Reg No:..... K25FY2337
Name :.....

Second Semester FYUGP Physics Examination
APRIL 2025 (2024 Admission onwards)
KU2DSCPHY102 (PHYSICS OF SOLIDS AND FLUIDS)
(DATE OF EXAM: 28-04-2025)

Time : 90 min Maximum Marks : 50

Part A (Answer any 6 questions. Each carries 2 marks)

1. State any two factors on which the moment of inertia of a body depends. 2

2. Which is more elastic-Steel or rubber? Justify your answer. 2

3. State Archimedes's principle. 2

4. Distinguish between steady flow and turbulent flow. 2

5. Freely falling rain drops are spherical. Why? 2

6. Give any four assumptions made in the kinetic theory of gases. 2

7. What is neutral surface and neutral axis of a beam? 2

8. Write down the expression for the bending moment of a beam and explain the terms involved. 2

Part B (Answer any 4 questions. Each carries 6 marks)

9. Three point masses m1, m2 and m3 are located at the vertices of an equilateral triangle of side a. What is the moment of inertia of the system about an axis along the altitude of the triangle passing through m1? 6

10. A cylindrical wire of length 1 m and radius 0.5 mm is twisted through an angle of 10°. If the modulus of rigidity of the material is 8×10^1 N/m^2, calculate the twisting couple. 6

11. Water is filled in a flask up to a height of 20 cm. The bottom of the flask is circular with a radius of 10 cm. If the atmospheric pressure is 1.013 x 10^5 Pa, find the force exerted by the water on the bottom of the flask. 6

12. Derive the continuity equation for the flow of an incompressible fluid. How does this equation get modified for a compressible fluid? 6

13. Derive the expression for the root mean square velocity of gas molecules in terms of the temperature of the gas. 6

14. A beam one meter long, 4 cm wide and 5 mm thick is supported on two knife edges 80 cm apart. The depression produced by a 2 kg load hung from the centre of the knife edges is is 5 mm. Find the Young's modulus of the material of the beam. 6

Part C (Answer any 1 question(s). Each carries 14 marks)

15. Derive an expression for the moment of inertia of a rectangular lamina of sides l and b, about an axis passing through its centre and perpendicular to length. Obtain its moment of inertia (i) about one side (ii) about an axis through its centre and perpendicular to its plane. 14

16. What is torsion pendulum? Explain how is it used to find the moment of inertia of a disc and the rigidity modulus of the material of a wire? 14