PVP 14

Code: ME1T6, AE1T6

I B.Tech - I Semester – Regular Examinations – November 2015

ENGINEERING MECHANICS - I

(Common for ME, AE)

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 resultant of two forces P&Q acting at an angle θ?
   b) State the parallelogram law of forces.
   c) Mention the characteristics of a couple.
   d) Distinguish between centre of gravity and Centroid.
   e) State the theorem of perpendicular axis applied to moment of inertia.
   f) Define coefficient of friction.
   g) What is a Wedge? State its uses in solving the problems on wedge friction.
   h) How will you apply the principle of virtual work in finding out the forces in a beam?
   i) What are the advantages of principle of virtual work?
   j) What are various types of trusses?
   k) What are the assumptions for forces in members of a perfect truss?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) A rod AB 2.5 m long is supported at A and B. The rod is carrying a point load of 5 KN at a distance of 1 m from A. What are the reactions at A and B? 8 M

   b) A square ABCD has sides equal to 200 mm. Forces of 150 N each act along AB & CD and 250 N along CB & AD. Find the moment of the couple, which will keep the system in equilibrium. 8 M

3. Find the moment of inertia about the centroidal axes XX and YY for the lamina shown in the Figure-1. 16 M

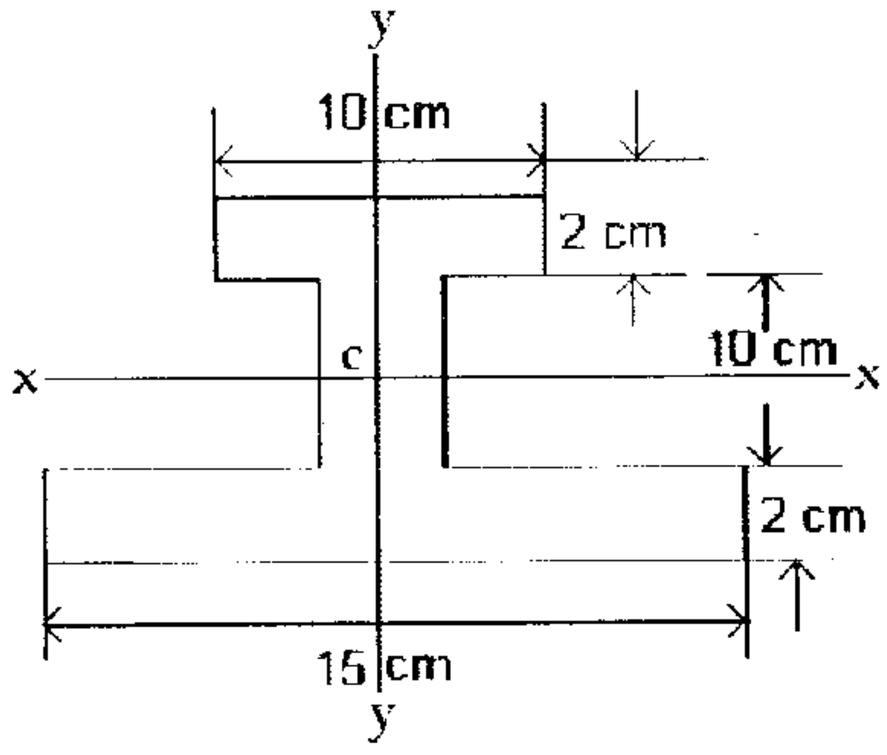

Figure – 1

4. A truss of 8m span and 4m height is loaded as shown in the Figure-2. Find the reactions at 'A' and 'E'. Also compute the forces in each member. 16 M

