MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

I B.Tech II Sem Regular Examination, October/November 2020
ENGINEERING MECHANICS
(CIVIL & MECH)

Time: 2 Hours.   **Max. Marks: 70**

Note: 1. Answer any FIVEquestions.
      2. Each question carries 14 marks and may have a, b as sub questions.

1 a) Describe the concept of free body diagram with suitable   7M
       sketches?

   b) Explain about a moment of a force about an axis?   7M

2   Two equal loads of 2500N are supported by a flexible string   14M
       ABCD at points B and C as shown in Fig 1. Find the tensions
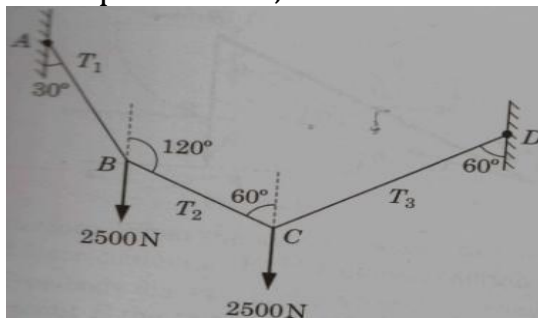   in the portions AB, BC and CD of the string.

Fig. 1

3 a) Explain the centroid of a composite plane figure?   7M

   b) Determine the centroid of the cross sectional area of an   7M
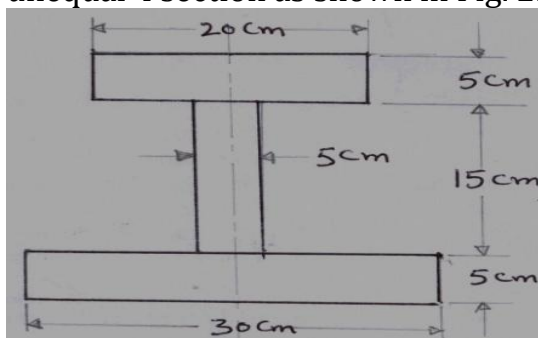   unequal I section as shown in Fig. 2.

Fig. 2

4   Determine the moment of inertia of the area of T-Section as shown in Fig.3   **14M**
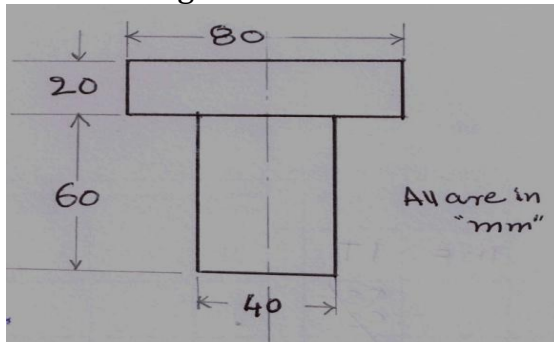

Fig.3

5 a) A screw jack has square threaded screw of 5 cm diameter and 1 cm pitch. The coefficient of friction at the screw thread is 0.15. Find the force required at the end of a 70 cm long handle to raise a load of 2000N. What is the force required if the screw jack is considered to be an idea machine?   **7M**

  b) Describe the polar moment of inertia?   **7M**

6   The velocity-time diagram for the rectilinear motion of a particle is represented by a parabola as shown in Fig.4. Find the distance travelled by the particle in the time T/2.   **14M**
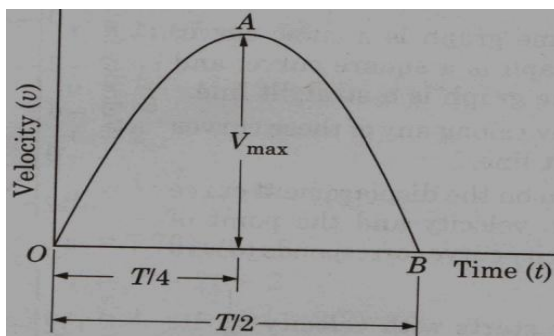

Fig. 4

7 a) A bob weighing 1 N suspended by a cord from the ceiling of a railway carriage was found to make an angle $\theta = 8^0$ with vertical when the railway carriage was negotiating a curve of 100m. Find the speed of the carriage and the tension in the cord.   **7M**

  b) Describe the principle of work and energy for a rigid body?   **7M**

8   A grinding wheel is attached to the shaft of an electric motor of rated speed of 1800 rpm. When power is switched on the unit attains the rated speed in 5 s and when the power is switched off the unit coasts to rest in 90 s. Assuming uniformly accelerated motion, determine the number of revolution the unit turns (a) to attain the rated speed (b) to come to rest.   **14M**

---oo0oo---