

I B.TECH - EXAMINATIONS - MAY, 2011
CLASSICAL MECHANICS
 (COMMON TO MECHANICAL ENGINEERING, CHEMICAL ENGINEERING &
 MECHATRONICS)

Time: 3hours

Max. Marks: 80

Answer any FIVE questions
All Questions Carry Equal Marks

- - -

- 1.a) Distinguish between co-planar and non-co planar forces. Classify the various types of forces.
- b) AD is a string hung from a horizontal ceiling at A and D. A weight of 75 N is hung from point B. Determine the magnitude of weight that should be hung from point C such that the portion BC of the string is horizontal. Also determine the tension in various portions AB, BC and CD of the string as shown in figure 1.

[6+10]

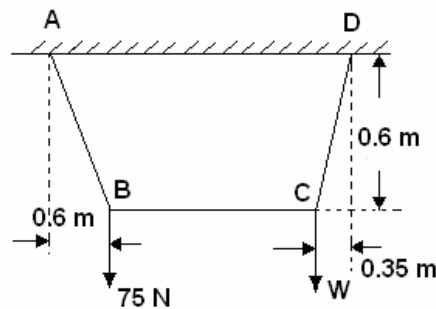


Fig: 1

- 2.a) Define free body diagram. Give 4 examples.
- b) Forces are applied to an angle bracket as shown in figure 2. Determine the magnitude and direction of the resultant.

[6+10]

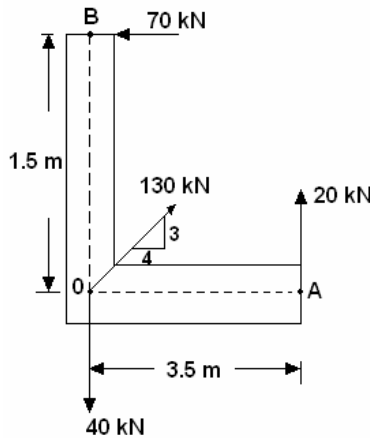


Fig: 2

- 3.a) Distinguish between centroid and centre of gravity.
- b) Find the coordinates of the centroid of the shaded area shown in figure 3. [4+12]

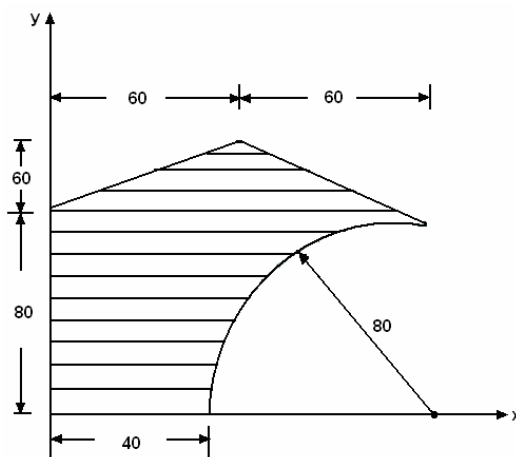


Fig: 3

- 4.a) What are the transfer formula for mass moments of inertia?
 b) Compute the moment of inertia of the channel section shown in figure 4 about centroidal x, y axes. [4+12]

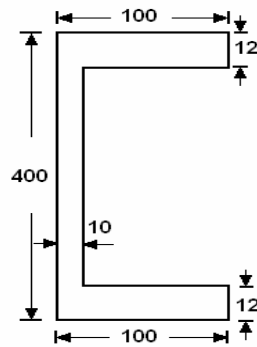


Fig: 4

- 5.a) Sketch the various types of trusses.
 b) Find the forces in the members BD, DE, EG and BE of the truss shown in figure 5. [4+12]

