

D 93943

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Name.....

Reg. No.....

**FIRST SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020**

Physics

PHY 1C 01—PROPERTIES OF MATTER AND THERMODYNAMICS

(2019 Admissions)

Time : Two Hours

Maximum : 60 Marks

The symbols used in this question paper have their usual meanings.

Section A (Short Answer Type)

*Answer at least **eight** questions.*

Each question carries 3 marks.

All questions can be attended.

Overall Ceiling 24.

1. What do you mean by the term Poisson's ratio ? What are its limiting values ?
2. What do you mean by uniform bending ? How can you achieve uniform bending in a beam ?
3. Compare the couple required for a twist in a hollow and a solid cylinder.
4. What are the two forces that govern the shape of a liquid drop ? Why a larger drop assumes flat shape ?
5. Write down the Newton's law of viscous flow of liquids. Explain the terms involved.
6. What is Brownian motion ?
7. Write down the expression for an isothermal and an adiabatic processes.
8. What do you mean by a quasistatic process ?
9. Explain the first law of thermodynamics.
10. What do you mean by the co-efficient of performance of a refrigerator ?
11. Entropy of an irreversible always increases. Why ?
12. What is the effect of pressure on boiling point of a liquid ? Give an example where it is applicable.

(8 × 3 = 24 marks)

Turn over

Section B (Paragraph/Problem Type)

Answer at least five questions.

Each question carries 5 marks.

All questions can be attended.

Overall Ceiling 25.

13. A wire of radius 1 mm is bent to a circle of radius 20 cm. Determine the bending moment. Given, the Young's modulus of the material of the wire is 200 GPa.
14. Calculate the depression at the free end of a light beam loaded by 2 kg at its free end. The length, breadth and depth of the beam are 1.2 m, 3 cm and 9 mm, respectively. Given, the Young's modulus of the material of the beam is $1.9 \times 10^{11} \text{ Nm}^{-2}$.
15. Calculate the work done in twisting a wire through an angle θ assuming the couple per unit twist of the wire as c .
16. Determine the energy released when 8 droplets of water of radius 0.5 mm coalesce to form a single drop. Give, the surface tension of water is 0.072 Nm^{-1} .
17. Prove any statement of the Carnot's theorem.
18. Given, the temperature inside and outside a refrigerator are 273 K 303 K, respectively. Determine the heat delivered to the surroundings for every joule of work done assuming the refrigerator cycle to be reversible.
19. Calculate the change of entropy when 2 kg of water at its boiling point is converted into steam at the same temperature. Given, the specific latent heat of steam is $226 \times 10^4 \text{ J/kg}$.

(5 × 5 = 25 marks)

Section C (Essay Type)

Answer any one question.

The question carries 11 marks.

20. Obtain an expression for the excess pressure inside a liquid drop.
21. Discuss the Carnot's cycle using a neat PV diagram. Obtain an expression for the efficiency.

(1 × 11 = 11 marks)