

Question bank of BSC MPCs V Sem

Sub: Physics

Paper: III

Subject: Thermo dynamics

UNIT: I

Long answer type questions.

1. Derive an expression for work done in isothermal and adiabatic process.
2. Describe Carnot's engine and derive an expression for its efficiency with a neat diagram and graph.
3. State and prove Carnot's theorem. Establish the thermodynamic scale of temperature using it.
4. Derive an expression for the Maxwell's distribution of molecular speeds in a gas.
5. What are postulates of kinetic theory of gases? Derive an expression for the coefficient of conductivity on the basis of kinetic theory of gas.
6. Derive expressions for the thermal conductivity and viscosity of a gas on the basis of kinetic theory of gases. Hence, obtain the relation between the two.
7. Define Entropy? What is the physical significance of entropy? Write a note on entropy changes in reversible and irreversible process.
8. Obtain an expression for the efficiency of a Carnot's engine using the temperature (T-S) diagram.
9. Explain the change of Entropy in a perfect gas.
10. Explain the change of Entropy when ice changes into steam.

Short answer type questions.

1. State and explain first law of thermodynamics.
2. State and explain second law of thermo dynamics.
3. Define and explain the term entropy.
4. What is T-S diagram. Draw a T-S diagram for reversible carnot's cycle.
5. Show that the change of entropy in a reversible cycle is zero.
6. Explain how entropy is related to disorder.

UNIT:II

Long answer type questions.

1. What are thermodynamic potentials? Derive Maxwell's thermo dynamic equations using them.
2. What is Joule-Kelvin effect. Derive an expression for Joule-Kelvin effect for a ideal gas obeying Vander Waal's equation. How does it depend on temperature of the gas?
3. Write an essay on liquefaction of gases.

4. Explain with theory the adiabatic demagnetization method for producing very low temperature.
5. Explain the principle of refrigeration and Vapour compression type.
6. Derive the ratio of specific heats and difference of two specific heats for a perfect gas.
7. Derive Clausius- Clayperon's equation.

Short answer type questions.

1. Explain the principle of refrigeration.
2. Explain the Principle of regenerative cooling.
3. Write a short note on adiabatic demagnetization.
4. List out the thermo dynamic potentials.
5. Distinguish between adiabatic and Joule Thomson expansion.

UNIT:III

Long answer type questions.

1. Derive Planck's radiation law of a black body radiation and deduce different laws from it.
2. What are pyrometers? Describe Fery's total radiation pyrometer with diagram .Explain how it is determined the temperature of a hot body.
3. Deduce Wein's displacement law.
4. Explain how temperature of the sun is calculated.
5. Explain the working of Disappearing filament of a optical pyrometer
6. Explain the quantum theory of radiation.

Short answer type questions.

1. Deduce Stefan's law from Planck's radiation formula.
2. What is Angstrom Pyroheliometer ?
3. What is Solar constant.
4. Deduce Stefan's law from Planck's law.
5. Explain Rayleigh-Jeans law.

UNIT:IV

Long answer type questions.

1. Explain Bose-Einstein distribution law mathematically? Apply it to a photon gas to obtain the energy distribution.
2. Give a comparison of Maxwell Boltzmann, Bose-Einstein and Fermi-Dirac Statistics.
3. Explain the molecular energies in a ideal gas.
4. Explain the application of Fermi-Dirac statistics to whitdwarfs and neutron stars.

5. What are the postulates of statistical mechanics. www.FirstRanker.com

Short answer type questions.

1. Define the terms phase space and ensemble.
2. Explain the differences between classical and quantum Statistics .
3. Explain the concept of probability.
4. Explain the terms phase cell, phase space, Types of Ensemble.
5. What are Neutron Stars.

www.FirstRanker.com