END TERM EXAMINATION

SECOND SEMESTER [B.TECH.] MAY-JUNE 2016

Paper Code: ETME-110	**Subject: Engineering Mechanics**
	(Batch 2013 onwards)
Time: 3 Hours	**Maximum Marks: 75**

Note: Attempt any five questions including Q no.1 which is compulsory. Select one question from each unit.

Q1 Short questions:-   **(2.5x10=25)**
 (a) State the various assumptions for the analysis of a perfect truss.
 (b) Explain cone of friction and angle of friction.
 (c) Explain the meaning of MA, VR and Efficiency of a screw jack.
 (d) What is a point of contraflexture in case of a beam?
 (e) Discuss various type of supports used in engineering structures.
 (f) What are the advantages of method of section over the method of joints in case of a truss?
 (g) Define the coefficient of restitution and instantaneous centre of rotation.
 (h) What is self locking in case of a machine and how you will verify whether a machine is self locking or not?
 (i) Derive the expression for the moment of inertia of a semi circle about its base.
 (j) Discuss the significance and applications of moment of inertia of a body.

UNIT-I

Q2 Three identical spheres P, Q, R of weight W are arranged on smooth inclined surface as shown in the figure 1. Determine the angle θ which will prevent the arrangement from collapsing.   **(12.5)**

Q3 Two blocks A and B are connected by a horizontal rod and are supported on two rough planes as shown in Figure 2. If weight of block B is 1500N and coefficient of friction of block A and B are 0.25 and 0.35 respectively, find the smallest weight of block A for which the equilibrium exist.   **(12.5)**

UNIT-II

Q4 Determine the forces in the members BC, CE and DE of a truss loaded and supported as shown in Figure 3.   **(12.5)**

Q5 Determine the moment of inertia of a cast iron section shown in Figure 4 about both X and Y axis.   **(12.5)**

UNIT-III

Q6 In a system of connected bodies (Figure 5) the pulleys are frictionless and of negligible weight. Determine the value of weight A required to give 0.6g acceleration to weight B (i) in downward direction (ii) in upward direction. **(12.5)**

Q7 Two smooth spheres A and B having a mass of 2kg and 4kg respectively collide with initial velocities as shown in Figure 6. If the coefficient of restitution for the spheres is e = 0.8, determine the velocities of each sphere after the impact.**(12.5)**

UNIT-IV

Q8 Draw the shear force and bending moment diagram for the cantilever beam loaded as shown in Figure 7.   **(12.5)**

Q9 A reciprocating Engine mechanism is shown in Figure 8. The crank OA is of length 20 cm and rotating at 500 rpm. The connecting rod AB is 100 cm long. Find the angular velocity of the connecting rod and velocity of piston B.   **(12.5)**

P.T.O.

ETME-110