

Total No. of Questions : 6

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EHS-184

B.E. (IIInd Sem.) (CGPA) Civil Engg. Exam.-2014 ENGINEERING MECHANICS

Paper - CE-204

Time Allowed : Three Hours

Maximum Marks : 60

Note : All questions are compulsory.

Internal choice are mentened with questions.

Q.I Fill in the blanks— 2 each

- (a) A is a single force which can replace two or more forces and produce the same effect as the forces.
- (b) Two equal and opposite parallel forces produce a whose moment is equal to either force multiplied by their perpendicular distance.
- (c) The first moment of area about any axis passing through the controid is

(2)

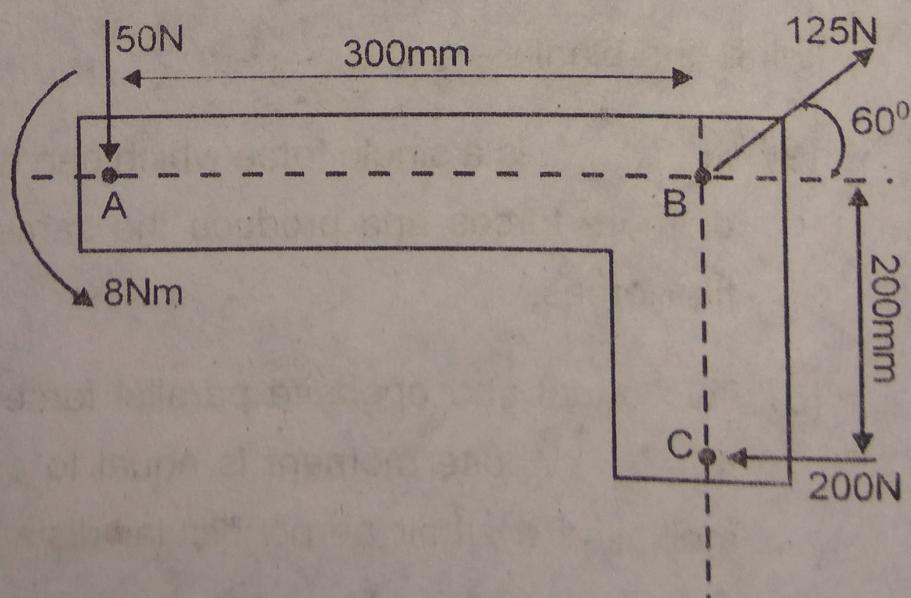
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(d) The efficiency of a self rocking machine is always than 50%.

(e) D'Alembert's principal is

Q.II (a) Define the system of coplanar and concurrent forces. 2

(b) An angle bracket has been subjected to three forces and a couple as shown in fig.1 . Determine the resultant of this system of forces proceed to locate the points where the line of action of the resultant intersects line AB and line BC. 8

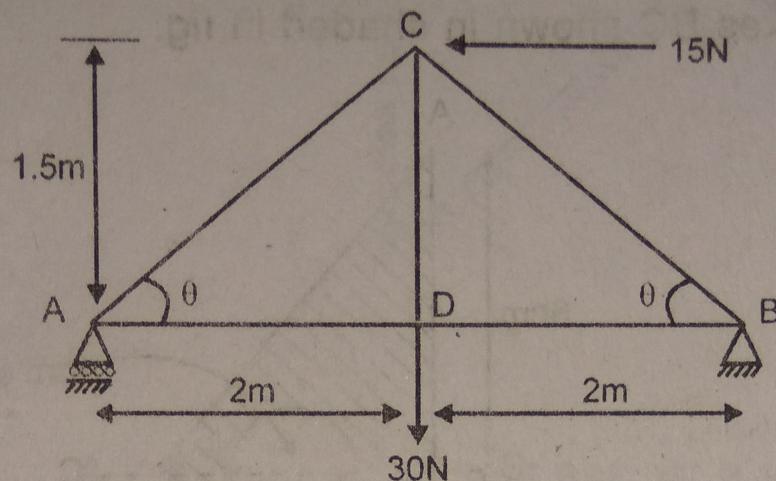


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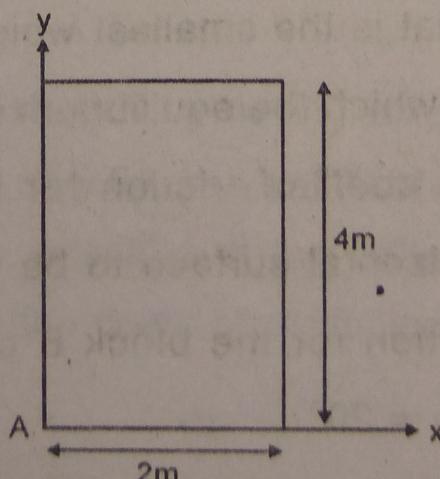
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Determine the magnitude and direction and nature of forces in the various members of the truss. 8



Q.III (a) Define radius of Gyration. How is it related to moment of Inertia. 2

(b) Find the product of inertia of the rectangular section shown in fig. with respect to x and y axis. Proceed the calculation of the principle axes and the values of the principal moments of inertia of the section about pt. A.'

