

Code: EC2T3

**I B.Tech - II Semester – Regular/Supplementary Examinations
May 2017**

**ELEMENTS OF MECHANICAL ENGINEERING
(ELECTRONICS & COMMUNICATION
ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

- a) What is the difference between Pattern and casting?
- b) What are main ingredients of a moulding sand? Explain in brief.
- c) Why the electrodes are coated by flux material and give its significance?
- d) Determine the moment of inertia of triangle with base width 'b' and height 'h' about the base.
- e) Define the following Mechanical Properties with applications i) Ductility, ii) Creep.
- f) Define moment of inertia.
- g) Distinguish between heat and work.
- h) State Zeroth law of thermodynamics.
- i) What is meant by following terms: i) Bore, ii) Stroke?

- j) What are the fundamental difference between S.I and C.I engine?
- k) Define Bulk Modulus and Modulus of Rigidity.

PART – B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) Explain different components of an Arc Welding Machine.

8 M

b) Discuss the different types of sands used to make a mould.

8 M

3. a) What are different types of Physical Properties a material should have? Discuss.

6 M

b) A bar of 20 mm diameter is tested in tension. It is observed that when a load of 37.7 kN is applied, the extension measured over a gauge length of 200 mm is 0.12 mm and contraction in diameter is 0.0036 mm. Find Poisson's ratio and elastic constants E, G, K.

10 M

4. a) Explain the importance of reversibility. What is the importance of this concept in thermodynamics? State the condition of thermodynamics reversibility.

8 M

b) State the second law of thermodynamics. What is available and unavailable energy? 8 M

5. a) Describe the operating principle of a Two-Stroke Petrol engine and describe the process entailed in each stroke. 8 M

b) Draw neat sketch of a Four-Stroke Diesel engine and label various parts, and give their material and describe their functions. 8 M

6. The cross section of a prestressed concrete beam is shown in Figure-1. Calculate the moment of inertia of this section about the centroidal axes parallel to and perpendicular to top edge. Also determine the radius of gyration. 16 M

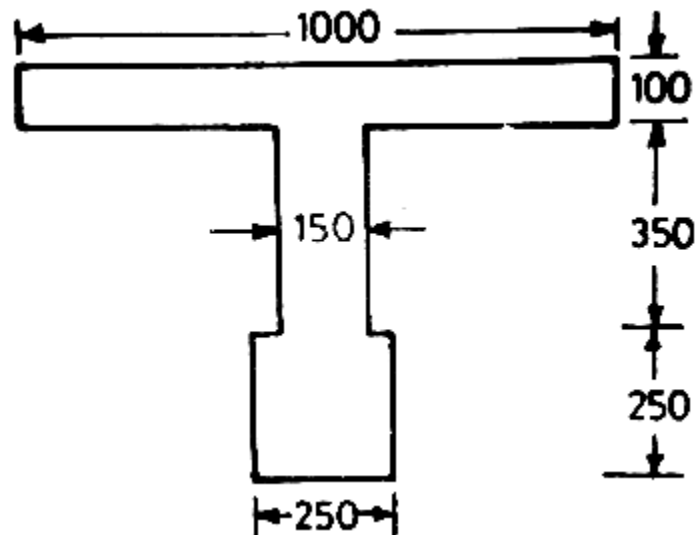


Figure-1