

Total No. of Questions : 6]

[Total No. of Printed Pages : 5

[3861]-164

F. E. (Semester - II) Examination - 2010

ENGINEERING MECHANICS

(2008 Pattern)

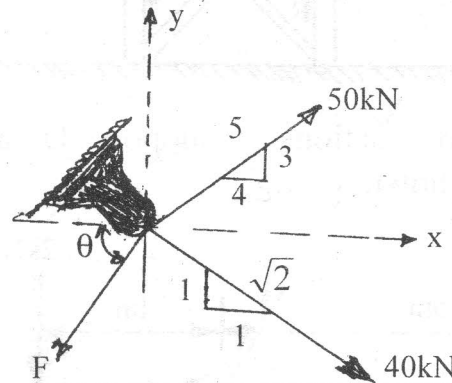
Time : 2 Hours]

[Max. Marks : 50

Instructions :

- (1) Attempt Q. 1 or Q. 2, Q. 3 or Q. 4 and Q. 5 or Q. 6.
- (2) Answer should be written in one answer book only.
- (3) Neat diagram must be drawn wherever necessary.
- (4) Figures to the right indicate full marks.
- (5) Assume suitable data, if necessary.
- (6) Use of cell phone is prohibited in the examination hall.
- (7) Use of electronic non-programmable pocket calculator is allowed.

Q.1) (A) Determine Magnitude 'F' and direction ' θ ' of force 'F', so that the resultant of three forces acting on hook is zero. [06]



(B) A stone is thrown vertically upward from a point on bridge located 40m above water level. Knowing that it strikes water 4 sec. after release, determine :

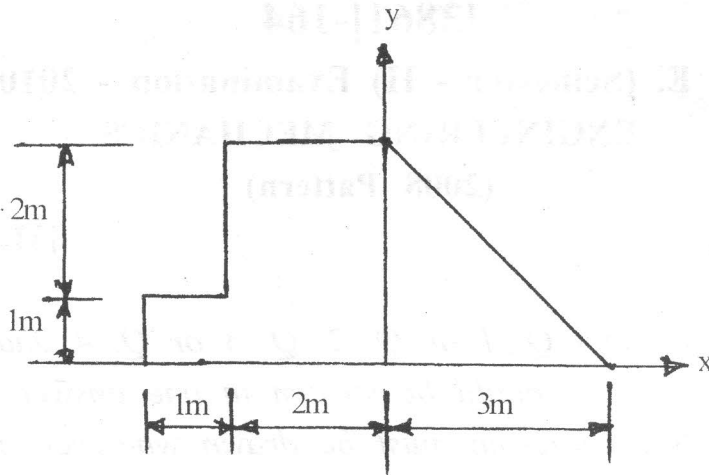
- (i) the speed at which stone was thrown upward.
- (ii) the speed with which it strikes water.

[06]

OR

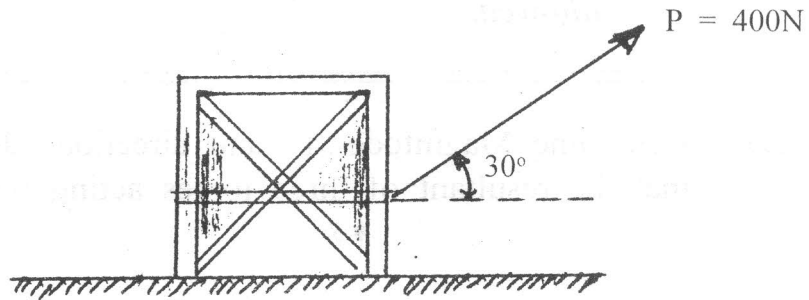
Q.2) (A) Locate Centroid of the plate as shown in fig.

[06]



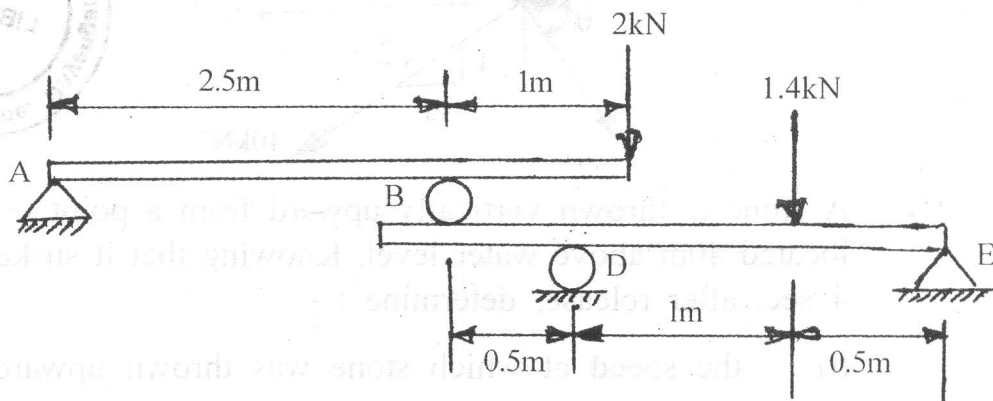
(B) The 50 kg crate as shown in fig. rests on a horizontal plane for which the coefficient of kinetic friction is $\mu_k = 0.3$. If the crate is subjected to a 400N towing force, as shown, determine velocity of the crate in 5 sec. starting from rest.

[06]

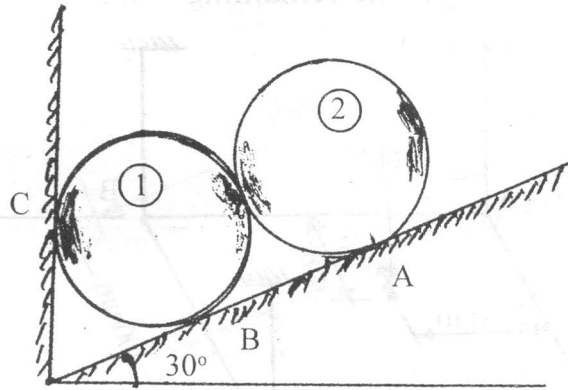


Q.3) (A) Find support reactions at support 'D' and 'E' for the beam system as shown in fig.

[06]



- (B) Two identical rollers each of weight 445N are supported by an inclined plane and a vertical wall as shown in fig. Assuming smooth surfaces, find reactions induced at the points of support A, B and C. [07]



- (C) A shot is fired at an elevation of 60° with a velocity of 60 m/s. State position of the shot at 2 sec. after firing. What will be the velocity at that instant? [06]

OR

- Q.4 (A) A ball of weight $Q = 53.4\text{N}$ rests in a right-angled trough as shown in fig. Determine forces exerted on the sides of the trough at D and E if all surfaces are perfectly smooth. [06]

