Code No: OR220252 **OR**

II B.Tech II Semester Supplementary Examinations, April/May 2005
THERMODYNAMICS
(Electrical & Electronic Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) State and Explain zeroth law of Thermodynamics.
   (b) A stationary mass of gas is compressed without friction from an initial state of $0 - 3m^3$ 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 37.6 kJ of heat from the gas during the process. How much does the internal energy of the gas change?

2. (a) Show that entropy is a property of the system.
   (b) A quantity of gas has an initial pressure and volume of 0.1 MN/m^2 and $0.1m^3$ respectively. It is compressed to a final pressure of 1.4 MN/m^2 according to the law $PV^{1.26}$=constant. Determine final value of gas.

3. (a) What is critical point and give the conditions of critical point of water.
   (b) One kg of steam enclosed in a closed vessel at 2.5 bar and 0.45 dry is heated until the pressure becomes 5 bar. Determine the heat transferred and change in entropy.

4. (a) Draw P-V and T-S diagram of Carnot cycle and explain each process in it.
   (b) In an otto cycle air at 17^0C and 1 bar is compressed adiabatic ally until the pressure is 15 bar. Heat is added at constant volume until the pressure raises to 40 bar. Calculate Air standard efficiency and mean effective pressure. Assume C_V = 0.717 kJ/kg K and R=8.314 kJ/mol K.

5. (a) Explain the working principle of two stroke petrol Engine.
   (b) Draw the value Timing diagram of Four stroke diesel engine

6. (a) What are the assumptions made in analyzing the flow of steam through a nozzle.
   (b) A single row impulse turbine develops 130 kW of power at a blade speed of 180 m/sec. Using 2kg steam per sec. Steam leaves the nozzle at 400m/sec. velocity coefficient of the blade is 0.9. Steam leaves the blade axially. Determine nozzle angle, blade angle at entry and exit assuming no shock and diagram efficiency.

7. (a) Write down merits of gas turbine over I.C. engines.
   (b) Briefly explain the methods to improve efficiency of open cycle gas turbine.

8. (a) How do you classify the Air Compressors.

(b) A single stage reciprocating compressor takes $1m^3$ of air per minute at 1.013 bar and 15^0C and delivers it at 7 bar. Assuming that law of compression is $PV^{1.35}$=constant and clearence is negligible, calculate indicated power.

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