Code: **EE1T6**

I B.Tech - I Semester – Regular Examinations February - 2014

BASIC MECHANICAL ENGINEERING
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours   Marks: 5x14=70

Answer any FIVE questions.   All questions carry equal marks

1. Explain working stress, Poisson's ratio, volumetric stress, volumetric strain, ultimate stress, yield stress and Hooke's law.   14 M

2. Find the coordinates of the centroid of a semicircular area as shown in fig 1.   14 M
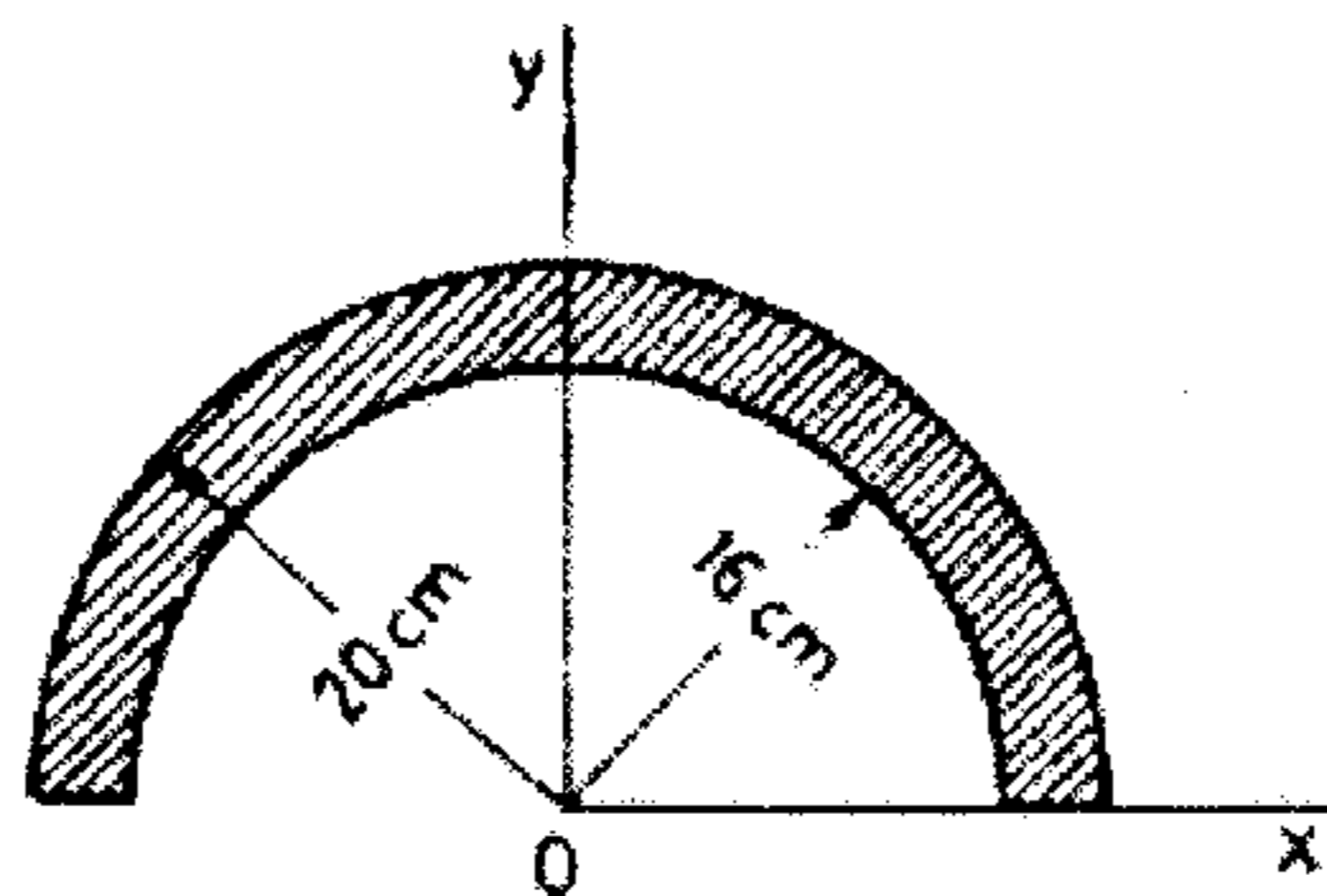

Fig 1.

