

GUJARAT TECHNOLOGICAL UNIVERSITY**P.D.D.C. Sem- I Remedial Examination March / April 2010****Subject code: X11102****Subject Name: Elements of Mechanical And Structural Engineering****Date: 07 / 04 / 2010****Time: 12.00 noon- 02.30 pm****Total Marks: 70****Instructions:**

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

PART-A**(ELEMENTS OF MECHANICAL ENGINEERING)**

- Q.1** (a) State and Describe classification of I.C.Engines. **07**
 (b) Explain with neat sketch working of centrifugal pump. **07**
- Q.2** (a) Explain types of prime movers in brief. **07**
 (b) State the various methods of governing I.C.Engines and describe any one in brief. **07**

OR

- Q-2** (a) Explain (i) Internal Energy (ii) Specific Heat (iii) Enthalpy **07**
 (b) Describe with a neat sketch the construction and working of a single stage single acting reciprocating air compressor. **07**
- Q.3** Mention different parts of the vapour compression refrigeration system along with their function. **07**

OR

- Q.3** A petrol engine having a compression ratio of 7 has a brake thermal efficiency which is 40 percent of ideal air standard efficiency. The calorific value of fuel used is 42,000 KJ/Kg. Calculate the fuel consumption in Kg/hr if the engine delivers 15 Kw. **07**

PART- B**(STRUCTURAL ENGINEERING)**

- Q.4** (a) Explain in detail behavior of ductile material under tension with salient points **07**
 (b) Explain poisson ratio, Bulk modulus, modulus of rigidity. **07**
- Q.5** (a) A rectangular bar of steel 70mmx50mm is 1.3m long carries a pull of 95KN. Find the tensile stress in the bar, strain & change in the length Take $E=200\text{Gpa}$. **07**
 (b) Derive the relation between modulus of elasticity (E), modulus of rigidity (G), poisson ratio (μ). **07**

OR

- (b) Derive the formula for the elongation of tapered circular bar under the action of axial load. **07**
- Q-6** (a) Derive the relation between shear force, bending moment & rate of loading. **07**

OR

- (a) Draw S.F & B.M diagram for a beam loaded as shown in **fig-1** **07**


