Roll No. …..……... **Total Pages: 02**

PC 1230/MH

BS/2058

STATISTICAL PHYSICS AND THERMODYNAMICS-II

Paper-I

Semester-IV

Time Allowed :Three Hours] [Maximum Marks : 30

Note : The candidates are required to attempt ***two*** questions each from Sections A and B carrying 5 marks each and ***five*** from Section C consisting of 7 short answer type questions carrying 2 marks each.

SECTION—A

1. What is entropy ? Obtain the relationship between entropy and amount of heat given to the system. 5

2. State and explain law of increase of entropy. 5

3. Obtain the equation of state of an ideal gas from simple statistical considerations. 5

4. Discuss the thermodynamics of a thermocouple and obtain expression for thermodynamic e.m.f. and Peltier coefficient. 5

SECTION—B

5. Derive Maxwell's thermodynamic relations. 5

6. Show that cooling is caused when a metal wire is stretched. 5

7. Using Maxwell's thermodynamic relations, find the Expression for $(C_p - C_v)$ for 1 mole of an ideal gas. 5

8. Discuss the liquefaction of Helium using the principle of regenerative cooling. 5

SECTION—C

(Attempt any **five** parts.)

9. (a) What is significance of thermodynamic potentials ?
   (b) What is the importance of S-T diagram ? Give one example.
   (c) What is thermo-magnetic effect ?
   (d) What do you mean by heat death of universe ?
   (e) Why a reversible heat engine can not have 100% efficiency ?
   (f) What are intensive parameters ? Give two examples.
   (g) Define third law of Thermodynamics.

5x2=10