

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV • EXAMINATION – SUMMER 2013****Subject Code: 142501****Date: 07-06-2013****Subject Name: Heat Power Engineering****Time: 10:30am – 01:00pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain: (i) Thermal Equilibrium (ii) Entropy **07**
(b) Give different statements of 2nd law of thermodynamics. Also state 3rd law of thermodynamics. **07**
- Q.2** (a) Derive the general expression for the change of entropy of perfect gas having mass of m kg. **07**
(b) State limitations of 1st law of thermodynamics and explain Clausius inequality. **07**
- OR**
- (b) Derive the equation for thermal efficiency of Carnot cycle. **07**
- Q.3** (a) A Carnot engine works between temperature limits of 870 K and 290 K. The engine receives 4200 kJ of heat per minute. Determine the power of the engine and the amount of heat rejected to the sink. **07**
(b) Explain Otto cycle with p-v diagram. **07**
- OR**
- Q.3** (a) What is steam nozzle? Explain the effect of friction on the steam flow through nozzle. **07**
(b) What is steam turbine? Differentiate between impulse and reaction turbine. **07**
- Q.4** (a) Explain the working of constant pressure closed cycle turbine with simple diagram. **07**
(b) Explain construction and working of a single stage, single acting reciprocating air compressor. **07**
- OR**
- Q.4** (a) Explain air compressor terminology. **07**
(b) Explain reversed Carnot cycle for air refrigeration. **07**
- Q.5** (a) Explain Bell Coleman air refrigeration cycle. **07**
(b) What are the advantages and disadvantages of air refrigeration system? **07**
- OR**
- Q.5** (a) Explain vapour compression refrigeration cycle with flow diagram. **07**
(b) What is black body? Explain different modes of heat transfer. **07**
