MAULANA AZAD NATIONAL URDU UNIVERSITY
Faculty of Science, Department of Physics
Questions for Semester Exam
THERMAL PHYSICS

UNIT : LAWS OF THERMODYNAMICS

(LQ)

Q1. Derive the expression for efficiency of Carnot Engine
Q 2. Derive Carnots Theorem
Q3. Describe the Kelvin Scale of Temperature and its significance
Q4. Compare and show the equivalence of the Kelvin & Clausius Statements of the second law of thermodynamics.

(SQ)

Q1. State the First law of thermodynamics
Q2. Define Entropy and state the second law of thermodynamics in terms of entropy
Q3. Calculate entropy change in free expansion
Q4. What is internal and external work?
Q5. Differentiate between isothermal and adiabatic processes
Q6 Define entropy and write a note on entropy change in reversible and irreversible processes.
Q7. What is latent heat? Derive Clausius Clayperon Equation for the change of state from solid to liquid.

UNIT: THERMODYNAMIC POTENTIALS

LQ

Q1. What are thermodynamic potentials. Derive Maxwells equations for them.
Q2. What is the Joule-Kelvin Effect? Find its value for real and perfect gases.
Q3. State Stefans law of black-body radiation and prove it from thermodynamic principles
Q4. Prove Maxwells thermodynamic relations

SQ

Q1. Derive Clausius Clayperon Equation from thermodynamic relations.
Q2. Prove $C_p - C_v = R$
Q3. Prove $C_p/C_v = \gamma$
Q4. Prove Gibbs-Helmholtz relation

UNIT: QUANTUM THEORY OF RADIATION

LQ

Q1.Prove Rayleigh-Jeans Law
Q2. Prove Planks law of black body radiation

SQ

Q1. What is a perfect black body? Show how it can be realised experimentally?
Q2. Derive Rayleigh Jeans law from Planks law
Q3. Derive Wiens law from Planks law
Q4. Derive Wiens displacement law from Planks law
Q5. Derive Stefans law from Planks law

UNIT: KINETIC THEORY OF GASES

LQ

Q1. State and derive Maxwells law of distribution of velocities

Q2. What is mean free path? Derive an expression for it and prove its dependence on temperature and pressure.
Q3. What are transport phenomena? Derive an expression for conductivity
Q4. What are transport phenomena? Derive an expression for viscosity
Q5. What are transport phenomena? Derive an expression for diffusion

SQ

Q.1 What is the relation between average, most probable and rms speed of molecules in a gas
Q2. What is mean free path? Derive an expression for it
Q3.What are transport phenomena. Describe three such phenomena.

UNIT:ELEMENTS OF STATISTICAL MECHANICS

LQ

Q1. Derive an expression for Fermi-Dirac Statistics
Q2. Derive an expression for Bose-Einstein Statistics
Q3. Derive an expression for Maxwell-Boltzman Statistics

SQ

Q1. What are microstates?
Q2. What is an ensemble?
Q3. What are the SI units of Stefan-Boltzmann's Constant?
Q4. What are bosons?
Q5 What are fermions?
Q6. What is number of microstates in the equilibrium state?