QP Code: D 112806	Total Pages: 2	Name:
		Register No.

FIRST SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2024

(CUFYUGP)

APH1MN102/PHY1MN102: Properties of matter and Thermodynamics

2024 Admission onwards

Maximum Time :2 Hours | **Maximum Marks :70**

Section A

All Questions can be answered. Each Question carries 3 marks (Ceiling : 24 Marks)

1	Define the two conditions to be satisfied for a system to be in static equilibrium
2	Four-legged animals need only small feet or hooves whereas the two-legged animals have relatively large feet. Explain how it relates to center of gravity
3	State and explain Hooke's law
4	Explain Elastic hysteresis with the help of a Stress-strain curve
5	Discuss the importance of elastic limit in the classification of material into elastic and plastic
6	A fish's flesh is denser than water, yet many fish can float while submerged. Explain the reason
7	Is it possible for an ideal insulator to attain thermal equilibrium?
8	How does the internal energy of a solid and an ideal gas depend on the volume?
9	Explain the Entropy change in a reversible adiabatic process
10	Distinguish between the heat engine and refrigerator. Also, give the expression for the efficiency of these?

Section B

All Questions can be answered. Each Question carries 6 marks (Ceiling : 36 Marks)

11	Draw a stress-strain diagram for a ductile metal under tension and explain the following a) Elastic region b) proportional limit c) yield point d) plastic region
12	Find out the total downward force on the floor of a room with a 4.0 m X 5.0 m floor and a ceiling 3.0 m high due to an air pressure of 1.00 atm?
13	Derive a relationship between the pressure p at any point in a fluid at rest and the elevation y of the point
14	Find out the work done by an ideal gas during an isothermal expansion at temperature T, when its volume changes from V1 to V2
15	During an adiabatic expansion the temperature of 0.450 mol of argon (Ar) drops from $66^{.0}$C to 10^0C. The argon may be treated as an ideal gas. A) How much work does the gas do? (b) What is the change in the internal energy of the gas?
16	Show that the total entropy change during any reversible cycle is zero

17	A Carnot engine takes 2000 J of heat from a reservoir at 500 K, does some work, and discards some heat to a reservoir at 350 K. How much work does it do, how much heat is discarded, and what is its efficiency?
18	Obtain the change in entropy during an isothermal expansion of ideal gas
Section C	
Answer any ONE .Each Question carries 10 marks (1x10=10 Marks)	
19	Discuss in detail the working of the refrigerator. Is it possible to cool your house by leaving the refrigerator door open?
20	Explain the working of Carnot's engine. Derive the expression for the efficiency of a Carnot's engine