23U115 (Pages: 2) Name: .....

Reg.No: .....

FIRST SEMESTER B.Sc./M.Sc. INTEGRATED GEOLOGY DEGREE EXAMINATION, NOVEMBER 2023

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U PHY1 C01 / CC20U PHY1 C01 / CC23I PHY1 IC01 - PROPERTIES OF MATTER AND THERMODYNAMICS

(Physics - Complementary Course)

(2020 Admission onwards)

Time : 2.00 Hours Maximum : 60 Marks

Credit : 2

Part A (Short answer questions)

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

1. State Hooke's Law of elasticity.
2. What are the theoretical limits of Poissons Ratio?
3. What is a cantilever?
4. Why molecules on the surface of a liquid have more energy?
5. Define coefficient of viscosity? Write its unit ?
6. How does the viscosity of a gas depeneds on its pressure?
7. Explain thermal equilibrium and chemical equilibrium.
8. What is indicator diagram? explain with diagram.
9. What is heat engine?
10. Briefly explain Carnot's engine.
11. What is the principle of refrigerator?
12. Mention the properties of entropy.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. Calculate the couple required to twist one end of a wire of lenth 1 m and radius 1.5 mm through an angle 45 degree by keeping the other end fixed given n= 5×10^{10} Nm^{-2}
14. Obtain the expression for the work done in blowing a bubble.

15. 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)?

16. Derive the expression for work done in isothermal process.

17. State the laws of thermodynamics and use it to derive the Mayer's relation, Cp-Cv = R.

18. Calculate the terminal velocity of an air bubble of radius 2×10^{-5}m raising in water of viscosity 0.8×10^{-3} Ns/m^2. Density of water = 10^3 kg/m^3 and g=9.8m/s^2. Neglect the density of air in comparison to that of water.

19. Using Clausius Clpeyron equation explain the effect of melting point solid and boiling point of liquid

(Ceiling: 30 Marks)

Part C (Essay questions)

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

20. Explain the method of Poiseuille's method for determining coefficient of viscosity.

21. What is entropy? Write its physical significance. Prove that the entropy of a system increases in an irriversible process.

(1 × 10 = 10 Marks)

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