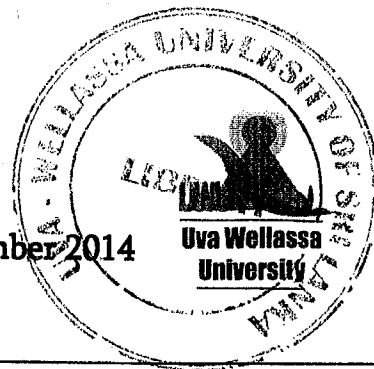


Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Science and Technology Degree Program
2nd Year 2st Semester Examination – August/ September 2014
SCT 254-1 Thermodynamics



Number of Questions: (03) Three

Answer Two (02) Questions including the question No 1

Use standard symbols without a definition. Use SI units.

Time allocation: One hour (01 hour)

Total mark allocated: 100

1. a. Explain the following terms

- i Thermodynamic system
- ii Surrounding
- iii Boundary
- iv Diathermic and adiabatic boundary
- v Isolated, open and closed systems

(25 marks)

b. What is a thermodynamic process? Show it in an indicator diagram.

(5 marks)

c. In separate indicator diagrams, show an isochoric and an isobaric processes.

(10 marks)

d. What are reversible and irreversible processes? A reversible process is an ideal process which can never be achieved in real life. Explain.

(10 mark)

2. a. Describe what is meant by “ the internal energy of a system”.

(10 marks)

b. In thermodynamics, we are usually interested in processes that can change the internal energy of a system. Describe processes that can change the internal energy of a system.

(10 marks)

- c. State the first law of thermodynamics for a diffusively interacting system (use standard symbols) identifying all terms.

(10 marks)

- d. In a cyclic process, there are two exothermic and two endothermic stages. The heat transfer in each stage are, + 17.4 kJ, -52.2 kJ, -5.36 kJ and +31.5 kJ.

- i. Identify endothermic and exothermic stages in the process.

(5 marks)

- ii. Calculate the net work done in this cyclic process.

(5 marks)

- e. Hence or otherwise show that the total work done, W , in an adiabatic expansion of an ideal gas is proportional to the drop in the temperature of the gas.

(10 marks)

- 3 a. Discuss the scientific background which led to the development of the 2nd law of thermodynamics.
- b. What are the two familiar forms of the 2nd law?
- c. What is a heat engine? Explain how it works with the help of a diagram.
- d. Describe why 100% efficient heat engine is not practically possible.
- e. What do you mean by the entropy of a system?

(10x5 = 50 marks)