

**FIRST SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020****Physics****PHY 1C 01—PROPERTIES OF MATTER AND THERMODYNAMICS****Time : Three Hours****Maximum : 64 Marks****Section A**

*Answer all questions.
Each question carries 1 mark.*

1. What is the unit of stress ?
2. Define rigidity modulus.
3. What is the condition for stress directly proportional to strain ?
4. Define period of oscillation.
5. What is the unit of co-efficient of viscosity.
6. Write down Stokes equation.
7. Why the hair of a brush cling together when taken out of water ?
8. When radius of capillary tube is less, capillary rise is _____.
9. In mercury meniscus is _____ in shape.
10. Define Entropy.

(10 × 1 = 10 marks)**Section B**

*Answer all questions.
Each question carries 2 marks.*

11. Explain the terms Neutral surface and Neutral axis.
12. Explain Elasticity.
13. What is its co-efficient of performance ?
14. Why thermodynamic temperature is called the absolute temperature ?

Turn over

15. Mention three applications of Stokes law.
16. What is angle of contact ?
17. Why small drops are spherical in shape ?

(7 × 2 = 14 marks)

Section C

Answer any **three** questions.

Each question carries 4 marks.

18. Derive the equation for rigidity modulus.
19. State and explain viscosity.
20. Explain the relation between surface energy and surface tension.
21. Write down Stokes law and explain the symbols used. Mention three applications of Stokes law.
22. Define 1. First law of thermodynamics 2. Clausius statement of second law of thermodynamics.

(3 × 4 = 12 marks)

Section D

Answer any **three** questions.

Each question carries 4 marks.

23. A block of gelatine is 60 mm by 60 mm by 20 mm when unstressed. A force of 0.245 N is applied tangentially to the upper surface causing a 5 mm displacement relative to the lower surface. The block is placed such that 60 × 60 comes on the lower and upper surface. Find the shearing stress, and shearing strain.
24. Calculate the height to which water will rise in a capillary tube of 1 mm diameter. Given $g = 9.8$, Surface tension of water = 0.072 N/m : Angle of contact = 0.
25. The excess pressure inside a spherical soap bubble of radius 10 mm is balanced by that due to column of oil of density 900 kg/m³, 1.33 mm high. Calculate surface tension.
26. A tank containing water has an orifice 10 m below the surface of water in the tank. Find the speed of discharge.
27. A gram molecule of gas at 127°C expands isothermally until its volume is doubled. Find the amount of work done and heat absorbed.

(3 × 4 = 12 marks)