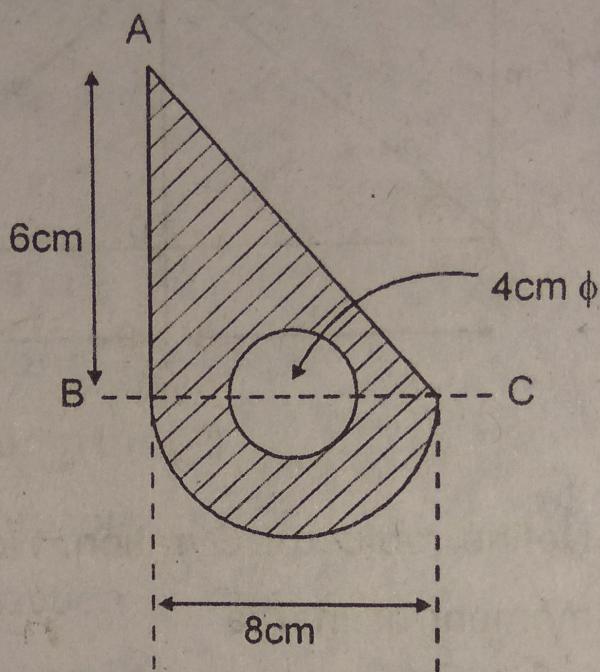


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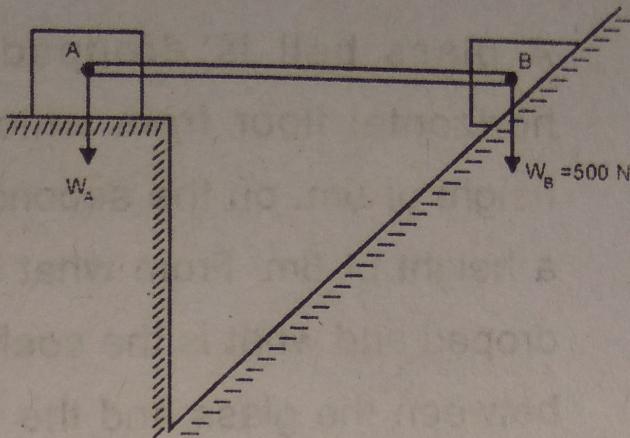
Find the moment of Inertia about the horizontal axes BC shown in shaded in fig. 8



Q.IV (a) What is angle of friction. 2

(b) Two blocks are connected by a horizontal link AB and rest on two planes as shown in fig. What is the smallest weight W_A of the block A for which the equilibrium can exist ? Assuming the coeff of friction for the block A and the horizontal surface to be 0.4 and the angle of friction for the block B on the inclined plane is $φ = 20^\circ$. 8

(5)



or

A 7 m long ladder rest against a vertical wall, with which it makes an angle of 45° , and on a floor. If a man whose weight is one half that of the ladder climbs it, at what distance along the ladder will he be, when the ladder is about to slip ?

The coeff. of friction between the ladder and the wall is $1/3$ and that between ladder and floor is $1/2$.

- QV (a) Ball A of mass 1 kg moving with a velocity of 2 m/s, impinges directly on a ball B of mass 2kg at rest. Find the velocities of two balls after the impact. Assume the coeff. of restitution $e= 1/2$. 8

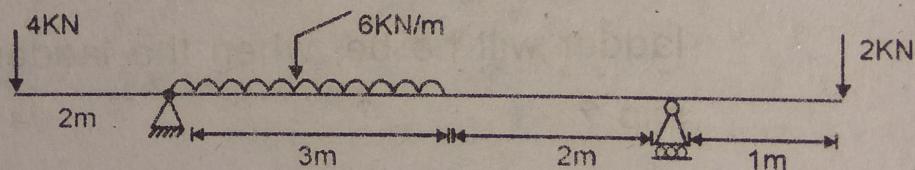
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A glass ball is dropped on to a smooth horizontal floor from which it bounces to a height of 9m. on the second bounce it rises to a height of 6m. From what height the ball was dropped and what is the coefficient of restitution between the glass and the floor ?

- (b) Write the principle of work and energy ? 2
- Q.VI (a) What is point of contraflexure ? 2
- (b) Draw the shear force and bending moment diagram for given fig.



or

Draw shear force and bending moment diagram.

