



QP CODE: 18103621



Reg No :

Name :

B.Sc.DEGREE(CBCS)EXAMINATION, DECEMBER 2018

First Semester

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

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

2018 Admission only

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Maximum Marks: 60

Time: 3 Hours

Part A

Answer any **ten** questions.

Each question carries **1** mark.

1. What is normal stress?
2. What do you mean by neutral filament?
3. Distinguish between uniform and non uniform bending.
4. Why the beams used in construction of bridges have a cross-section shape of the letter I?
5. What is the expression for excess pressure inside a soap bubble?
6. Explain the term terminal velocity.
7. What is the effect of viscosity on Brownian motion.
8. What is the effect of temperature and pressure on the viscosity of gases.
9. What is a thermodynamic system?
10. What are the essential parts of a heat engine?
11. Mention the principle involved in the working of a refrigerator?
12. Explain the third law of thermodynamics

(10×1=10)

Part B

Answer any **six** questions.

Each question carries **5** marks.

13. A wire, 4 m long and 0.3 mm in diameter, is stretched by a force of 0.8 kg wt. If the extension in length amounts to 1.5 mm, calculate the energy stored in the wire.
14. What couple must be applied to the free end of a wire of length 0.80 m and radius 6 mm to produce a twist of 600 at the free end while the other end is fixed. Rigidity modulus of the material of the wire is $13.55 \times 10^{10} \text{ N/m}^2$.
15. Calculate the loss of energy when 27 drops of water each of radius 0.6 mm coalesce to form a single drop. Surface tension of water is $72 \times 10^{-3} \text{ N/m}$.





16. A flat glass plate of area $4.2 \times 10^{-3} \text{ m}^2$ is separated from another large plate by a layer of glycerine of thickness 2 mm. If the coefficient of viscosity of glycerine is 2 Ns/m^2 , what is the force required to keep the plate moving with a velocity $5 \times 10^{-2} \text{ m/s}$.
17. Describe constant pressure head method to determine the viscosity of a liquid.
18. One mole of hydrogen at 23°C is isothermally expanded until its pressure reduces to $1/4^{\text{th}}$ of its initial value. Calculate the work done?
19. Define adiabatic process. Derive the relation between pressure and volume of a gas undergoing adiabatic changes?
20. State and explain Zeroth and first law of thermodynamics?
21. State and explain the two versions of Second law of thermodynamics?

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **10** marks.

22. What do you mean by Rigidity modulus of the material? Explain with necessary theory how rigidity modulus of material, taken in the form of a rod, can be determined using static torsion apparatus.
23. What you do understand by Young's modulus of the material? Derive the expression for the depression at the free end of the cantilever heavily loaded at free end.
24. Explain the different factors affecting surface tension and discuss various applications of surface tension.
25. Derive Maxwell's thermodynamical relations. Give its Physical Significance.

(2×10=20)

