Government General Degree College, Chapra

Internal Assessment- 3rd Semester, 2021-22

Physics- General

Paper: PHY-G-CC-T-03

Total Marks: 15 Time: 40 minutes

Answer any three questions only:

1. Write Stefan's law related to radiation. How Newton's law of cooling is obtained from it? Write down Planck's law of black body radiation. 2+2+1

2. Define Thermal Conductivity and Thermometric conductivity. What will be the change in entropy if 5g of ice at 0^oC is converted completely into water at 0^oC? (Latent heat of fusion 80 cal/g). 2+3

3. What is meant by internal energy of a gas? Is this a state function? Under what conditions a process will be reversible? When will the efficiency of Carnot Engine be 100%? 1+ 1+1+2

4. Define entropy. What is its physical significance? A Carnot's engine works between two sources at 127 ^OC and 27 ^OC. In a complete cycle it rejects 1260 Joule of heat. How much work is obtained in complete cycle? 1+1+3

5. Define average velocity and r.m.s velocity of gas molecules. Keeping pressure unchanged, at what temperature the r.m.s. speed of nitrogen will be double of its r.m.s. speed at N.T.P.? 2+3

6. State the principal of equipartition of energy. Define degrees of freedom. For a diatomic gas, how many transitional degrees of freedom are there? What is Boyel temperature? 2+2+1

7. Prove that the ratio of two specific heats of a gas is $\gamma = 1 + \frac{2}{n}$, where n is the number of degrees of freedom. Explain, how water remains under ice slab in polar region. 3+2

8. What is a perfect black body? Draw the energy distribution curve of black body radiation for two different temperatures. Draw Fermi-Dirac distribution function at temperature T = 0K and T ≠ 0K. What do you mean by phase-space? 1+1+2+1