PC-734/MH

BS-2051

STATISTICAL PHYSICS AND THERMODYNAMICS-II

(Semester–IV)

Time : Three Hours] [Maximum Marks : 30

Note : Attempt *two* questions each from Section A and B. Section C will be compulsory.

SECTION–A

I. State and explain second law of thermodynamics in different forms. 5

II. What do you mean by Thermocouple ? Obtain an expression for Peltier coefficient. 5

III. What do you mean by heat-death of universe ? 5

IV. Explain why Carnot's heat engine cannot be realised in actual practice. 5

SECTION–B

V. Using Maxwell's Thermodynamic relations, find the Clapeyron equation of change of state. 5

VI. Starting from four Thermodynamic potentials, derive Maxwell's Thermodynamic relations. 5

VII. Discuss the liquefication of Helium using the principle of regenerative cooling. 5

VIII. Discuss the variation of internal energy with volume for real gas using Maxwell's thermodynamic relations. 5

SECTION–C

IX. Attempt any *five* parts :

(a) Why a reversible heat engine cannot have 100% efficiency ?

(b) What is the significance of $\Delta S \geq 0$?

(c) What is temperature of inversion ?

(d) Define Thomson coefficient.

(e) What is significance of S-T diagram ?

(f) What is quasi-static process ?

(g) Differentiate between Refrigerator and heat pump.

(5×2=10)