SHORT ANSWER QUESTIONS

Define extensive property?
Distinguish between different types of systems with examples?
State Clausius Statement of Second law of thermodynamics?
Define partial pressure?
What is the available energy in a system?
What is Throttling process?
State the expression for Vander wall's equation and determine the constants?
What is mean by triple point?
Define specific humidity?
What are the process of Ericsson cycle?
why does free expansion have zero work transfer?
State the thermodynamic definition of work?
Define heat engine?
Mention the various process of Lenoir cycle?
What is meant by saturated steam?
Define Latent heat?
State the Boyle's law?
Define Mole fraction?
What is swept volume?
What unit of refrigeration?
Define thermodynamics?
Mention different thermodynamic systems?
Define first law of thermodynamics?
Define the Kelvin Planck statement of Second law of thermodynamics?
What is compressibility factor?
What is meant by Mass fraction?
Define an ideal gas?
What is meant by the enthalpy of a mixture of ideal gases?
Define a Cycle?
For a given compression ratio which is more efficient either Otto cycle or Diesel cycle?
Define a Control volume?
What is meant by thermodynamic equilibrium?
What is Perpetual Motion Machine of first kind – PMM1?
Define enthalpy?
In general, what are the three phases of a pure substance?
Define Triple Point?
What is compressibility factor?
Define Partial pressure?
Write the relation between specific heats and adiabatic index?
What is mean by mean effective pressure?

LONG ANSWER QUESTIONS

Sketch the constant volume gas thermometer and explain
Describe briefly thermodynamic systems
State and prove Clausius inequality.
Bring out the concept of entropy and importance of TS diagram?
Explain the phase transformation process with diagram?
Describe with neat sketch P-T Diagram or Triple point
Explain about the Gravimetric analysis
Explain the properties of mixture of Ideal gases i) Gas constant ii) Molecular weight
Derive an expression for the efficiency of sterling cycle
Derive an expression for the air standard efficiency of diesel cycle
A stationary mass of gas is compressed without friction from an initial state of 0.3 m3 and 0.105 MPA to a final state of 0.15 m^3 and 0.105Mpa, the pressure remaining constant during the process. There is a transfer of 37.6kJ of heat from of heat from the gas during the process. How much does the internal energy of the gas change?
Differentiate between microscopic approach and macroscopic approach
Describe with neat sketch P-T Diagram or Triple point
Define the term irreversibility process and Reversible process give an example of each?
Explain Throttling process with neat sketch
Describe with neat sketch the Phase transformation process
A Vessel of 0.35 m^3 capacity contains 0.4 kg of Carbon monoxide (molecular weight = 28) and 1 kg of air at 20^0C. Calculate i) The partial pressure of each constituent ii) The total pressure in the vessel. The gravimetric analysis of air may be taken as 23.3% Oxygen (molecular weight = 32) and 76.7% nitrogen (molecular weight = 28)
Explain about the Gravimetric analysis
Make comparison of Otto, Diesel, and Dual combustion cycles with respect to i) Efficiency vs Compression Ratio ii) For the same compression ratio and the same heat input
Derive an expression for the efficiency of Ericsson cycle
Explain the Quasi-Static process with a neat sketch
Derive an expression for Steady flow energy equation and what are the assumptions made
Explain with the help of a neat sketch the process of Free Expansion
When a stationary mass of gas was compressed without friction at constant pressure, its initial state of 0.4 m^3 and 0.105Mpa was found to change to find state of 0.20 m^3 and 0.105Mpa. There was a transfer of 42.5 kJ of heat from the gas during the process. How much did the internal energy of the gas change?
With help of a P-T diagram explain Clausius- Clapeyron equation
Describe with neat sketch P-V-T surfaces
Explain the Compressibility chart
Explain the Avogadro's law

Derive an expression for the air-standard efficiency of Diesel cycle

The stroke and cylinder diameter of a compression ignition engine are 250 mm and 150 mm respectively. If the clearance volume is 0.0004 m^3 and fuel injection takes place at constant pressure for 5% of the stroke, determine the efficiency of the engine. Assume the engine working on the diesel cycle

Air contained in the cylinder and piston arrangement comprises the system. A cycle is completed by four process 1-2, 2-3, 3-4 and 4-1.
The energy transfers are listed below.
Complete the table and determine the network in kJ. Also check the validity of the first law of thermodynamics.

Process	Q (kJ)	W (kJ)	ΔU (kJ)
1-2	40	?	25
2-3	20	-10	?
3-4	-20	?	?
4-1	0	+8	?

Explain with a neat sketch Pdv work or Displacement work

Explain with a neat sketch the Joule's Experiment

In a gas turbine unit, the gases flow through the turbine is 15 kg /sec and the power developed by the turbine is 12000KW. The enthalpies of gases at the inlet and outlet are 1260 KJ/kg and 400 KJ/kg respectively, and the velocity of gases at the inlet and outlet are 50 m/s and 110 m/s respectively.

Calculate the state of steam i.e. Whether it is wet, dry or superheated for following cases

(i) Steam has a pressure of 15 bar and specific volume of 0.12 m^3/kg

(ii) Steam has a pressure of 10 bar and temperature 200^{0}C

(iii) Steam has a pressure of 30 bar and if 2700 KJ/kg of heat is required to generate steam

Explain the properties of mixture of Ideal gases i) Gas constant ii) Molecular weight

Explain the Volumetric analysis of a gas mixture

The volume analysis of gas and other data are as follows:

Constituent	Percentage	Molecular Weight
Oxygen	23.14	32
Nitrogen	75.53	28
Argon	1.28	40
Carbon dioxide	0.05	44

Calculate i) Gas constant for air and ii) Apparent molecular weight

Compare the dual, diesel and otto cycles?

The swept volume of a diesel engine working on dual cycle is 0.0053 m^3 and clearance volume is 0.00035 m^3. The maximum pressure is 65 bar. Fuel injection ends at 5% of the stroke. The temperature and pressure at the start of the compression are 80^{0}C and 0.9 bar. Determine the air standard efficiency of the cycle. Take for air as 1.4