

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC SEM-I Examination-Dec-2011

Subject code: X11102**Date: 23/12/2011****Subject Name: Elements of Mechanical and Structural Engineering****Time: 10.30 am -1.00 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) Define the following terms with unit **07**
(i) Force (ii) Heat (iii) Specific heat (iv) Work (v) Temperature
(vi) Pressure (vii) Efficiency
- (b) Explain the classification of heat engine. **07**
- Q.2** (a) Differentiate between Otto and Diesel cycle. **07**
(b) Explain working and construction of centrifugal pump. **07**
- OR**
- (b) What are differences between governor and flywheel? Classify governors. **07**
- Q.3** (a) Explain the working of Four stroke Petrol engine with neat sketch. **07**
(b) Explain advantages of multistage in reciprocating air compressor. Write applications of compressed air. **07**
- OR**
- Q.3** (a) Explain the working of Vapour Compression Refrigeration system. **07**
(b) Derive the equation of work required in single stage reciprocating air compressor without clearance. **07**
- Q.4** (a) Differentiate between ductile and brittle materials. What are significant behaviors of these materials under tensile loading? **07**
(b) Explain Linear, shear, lateral, thermal and volumetric strain. **07**
- OR**
- Q.4** (a) What are the various physical and mechanical properties of materials? **07**
(b) Derive an expression of stiffness of a hollow shaft under torsion. **07**
- Q.5** (a) State the different types of beam and draw it. State the different type of loads on beam. **07**
(b) Derive the formula for the elongation of tapered circular bar under the action of axial load. **07**
- OR**
- Q.5** (a) Derive the equation of reaction and bending moment for simply supported beam having length **L** meter, with uniform distributed load **w** N/meter over it. Draw shear force and bending moment diagram also. **07**
(b) Define the following terms **07**
(i) Stress (ii) Strain (iii) Principal stress (iv) Compound stress
(v) Factor of Safety (vi) Proof resilience (vii) Modulus of resilience
