2021
B.A./B.Sc.
Third Semester
CORE – 6
PHYSICS
Course Code: PHC 3.21
(Thermal Physics)

PART–B
Total Mark: 30

Answer the following questions.

1. (a) Starting from the expression for the pressure exerted by an ideal gas, derive the equation of state for it. 3
   (b) Calculate the values of molar heat capacity C_p and C_v of a gas if ratio of heat capacities is 1.49. Given $R = 8.3$ j/mole/k 3

2. (a) Obtain the reduced equation of state of real gases. How does this equation lead to the law of corresponding states? 4
   (b) What do you understand by the term temperature inversion? How is it different from critical temperature? 2

3. (a) A cylinder is filled with a gas. The cylinder has a movable piston. If 1000 calories of heat is supplied to the gas, find the increase in internal energy if the external work done is 200 joule. 2
   (b) Describe Carnot's reversible heat engine and calculate its efficiency. 4

4. (a) Explain how the concept of entropy leads to second law of thermodynamics. 3
   (b) Calculate the change in entropy when 10 gm of ice at $0°C$ is converted into water at the same temperature. (Given that latent heat of ice is 80 cal/gm). 3

5. (a) Briefly discuss the conditions of equilibrium of a system under adiabatic-isochoric condition. 2
   (b) Starting from the four thermodynamic potentials, discuss the four Maxwell's thermodynamic relation. 4