3. An I section is made of three rectangles as shown in Fig 2. Find the moment of inertia of the section about the horizontal axis passing through the center of gravity of the section.
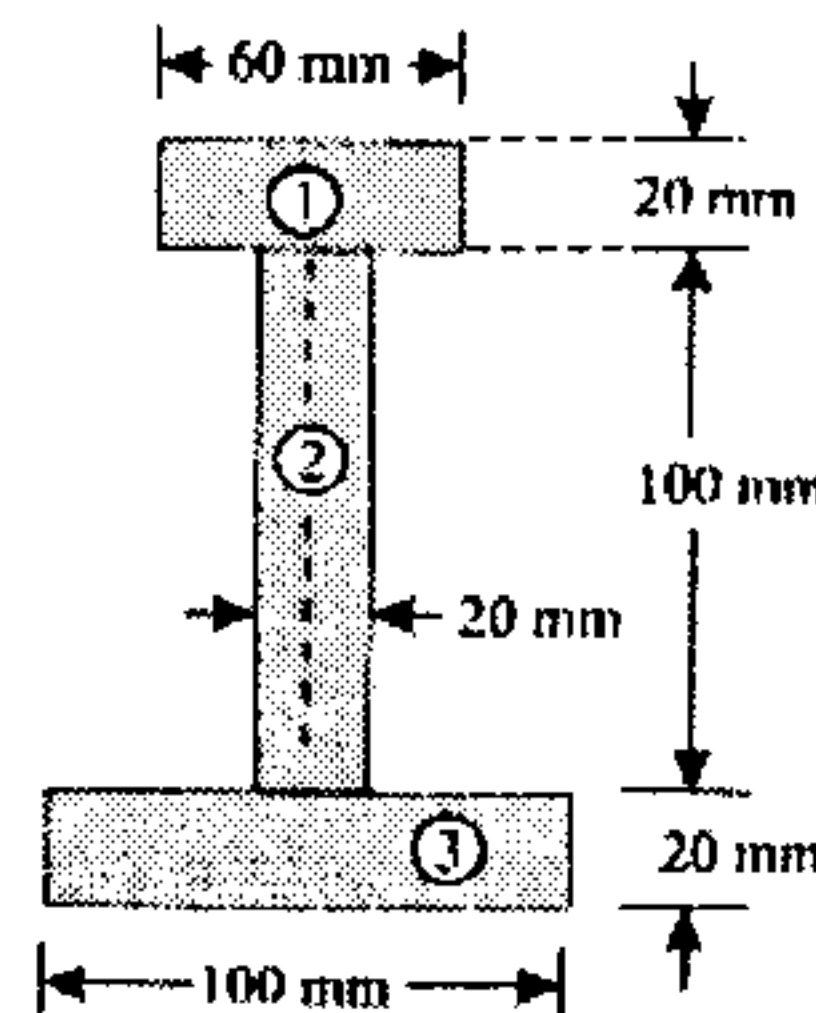
14 M

|◄ 60 mm ►|
①   20 mm
②   100 mm
|◄ 20 mm
③   20 mm
|◄—— 100 mm ——►|

Fig 2.

4. a) Write the torsion equation for a hollow shaft.   4 M

b) Find the maximum stress in a propeller shaft 40cm external and 20cm internal diameter, when subjected to twisting moment of 4650N-m.if the modulus of rigidity G=82GPa, how much is the twist in a length 20times the external diameter?   10 M

5. a) List out the main components of IC engines.   5 M

b) Briefly explain the working of two stroke petrol engine. 9 M

6. Explain about Brayton and Rankine cycles with neat sketches.   14 M

7. a) What are the functions of steam boilers? 5 M

   b) Classify steam boilers and explain Babcock and Wilcox boiler with a neat sketch. 9 M

8. a) List out the steam boiler mountings and accessories. 6 M

   b) Explain the working of economizer with a neat sketch. 8 M