

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-III (OLD) EXAMINATION – WINTER 2017****Subject Code:133401****Date:14/11/2017****Subject Name: Thermodynamics and Thermal Engineering****Time: 10:30 AM to 01:00 PM****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)** Derive the expressions of efficiency in Otto Cycle. **07**
- (b)** Define Ideal and non-ideal gas. How they get differ with each other in their behaviour? Explain the entropy change of an ideal gas. **07**
- Q.2 (a)** Define the following : **07**
- (i) Emissivity
- (ii) Stefan-Boltzmann Law
- (iii) Wien's Displacement Law
- (b)** Explain the various types of Heat Exchangers. **07**
- OR**
- (b)** Describe briefly about the following processes : **07**
- (i) Sensible heating (ii) Cooling and dehumidification
- Q.3 (a)** Define entropy and irreversibility. Discuss their relationships. **07**
- (b)** Explain the working of single stage reciprocating air compressor with a neat sketch. **07**
- OR**
- Q.3 (a)** Derive the equation for conduction of heat through a plane wall. **07**
- (b)** Explain PVT behaviour of pure substances with the help of PT and PV diagrams. **07**
- Q.4 (a)** Derive the equation for conduction of heat through a radial wall. **07**
- (b)** Briefly explain the following **07**
- (i) Parallel-flow heat exchangers.
- (ii) Counter-flow heat exchangers.

OR



Q.4 (a) Write the comparison between vapour compression system and vapour absorption system. **07**

(b) Define the following terms : **07**

(i) Dew point temperature (ii) Relative humidity (iii) Specific humidity.

Q.5 (a) Explain Fourier's Law of Heat Conduction and Explain Thermal Resistance. **07**

(b) Calculate the percentage loss in ideal efficiency of a diesel engine with compression ratio 14, if the fuel cut-off is delayed from 5% to 8%. **07**

OR

Q.5 (a) Compare the efficiency of Otto, diesel and dual cycle for same compression ratio and heat rejection with help of p-v and T-S diagram. **07**

(b) Write down the properties of refrigerant in detail. **07**
