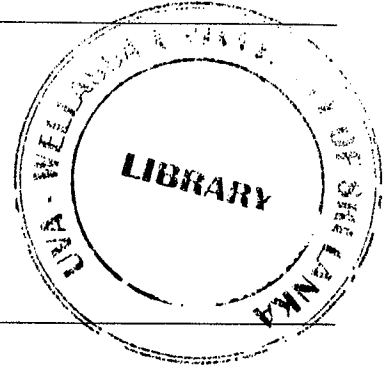


Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 level 2nd Semester Examination – Jan./Feb. 2016
SCT 368-1 Applied Thermodynamics



Instructions to candidates

Duration: One (01) hour

Number of questions: Two (02)

Number of pages: Two (02)

Mark allocation: 100 marks

Answer All Questions

1.

A Carnot cycle is conducted using air contained in a cylinder piston. Initially system contains air at 27 degree in Celsius, 150kPa and 450cm³. The system is compressed isothermally with compression ratio of 9. Then system undergoes adiabatic compression with compression ratio of . After that system undergoes an isothermal expansion process to a point where pressure of the system is 400kPa. At that point system is subjected to an adiabatic expansion until it reaches the first state. Exponent for adiabatic processes $n=1.4$

 - a. Draw the P-V diagram for process and states (10 marks)
 - b. Calculate the
 - i. Maximum pressure of the system (7.5 marks)
 - ii. Maximum temperature of the system (7.5 marks)
 - iii. Amount of Work done during isothermal compression process (7.5 marks)
 - iv. Carnot cycle efficiency (5 marks)
 - c. Draw the P-V diagram for diesel cycle and explain each process briefly (12.5 marks)

2. A steam power plant operates as saturated steam enters the turbine at 1MPa and saturated water enters the pump at 10KPa. Consider turbine and pump processes as isentropic, power out and efficiency of the turbine are 25MW and 80% .
 - a. Using a P-V diagram and steam tables calculate
 - i. Quality of steam when it enters the condenser (10 marks)
 - ii. Flow rate of steam (10 marks)
 - iii. Pump work (10 marks)
 - iv. Efficiency of Rankine cycle (10 marks)
 - b. Name each equipment and briefly explain processes of refrigerator cycle using entropy diagram. (10 marks)