Reg. No. : ....

Name : ....

V Semester B.Sc. Degree (C.B.C.S.S. – Supplementary) Examination, November 2023
(2017 and 2018 Admissions)
CORE COURSE IN PHYSICS
5B07PHY : Thermal Physics

Time : 3 Hours

Max. Marks : 40

Instruction : *Write answers in* **English only.**

SECTION – A

(Answer **all** the questions – Very short answer type – **Each** carries **1** mark). **(4×1=4)**

1. The first law of thermodynamics is the law of conservation of

2. According to Maxwell Boltzmann distribution particles are

3. During an irreversible process the entropy of the system

4. The minimum volume of a phase cell is of the order of

SECTION – B

(Answer **any 7** questions – Short answer type – **Each** carries **2** marks). **(7×2=14)**

5. Explain the term internal energy.

6. Define coefficient of performance of a refrigerator.

7. Name the four thermodynamic potentials.

8. State law of equipartition of energy.

9. Define thermodynamic equilibrium.

10. Distinguish between intensive and extensive parameters. Give examples.

11. Write down any four postulates of kinetic theory of ideal gas.

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12. Explain second law of thermodynamics.

13. What is meant by Gibb's function ? Give its mathematical expression.

14. Define reversible process. What are the conditions under which a process is reversible ?

SECTION – C

(Answer **any 4** questions – Short essay/problem type – **Each** carries **3** marks). **(4×3=12)**

15. The temperature inside and outside a refrigerator are 273 K and 303 K respectively. Assuming that the refrigerator cycle is reversible calculate the heat delivered to the surroundings for every joule of work done.

16. A Carnot engine is working between 300°C and 1000°C. Calculate the increase in efficiency if temperature of the source is raised by 200°C.

17. Considering one mole of a perfect gas undergoing reversible isothermal change calculate the change in entropy.

18. Calculate the rate at which energy is radiated per unit area of a black body at 500 K. Given Stefan's constant $\sigma = 5.67 \times 10^{-8}$ W/m^{-2}K^{-4}.

19. Calculate the increase of entropy when 1g of water is heated for 0° C to 100°C. Given specific heat capacity of water = 4200 JKg^{-1}K^{-1}.

20. One mole of a gas at 92°C expands isothermally until its volume is doubled. Calculate the work done.

SECTION – D

(Answer **any 2** questions – Long essay type – **Each** carries **5** marks). **(2×5=10)**

21. Explain briefly black body radiation and Planck radiation law.

22. What is T-S diagram ? Derive the expression for efficiency of a Carnot engine using T-S diagram of Carnot cycle.

23. Explain the principle of a two stroke engine.

24. What is an isothermal process ? Derive the expression for work done in an isothermal process.

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