

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE SEMESTER 1<sup>st</sup> / 2<sup>nd</sup> (OLD) EXAMINATION WINTER 2016**

**Subject Code: 110006**

**Date: 23/01/2017**

**Subject Name: Elements of Mechanical Engineering**

**Time: 10:30 AM TO 1:00 PM**

**Total Marks: 70**

**Instructions:**

- 1. Attempt any five questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

- Q.1 (a)** Explain the following terms in brief: **07**  
(1) Heat and work  
(2) Specific heat and calorific value of fuel  
(3) Differentiate between vapor and gas  
(4) List various source of energy
- (b)** What is prime mover ? How are they classified ? Discuss sources of energy used by prime movers **07**
- Q.2 (a)** What is boiler ? Discuss Construction & working of Cochran boiler with neat sketch **07**
- (b)** With a neat sketch explain combined separating and throttling calorimeter. **07**
- Q.3 (a)** Derive an expression for air standard efficiency of Otto cycle. **07**
- (b)** Explain the working of 4 stroke diesel engine. **07**
- Q.4 (a)** List various types of bearings and discuss any three of them. **07**
- (b)** Classify the Air compressor. Differentiate between reciprocating compressor & rotary compressor. **07**
- Q.5 (a)** Derive characteristics equation of a perfect gas. **07**
- (b)** For adiabatic process derive relation between pressure, volume. Also derive equation for work done and heat transfer. **07**
- Q.6 (a)** With a neat sketch explain the working of vapour compression refrigerant system. **07**
- (b)** Explain the concept of multi-staging in reciprocating compressor. What are its advantages ? **07**
- Q.7 (a)** Sketch single block brake, double block brake and band brake. Give their practical application **07**
- (b)** State the advantages and disadvantages of gaseous fuels. List the various gaseous fuels. **07**

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