25U120S (Pages: 2) Name: .....

Reg.No: .....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2025

(CBCSS - UG)

CC20UPHY1C01 - PROPERTIES OF MATTER AND THERMODYNAMICS

(Physics - Complementary Course)

(2019 to 2023 Admissions - Supplementary)

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 elastic hysterisis?
2. What is Poissons Ratio?
3. Give any two everyday examples involving surface tension?
4. What it the energy required to increase the bubble radius by two times the initial radius?
5. What is the relation between coefficient of viscosity and terminal velocity of a body?
6. How does the viscosity of a gas depends on its pressure?
7. What is meant by thermodynamic equilibrium?
8. Find the expression for work done during adiabatic process.
9. Mention the limitations of first law of thermodynamics.
10. Give any two statements of second law pf thermodynamics.
11. Mention the name of thermodynamic process involved in carnot engine.
12. Explain the change in entropy during reversible and irreversible process.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. A torsion pendulum with a wire of length 1m,diameter 1.22 mm and modulus of rigidity 8×10^{10} Nm^{-2}, oscillates with a period of 1.25 s. Find the moment of inertia of the suspended body about the axis of suspension.
14. An air bubble of radius 1cm is allowed to rise through a long cylindrical column of liquid of viscous liquid and travels at a steady rate of 0.21cm/s. If the density of the liquid is 1470kg/m^3, find the viscosity fo the liquid. Assuming g=9.8m/s^2, neglect the density of air.

15. A capillary tube 10^{-3} m in diameter and 0.3m in length is fitted horizontally to a vessel kept full of alcohol of density $0.8x10^3$ kg/m^3. The capillary tube is 0.3m below from the surface of alcohol in the vessel. Calculate the volume of alcohol flows in 5 minutes. What happens if we replace, the alcohol with liquid of density $0.5x10^3$ kg/m^3. Calculate the volume flow for the new liquid.

16. Write a note on brownian motion. Explain its significance.

17. What is PV diagram? How will you calculate the amount of work done on the system or by the system when (1) pressure is constant (2) pressure is variable.

18. A Carnot's engine absorbs 104 calories of heat from a reservoir at 627 degree Celsius and rejects heat to a sink at 27 degree Celsius. What is its efficiency? How much work does it perform (in joule)?

19. Calculate the change in entropy of 5Kg water at 100 degree celsius when changes into vapour.

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. What is meant by cantilever? Derive the expression at the free end cantilever loaded at free end, when the weight of the cantilever is negligible.

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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