clearly indicate the procedure and final values. [A]/[CO6]
10. Using the given manometer arrangement, determine the pressure at different depths in the liquid. Tabulate the observations, calculate the pressure and plot pressure against depth to verify the expected dependence. [A]/[CO6]
11. Using the ultrasonic transducer and the given medium, determine the velocity of ultrasonic waves. Include the observations, relevant formula, calculations and final result with proper units. [A]/[CO6]
12. Using the prescribed arrangement, determine the thickness of the given material/sample using ultrasonic waves. Show all observations, calculations and the final result with appropriate units. [A]/[CO6]

13. Using an audio oscilloscope or suitable Physics Toolbox application, determine the frequency of the given sound signal at different intensity/loudness levels. Tabulate the observations and analyse the variation. [A]/[CO6]

14. Using a light meter or suitable Physics Toolbox application, study the variation of illuminance with distance from the given light source. Record the observations, plot the appropriate graph and verify the dependence of illuminance on distance. [A]/[CO6]