QP CODE: 19103021

B.Sc.DEGREE(CBCS)EXAMINATION, NOVEMBER 2019

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

D2040933

Time: 3 Hours

Maximum Marks :60

Part A

*Answer any **ten** questions.*

Each question carries 1 mark.

1. What is stress?

2. What is compressibility of materials?

3. Explain the term torsional rigidity of material.

4. The value of rigidity modulus for the material of the same wire obtained by dynamical method will be a trifle higher than that obtained by statical method. Why?

5. Small insects can walk on the surface of water. Why?

6. Why are tiny liquid drops spherical in shape?

7. Write down Poiseuille's equation and explain the symbols.

8. Mention any two applications of Stoke's equation.

9. Differentiate closed and isolated system?

10. Distinguish between isothermal and adiabatic process

11. Explain the term internal energy?

12. Why adiabatic process is known as isentropic process?

$(10 \times 1=10)$

Part B

*Answer any **six** questions.*

Each question carries 5 marks.

13. A cylindrical metal bar having length 24 cm and diameter 4 cm is suspended by a wire 50 cm long such that the axis of the bar is horizontal. It is observed that the arrangement makes 100 torsional oscillations in 235.9 sec. Determine the coefficient of rigidity of the material of the wire. Density of the material of the bar 9000 kg/m³ and radius of the wire is 0.1 cm.

14. Compare the loads required to produce equal depression for two beams of the same material, length and weight when one has a circular cross section and the other has a square cross section under uniform bending.

15. What are the factors affecting surface tension?

16. Distinguish between streamline flow and turbulent flow.

17. Explain Bernoulli's theorem?

18. Derive the relation between volume and temperature of a gas undergoing adiabatic changes?

19. A Carnot engine working as a refrigerator between -3^0C and 27^0C receives 500J of heat from the reservoir at the lower temperature. Calculate the amount of heat rejected to the reservoir at the high temperature. Calculate also the amount of work done in each cycle to operate the refrigerator.

20. A Carnot's refrigerator takes 80J heat from water at 0^0C and discards it to room temperature at 27^0C. How much heat is discarded to the room? What is the work done by the refrigerator in the process? What is the coefficient of performance of the machine?

21. One gram molecule of a gas expands isothermally to three times its original volume. Calculate the change in entropy. R= 8.3 J/mole/K.

(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. Explain the terms neutral surface and neutral axis. Derive an expression for bending moment of a beam.

24. Discuss Poiseuille's method of determining the viscosity of liquid by constant pressure head method.

25. Derive Maxwell's thermodynamical relations. Give its Physical Significance.

(2×10=20)