25I105S (Pages: 2) Name: .....

Reg.No: .....

FIRST SEMESTER M.Sc. INTEGRATED GEOLOGY DEGREE EXAMINATION, NOV. 2025

(CBCSS)

CC23PHY1IC01 - PROPERTIES OF MATTER AND THERMODYNAMICS

(Physics)

(2023, 2024 Admissions - Supplementary/Improvement)

Time : 2.00 Hours Maximum : 60 Marks

Credit : 2

Part A (Short answer questions)

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

1. What is meant by strain? Does it have a dimension.
2. Differentiate between cohesive force and adhesive force.
3. Explain the effect of impurities on surface tension.
4. How viscosity of gases varies with change in temperature?
5. Explain quasistatic process.
6. State and explain first law of thermodynamics. Give its mathematical expression.
7. What is heat engine?
8. Mention the name of thermodynamic process involved in carnot engine.
9. State Carnot's theorem.
10. What is the principle of refrigerator?
11. Explain the change in entropy during reversible and irreversible process.
12. Explain the concept entropy and disorder.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer ***all*** questions. Each question carries 5 marks.

13. Find the Poisson ratio for the material having Y = $12.25 \times 10^{10} N/m^2$ and n=4.55×10^{10} N/m^2.
14. The time period of oscillation of a torsion pendulum is 2 seconds. If the length of the wire taken is doubled and radius taken is halved,of the material,what is the new time period?
15. What is meant by bending moment? Derive the expression for the same.

16. A plate of metal $0.5x10^{-2}$ m^2 area rests on a layer of caster oil $4x10^3$ m thick, whose coefficient of viscosity is $1.55Ns/m^2$. Calculate the tangential force required to move the plate with a uniform speed of $4x10^{-2}$m/s. Repeat the calculation for benzene, whose coefficient of viscosity is half of caster oil.

17. Two liquid drops of same radius are falling through air with a terminal velocity of 10cm/sec. If these two drops merge to form a single drop, what would be resultant terminal velocity.

18. Explain thermodynamic system with suitable examples.

19. A quantity of air (Y=1.4) at 27deree celcius is compressed suddenly to 1/4th of its volume. Find final temperature.

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

20. Derive an expression for the rate of flow of a liquid through a capillary tube.

21. Write Clausius-Clayperon equation. Explain the effect of pressure on the boiling point of liquids and melting point of liquids on the basis of this equation.

(1 × 10 = 10 Marks)

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