

FACULTY OF ENGINEERING**B.E. 2/4 (Auto. Engg.) II – Semester (Main) Examination, May 2013****Subject : Thermal Engineering****Time : 3 hours****Max. Marks : 75****Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.****PART – A (25 Marks)**

1. Differentiate between open, closed and isolated system. 3
2. Draw the T-s diagram of a simple Brayton cycle. 2
3. What is a Quasi-static process? 3
4. Give the limitations of first law of Thermodynamics. 3
5. Define clearance volume, volumetric efficiency and isothermal efficiency. 3
6. Define COP. 2
7. Give the properties of an ideal refrigerant. 2
8. Define LMTD of heat exchanger. 3
9. Define Stefan Boltzman law. 2
10. Define second law of Thermodynamics. 2

PART – B (50 Marks)

- 11.a) State the first law of thermodynamics.
 - b) In an internal combustion engine during the compression stroke the heat rejected to the cooling water is 50 kJ/kg. and the work input is 100 kJ/kg. Calculate the change in internal energy of the working fluid stating whether it is a gain or loss.
- 12.a) Derive the working of carnot cycle.
 - b) What are the characteristics of entropy?
13. Explain the methods to improve the efficiency of Brayton cycle.
- 14.a) Explain with a neat sketch actual P-V diagram for a single stage compressor.
 - b) Explain with the help of neat sketch of vapour absorption refrigeration system.
- 15.a) Define Reynold number and Nusselt number.
 - b) The inner surface of a plane brick wall is at 52⁰C and the outer surface is at 27⁰C. Calculate the rate of neat transfer per m² of surface area of the wall, which is 222 mm think. The thermal conductivity of the brick is 0.51 W/mk.
16. Derive the LMTD in a parallel flow heat exchanger.
17. Write short notes on the following :
 - a) Rankine cycle
 - b) Reverse carnot cycle