

QP CODE: 23145771



Reg No :

Name :

**B.Sc DEGREE (CBCS) REGULAR/IMPROVEMENT/REAPPEARANCE
EXAMINATIONS, DECEMBER 2023**

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

FA750B06

Time: 3 Hours

Max. Marks : 60

Part A

*Answer any **ten** questions.*

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

1. What is linear strain?
2. What is a cantilever?
3. If length of the cantilever is doubled without changing any other characteristics, then the depression at the loaded end will change by what factor for the same load.
4. Why the beams used in construction of bridges have a cross-section shape of the letter I?
5. Explain the excess pressure of the curved surface.
6. A needle floats on clear water but sinks when some detergents are added to it. Explain why?
7. Define critical velocity.
8. Mention the cause of Brownian motion.
9. What is meant by thermodynamic equilibrium?
10. Distinguish between isothermal and adiabatic process
11. Explain the term internal energy?
12. Name the four principal thermodynamic potentials.

(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. A uniform metal disc of radius 5 cm and mass 1000 g is fixed symmetrically to the lower end of a torsion wire of length 100 cm and diameter 1.2 mm, the upper end of which is fixed. The time period of torsional oscillations is 6 s. Calculate the rigidity modulus of the material of the wire.
15. Prove that surface tension is numerically equal to surface energy.
16. A liquid flows through a horizontal tube of length 0.2 m and internal radius 0.8 mm under a constant pressure head of 0.5 m. In 5 minutes $8.6 \times 10^{-3} \text{ m}^3$ of liquid is flowing out of the tube. If the density of the liquid is 10^3 kg/m^3 , calculate the viscosity of the liquid.
17. Explain Bernoulli's theorem?
18. Calculate the increase in temperature of a gas initially at 30°C if its pressure is suddenly doubled. Given $\gamma=1.4$
19. The efficiency of a Carnot's engine changes from $1/5$ to $1/2$ when the source temperature is raised by 120K. Calculate the temperature of the Sink?
20. State and explain the two versions of Second law of thermodynamics?
21. State and explain third law of thermodynamics and briefly explain the concept of 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. Explain the terms plane of bending and axis of bending. Derive an expression for elevation at the mid-point of beam loaded uniformly on its both end.
24. Derive Stoke's formula. How will you determine the coefficient of viscosity of a liquid by Stoke's method?
25. What is the principle behind the working of a refrigerator? Define coefficient of performance and derive a relation connecting coefficient of performance and efficiency of a carnot's engine. State the second law of thermodynamics.

(2×10=20)