End Sem(III) —
Phy (GE – 3)

2021

Time : 3 hours

Full Marks : 75

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

(Compulsory)

1. Answer in very short of the following questions : 1×10 = 10

   (a) Internal energy of a system consist of two energies. Name the two energies.

   (b) Which remains constant in isochoric process ? Vol.

   (c) Why C_p is greater than C_v ?

   (d) Write down the formula of entropy and its unit.

(e) Write down the formula of Clausius-Clapeyron equation.

(f) What is transferred in the transport phenomena of viscosity ?

(g) By the principle of equipartition of energy, what is the value of mean kinetic energy per degree of freedom of a gas molecule ?

(h) In the equation $E = h\upsilon$, what is 'h' called ?

(i) What is energy density ?

(j) If 'T' is the absolute temperature of a gas, η is its coefficient of viscosity then what is relation between them ?

2. Answer any **one** short answer type question :

$5 \times 1 = 5$

(a) Draw the (P – V) diagram of Carnot's ideal reversible engine and its different processes. Also draw the essential parts of Carnot's engine and name them.

(b) What are the transport phenomena ? Explain.

Group – B

Answer any **four** questions of the following : $15 \times 4 = 60$

3. Describe construction working and theory of Carnot's reversible heat engine of an ideal gas. Also calculate the efficiency of Carnot's engine.

4. Define the two specific heat of gases. Why C_p is greater than C_v ? Prove the formula $C_p - C_v = R$ where 'R' is gas constant. Also calculate the work done during an isothermal process.

5. What are thermodynamic potentials ? Describe the four Maxwell's relations and explain.

6. Derive Stefen Boltzmann law of black body radiation using the laws of thermodynamics.

7. Derive Bose-Eienstein Distribution Law.

8. Applying the law of equipartition of energy, derive expression for C_p and C_v and also find the value of the ratio of two specific heat capacity of monoatomic and diatomic gases.