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Total No. of Printed Pages: [1]

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B.Sc. (Non-Medical) (Semester – 3rd)
THERMAL PHYSICS AND STATISTICAL MECHANICS
Subject Code: BSNMS1-301
Paper ID: [22131413]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a) State and give interpretation for the laws of thermodynamics.
- b) Prove that the efficiency of all reversible engines working between same temperatures are same.
- c) Define the term entropy and signify it with its physical interpretation.
- d) Explain radiant energy & its properties.
- e) What is Partition Function?
- f) Formulate the expression for distribution of velocity.
- g) One mole of hydrogen gas is mixed with one mole of nitrogen at the same temperature. Will the change in entropy be positive, negative or zero?
- h) Explain the term mean free path?
- i) What is the absolute scale of temperature?
- j) Define the terms C_p & C_v .

Section – B

(5 marks each)

- Q2. State the Stefan's law of black body radiation & derive its equation.
- Q3. What do you understand by thermodynamic probability? How it is related to the entropy of the system? Establish the necessary relation.
- Q4. Distinguish in between M-B statistics, F-D statistics, B-E statistics.
- Q5. Calculate the change in entropy of liquid when heated from temperature T_1 to T_2 .
- Q6. Define specific heat capacity, latent heat & derive the equation of Mayer law.

Section – C

(10 marks each)

- Q7. Derive the Maxwell's relationship.
- Q8. Define Isothermal Process and explain the terms
 - (a) Ice point.
 - (b) Triple point.
 - (c) Steam point.
 - (d) Sulphur point.
 - (e) Gold point.
- Q9. State & Derive Clausius Clapeyron equation.