ENGG 111 (Thermodynamics) Assignment

1. The temperature of human body shown by a thermometer is 98.6^o Fahrenheit. Determine the temperature in degree Celsius, Kelvin and Rankine range.

2. Compressed air from a higher pressure cylinder is released slowly into a large balloon. Emptying the cylinder fills the balloon to a volume of 25 m^3. What is the work done by the compressed air if the atmospheric pressure is 101kPa?

3. Nitrogen gas at 300 K, 101 kPa & 0.1 m^3 is compressed slowly in an isothermal process to 500 kPa. Calculate the work done during the process?

4. Gas expands in a cylinder according to the relation, $PV^{1.3} = C$ from an initial state of 0.3 m^3 and 1000 kPa to a final state of 101 kPa. Calculate the work done on the piston by the gas pressure.

5. During the compression stroke an IC engine rejects 25 kJ/kg of heat to the cooling water. The work input to the stroke is 75 kJ /kg. Calculate the change in the internal energy of working fluid.

6. Derive the first law of thermodynamics in terms of enthalpy.

7. Write short notes on Perpetual Motion Machine Type II (PMM II). Why is it impossible to construct such machines?

8. Describes the Refrigeration and Heat Pump Cycle with suitable graphical and schematic representations.

9. Describe the deviation shown by practical Otto and Diesel cycles to the ideal Otto and Diesel cycles with suitable graphical and schematic representations.

10. Consider a gas enclosed in a piston cylinder arrangement. The gas is initially at 150 kPa & occupies a volume of 0.03 m^3. The gas is now heated until the volume of gas increases to 0.1 m^3. Calculate the work done by the gas if volume of the gas is inversely proportional to the pressure.

11. What are the assumptions for air standard thermodynamic cycles?

12. How are limitations of first law of thermodynamics addressed by second law of thermodynamics?

13. "Entropy of the universe is always increasing." Explain.

14. Explain Carnot, Reversed Carnot, Otto, Diesel and Brayton cycles with P-V and T-S diagrams.