Roll No. | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

B.Sc (Non Medical) (2018 Batch) (Sem.–3)

THERMAL PHYSICS

Subject Code : BSNM-304-18

M.Code : 76903

Time : 3 Hrs. **Max. Marks : 50**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying ONE marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) Define first law of thermodynamics and give its physical significance.

b) State principle of increase of entropy. What does it conclude?

c) A Carnot's engine whose low temperature reservoir is at 7°C has an efficiency of 40%. To increase the efficiency to 50% by how many degrees should the temperature of the source be increased?

d) Write four Maxwell's thermodynamic relation in terms of thermodynamic potentials.

e) Differentiate between Joule-Thomson and adiabatic cooling.

f) What do you understand by adiabatic demagnetization?

g) What do you understand by accessible and inaccessible energy state of a statistical system?

h) What the law of thermodynamics says about thermal equilibrium between two thermodynamic systems?

i) Mention the statistical interpretation of second law of thermodynamics.

j) Differentiate between bosons and fermions.

SECTION-B

2. Discuss the equivalence of Kelvin and Clausius statements of second law of thermodynamics.

3. Derive the relationship between Thermodynamic and gas scale of temperature.

4. Use Maxwell's thermodynamic relation to derive Clausius-Clapeyron equation.

5. Explain in detail microstates and macrostates for a system of non-interacting particles.

6. Deduce Planck's radiation law by applying Bose-Einstein statistical approach to a radiating system.

SECTION-C

7. a) Derive the expression for entropy of a perfect gas.

   b) Write a short note on the production and measurement of very low temperatures.

8. Explaining the concept of probability and thermodynamic probability, derive the expression for probability distribution. Also show its narrowing with increasing number of particles.

9. a) Explain in detail the M-B, B-E and F-D distribution functions and conditions for their applications.

   b) Calculate the surface temperatures of the sun and moon. Given that wavelength of maximum intensity emission (λ_m) is 573Å and 14μm for sun and moon respectively.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.