

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER- 1<sup>st</sup> / 2<sup>nd</sup> • EXAMINATION – SUMMER • 2014**

**Subject Code: 110006**

**Date: 18-06-2014**

**Subject Name: Elements of Mechanical Engineering**

**Time: 02:30 pm - 05:00 pm**

**Total Marks: 70**

**Instructions:**

1. Attempt any five questions
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of steam tables is permissible.

- Q.1** (a) Discuss the quality and quantity governing method of IC engine. **07**  
(b) With a neat sketch explain combined separating and throttling calorimeter. **07**
- Q.2** (a) State the advantages and disadvantages of gaseous fuels. List the various gaseous fuels. **07**  
(b) Define the following **07**  
(i) Energy (ii) Specific heat  
(iii) Zeroth law of thermodynamics (iv) Temperature
- Q.3** (a) With a neat sketch explain the working of vapour compression refrigerant system. **07**  
(b) A system contains  $0.19 \text{ m}^3$  of air at pressure of 5 bar and  $190^\circ \text{C}$ . It is expanded adiabatically until the pressure is 1 bar. The gas is then heated at constant pressure till its enthalpy increases by 100 kJ. Determine total work done. **07**
- Q.4** (a) Derive an expression for air standard efficiency of Otto cycle. **07**  
(b) Two boiler A and B discharge equal amount of steam into common main steam pipe. The boiler A discharges steam at 10 bar and  $350^\circ \text{C}$  and B discharges at 10 bar and with dryness fraction 0.9. Calculate the condition of steam after mixing. **07**
- Q.5** (a) With a neat sketch explain the working of any one type of water tube boiler. **07**  
(b) Explain the working of 4 stroke diesel engine. **07**
- Q.6** (a) Differentiate between belt, chain and gear drive. **07**  
(b) Explain the concept of multistaging in reciprocating compressor. What are its advantages? **07**
- Q.7** (a) With a neat sketch explain any one type of coupling. **07**  
(b) Enlist the properties and applications of any one non-ferrous metal. **07**

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