

Question Bank

Program : Mechanical Engineering

Course – Thermal Engg. (TEN)

Semester: ME3I

Course Code- TEN (22337)

Unit 1 Fundamentals of Thermodynamics

Questions for 2 marks

- (i) Define system and list the types of systems
- (ii) Define open system and close system giving examples.
- (iii) Define (a) Enthalpy (b) Entropy
- (iii) Define (a) Internal energy (b) Flow work
- (iv) Define intensive and extensive property giving examples
- (v) Define (i) Potential energy (ii) Kinetic energy

Questions for 4 marks

- (i) State and explain Kelvin Plank's Statement of Second Law of thermodynamics.
- (ii) State and explain Clausius Statement of Second Law of thermodynamics.
- (iii) Differentiate open system and close system
- (iv) State the limitations of First law of thermodynamics
- (v) State and explain Zeroth Law of thermodynamics
- (vi) State (a) First law of thermodynamics (b) Zeroth Law of thermodynamics
- (vii) Write Steady Flow Energy Equation. State the significance of each term in it.
- (viii) Write Steady Flow Energy Equation for (a) Boiler (b) Condenser (c) Compressor (d) Turbine

Unit 2 Ideal Gases and Ideal Gas Processes

Questions for 2 marks

- (i) State (a) Boyle's law (b) Charles's law

- (ii) State Avogadro's Law
- (iii) Define ideal gas and state the assumptions made for ideal gas.
- (iv) Represent the following processes on P-V and T-S diagram
 - (a) Isobaric process (b) Isochoric process
- (v) Represent the following processes on P-V and T-S diagram
 - (a) Adiabatic process (b) Isothermal process

Questions for 4 marks

- (i) A closed vessel contains 3 Kg of carbon dioxide at a temperature 20°C and pressure of 0.8 bar. Heat is supplied to the vessel till the gas acquires a pressure of 1.4 bar. Calculate (a) Final temperature (b) Work done on or by the gas (c) Heat added (d) Change in internal energy
- (ii) 4 Kg of an ideal gas is expanded from a pressure of 8 bar and volume 1.5 m^3 to a pressure of 1.5 bar and volume 4.5 m^3 . The change in Internal energy is 525 KJ. $C_v = 1.047\text{ KJ/Kg K}$. Calculate (a) Gas constant (b) Change in enthalpy (c) Initial and final temperatures
- (iii) A gas expands adiabatically from a pressure and volume of 8 bar and 0.04 m^3 respectively to a pressure of 1.4 bar. Determine (i) Final volume (ii) Work done (iii) Change in internal energy

Assume $C_p = 1.046\text{ KJ/Kg K}$ $C_v = 0.752\text{ KJ/Kg K}$

- (iv) Difference between Isobaric and Isothermal process
- (v) Difference between Isentropic and Isothermal process

UNIT 3 Steam and Steam Boilers

Questions for 2 marks

- (i) Define (a) Dryness fraction (b) Degree of superheat
- (ii) Define : (i) Superheated steam (ii) Dry saturated steam
- (iii) State the function of the following : (a) Superheater (ii) Economiser
- (iii) State the function of the following : (a) Air preheater (ii) Feed Pump
- (iv) Define boiler draught and state its significance
- (v) Mention the function of (a) Fusible plug (b) Steam stop valve

Questions for 4 marks

- (i) Differentiate between boiler mountings and boiler accessories

(ii) Differentiate between Fire tube boiler and Water tube boiler

(iii) Give the classification of boilers

(iv) State the advantages of water tube boilers and list any two names of water tube boiler

(v) Draw the well labeled sketch of Babcock and Wilcox boiler

(vi) Draw the well labeled sketch of Lamont boiler

Type equation here.