Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– 1st / 2nd EXAMINATION (NEW) – SUMMER 2018

Subject Code: 2110006   **Date: 19-05-2018**
Subject Name: Elements of Mechanical Engineering
Time: 02:30 pm to 05:00 pm   **Total Marks: 70**
Instructions:
1. **Question No. 1 is compulsory. Attempt any four out of remaining Six questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

		Mark
Q.1	**Objective Question (MCQ)**	

(a)   **07**
1. Define: Resilience.
2. Define: Creep.
3. Define: one ton refrigeration.
4. Define: Gas constant.
5. Define: Prime mover.
6. Define: C. O. P.
7. Define: Free air delivery.

(b)   **07**
1. During isothermal process ……
   (a) Work transfer is equal to heat transfer (b) Work transfer is zero
   (c) Enthalpy remains constant (d) Heat transfer is zero.

2. Which law give the definition of temperature?
   a) Planck Law b) Charle's law
   c) Avogadro law d) Zeroth law of thermodynamics.

3. In a IC engine which energy is converted into mechanical energy…….. A) Heat energy B) Potential energy C) kinetic energy D) Chemical energy of fuel.

4. Which of the following are boiler mountings?
   (a) Super heater (b) Air preheater (c) Fusible Plug (d) Economiser

5. For the same compression ratio, the thermal efficiency of otto cycle is…….
   a) Less than Diesel engine b) Greater than Diesel engine
   c) Equal to Diesel Engine d) None of the above

6. Brass is fundamentally alloy of _____
   (a) Copper and zinc (b) Copper and nickel
   (c) Copper and tin (d) Copper, zinc and molyblednum

7. Spur gear has teeth_____to the axes of the gears.
   (a) inclined (b) perpendicular (c) parallel (d) none of the above

			Mark
Q.2	**(a)**	Make comparison between vapour compressions and vapour absorption system.	**03**
	(b)	Draw neat and labelled sketches only of following: Protected flange coupling, internal expanding shoe brake, single plate friction clutch, Band brake.	**04**

(c) What are the applications of air compressor? Derive an expression of work done for single stage single acting reciprocating air compressor without clearance. **07**

Q.3 **(a)** Define the following terms: (i) Scavenging, (ii) Compression ratio, (iii) Indicated thermal efficiency. **03**

(b) With neat sketch explain construction and working of gear pump and screw pump. **04**

(c) With neat sketch describe the working of two stroke diesel engine. **07**

Q.4 **(a)** What are bearings? How are they classified? **03**

(b) Explain Green's economizer with neat sketch. **04**

(c) Explain with neat sketch the construction and working of Babcock and Wilcox boiler. Show path of the gases and water in it. **07**

Q.5 **(a)** Classify plain carbon steel. Compare their properties and application. **03**

(b) Define the following terms: (i) Heat of superheat (ii) Degree of superheat (iii) Critical point (iv) Latent Heat. **04**

(c) With a neat sketch explain structure and working of combined separating and throttling calorimeter and derive the suitable equation for finding the dryness fraction of steam. **07**

Q.6 **(a)** Derive characteristics equation of a perfect gas with the help of Boyle's law and Charle's law. **03**

(b) Write a short note on "Global Warming and Ozone depletion". **04**

(c) What is adiabatic process? Prove with usual notations the law of governing adiabatic process as PV^γ = Constant. **07**

Q.7 **(a)** Classify and explain the thermodynamic system with giving two suitable engineering examples of each. **03**

(b) Define heat engine. Explain the essential requirements of heat engine with suitable figure. **04**

(c) Derive equation for air standard efficiency of Diesel cycle. **07**

****