DOON UNIVERSITY, DEHRADUN
School of Physical Sciences
End Semester Examination: Third Semester, 2023-24
B.Sc Hons. (Physics) with research
Course: PHC-202: Thermal Physics

Time Allowed: 2Hours   *Maximum Marks: 30*

SECTION: A   *(Marks: 1.5X6=09)*

1. What do you understand by the internal energy of an isolated system? How it can be varied?

2. What do you understand by the entropy of a system?

3. Draw a Carnot cycle on *PV* diagram and explain the plot.

4. Write down Clausius clapeyron equation.

5. What do you understand by the unattainability of absolute zero? How it violates the second law of thermodynamics?

6. What are the limitations of first law of thermodynamics that are overcome in second law?

SECTION: B (Attempt any 3 questions)   *(Marks 3X3=09)*

7. Derive an expression for the entropy change during a Carnot cycle.

8. Calculate the change in entropy when 1g ice is converted into steam at atmospheric pressure. Given that specific heat capacity of water = 4200 $JK^{-1}kg^{-1}$, latent heat of ice = $3.36 \times 10^5 Jkg^{-1}$ and latent heat of steam = 2.26 x 106 Jkg-1.

9. What is Gibb's free energy G. Deduce one maxwell relation from G.

10. Explain Third Law of thermodynamics and Nernst heat theorem in terms of entropy and disorder.

SECTION: C   *(Marks: 6X2=12)*

11. State the basic assumptions of the kinetic theory of an ideal gas and show that the pressure exerted by an ideal gas is two third of its kinetic energy per unit volume. Also explain what are average speed, root meansquare speed and Most probable speed.

12. Derive maxwell's all four thermodynamic relations.