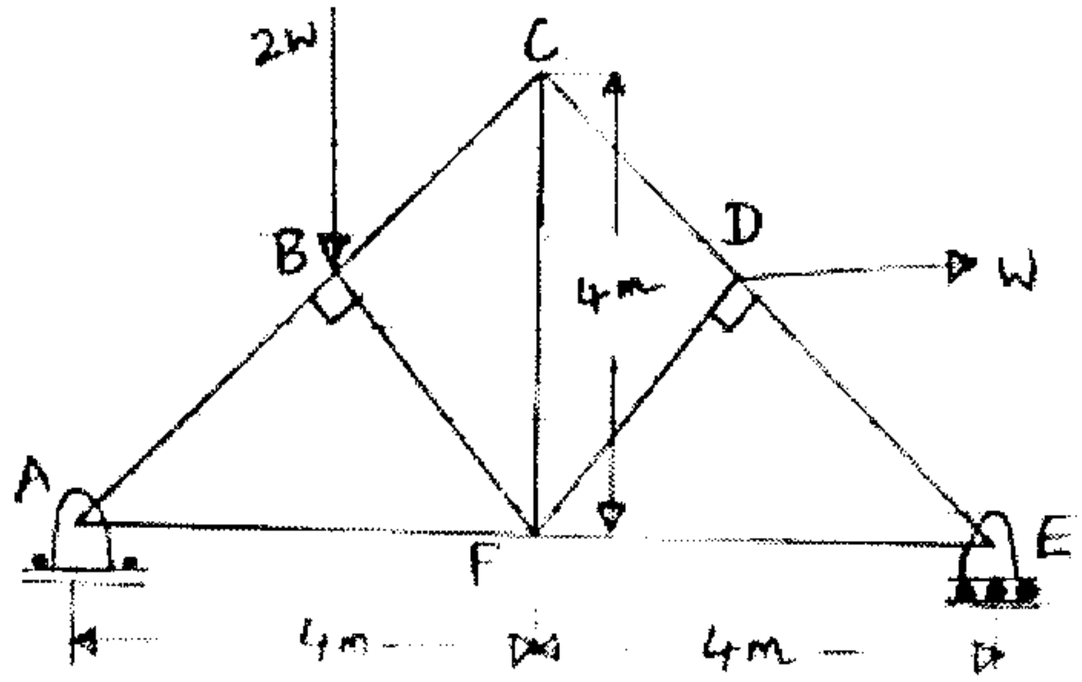

Figure-2

5. Block B rests on the block A, and is attached by a horizontal rope BC to a wall as shown in Figure-3. What force P is necessary to cause motion to A to impend? The coefficient of friction between A and B is 0.25, and between A and the floor is 0.33. A has a mass of 14 kg and B has a mass of 9 kg. 16 M

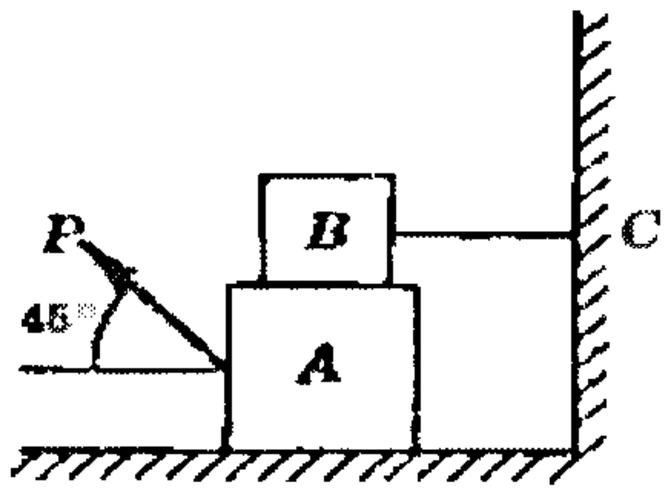

Figure-3

6. A homogeneous ladder having a mass M and length l is held in equilibrium by a horizontal force P as shown in Figure-4. Using virtual work method, express P in terms of M. 16 M

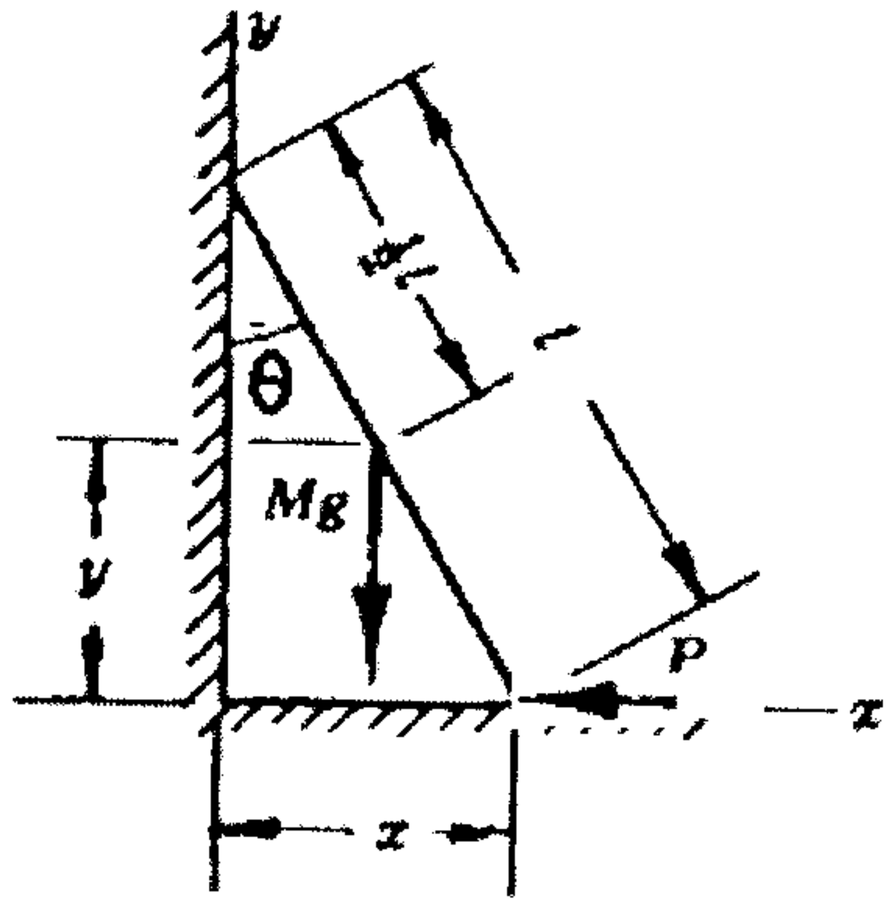

Figure-4