QP CODE: 21102421

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Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) EXAMINATIONS, OCTOBER 2021

First Semester

Complementary Course - PH1CMT02 - PHYSICS - PROPERTIES OF MATTER AND THERMODYNAMICS

(Common to B.Sc Chemistry Model I, B.Sc Geology Model I)

2017 Admission Onwards

0E3B561E

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Distinguish between elastic limit and yield point.
2. Rigidity modulus is higher for thinner or thicker wire of the same material. Analyze critically.
3. What is a cantilever?
4. Distinguish between uniform and non uniform bending.
5. Small insects can walk on the surface of water. Why?
6. A needle floats on clear water but sinks when some detergents are added to it. Explain why?
7. Explain Stoke's formula.
8. What do you mean by Brownian motion?
9. Define open, closed and isolated Systems.
10. What is an indicator diagram? Give its physical significance.
11. What is meant by the principle of unattainability of absolute zero?
12. Define enthalpy.

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Explain the static torsion method to find the rigidity modulus of a metal rod.

14. Calculate the depression at the free end of a light cantilever loaded by 1.8 kg at the free end of it. It has a length of 1.5 m, breadth 3 cm depth 8 mm. Young's modulus of material of the cantilever is 2×10^{11} N/m^2

15. Calculate the excess pressure inside a drop of mercury of radius 3 mm. Surface tension of mercury is 0.465 N/m and atmospheric pressure is 1.01×10^5 Pa.

16. Define critical velocity of a fluid flow and Reynolds' number. What is its relation with the nature of the flow?

17. At a certain point in a horizontal pipeline the water speed is 2.50 m/s and the gauge pressure is 1.80×10^4 Pa. Find the gauge pressure at a second point in the pipe if the cross sectional area at the point is twice that at the first.

18. Calculate the change in entropy when one mole of a perfect gas undergoing reversible isothermal change.

19. What is an indicator diagram? Show that adiabatic curve is steeper than isothermal curve.

20. A Carnot's engine working between two temperatures 500K and 400K receives 1500 calories of heat from the source in each cycle. Calculate the amount of heat rejected to the Sink. Calculate the efficiency of the engine and the work done by the engine in one cycle.

21. 100g of water at 0^OC is brought in contact with heat reservoir at 100^OC. Find the change in entropy.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Discuss about different types of elasticity and obtain the relation connecting Young's modulus (Y), Bulk modulus (K) and Poisson's ratio (σ).

23. What do you mean by torsional oscillations? Derive an expression to find rigidity modulus of the material using a torsion pendulum.

24. Derive Bernoulli's equation for the streamline flow of liquid. Discuss some applications of Bernoulli's equation.

25. Discuss the working of a Carnot's refrigerator. How is it different from a Carnot engine? Explain.

(2×10=20)