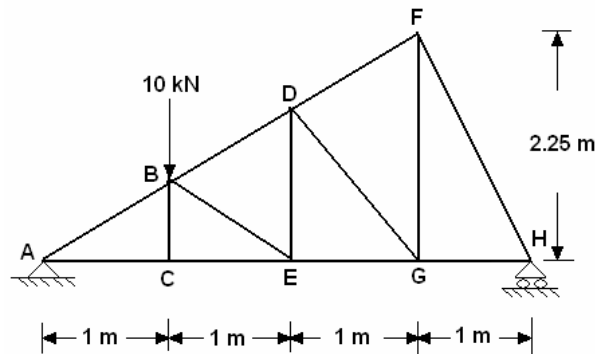


Fig: 5

- 6.a) State and explain D' Alembert's principle.
 b) A stone is thrown from the top of a building upward at an angle of 40° to the horizontal with an initial speed of 30 m/sec. The height of the building is 30 m. Determine:
 i) The horizontal distance from the point of projection to the point where the stone strikes the ground.
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 iii) Velocity, when it strikes the ground
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- 7.a) State and explain impulse-momentum principle.
 b) Determine the time required for the heights shown in figure 6 to attain a velocity of 9.81 m/sec. What is the tension in the chord? Take $\mu = 0.2$ for both planes. [4+12]

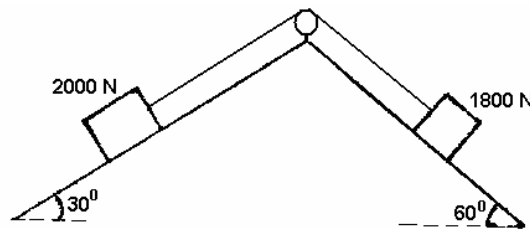


Fig: 6

- 8.a) Define the terms:
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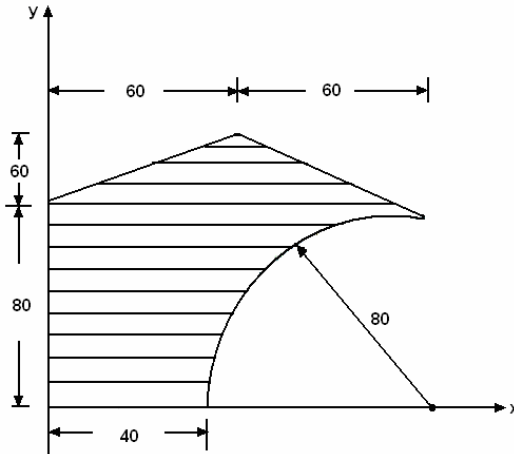


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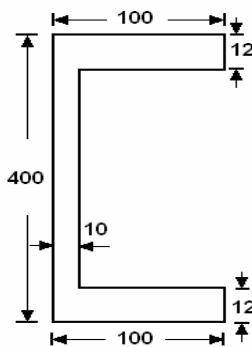


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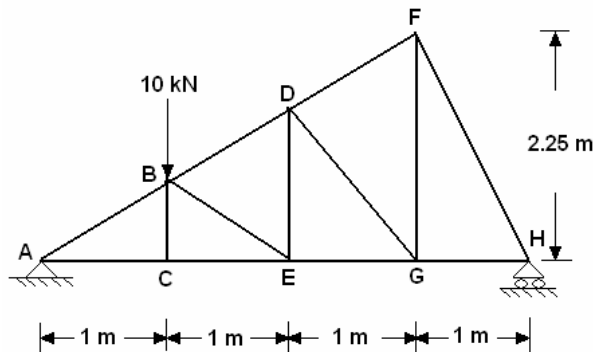


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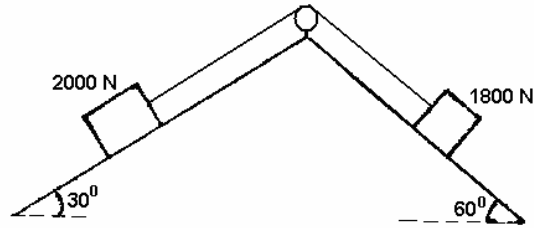


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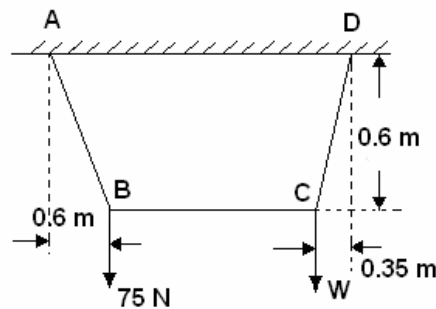


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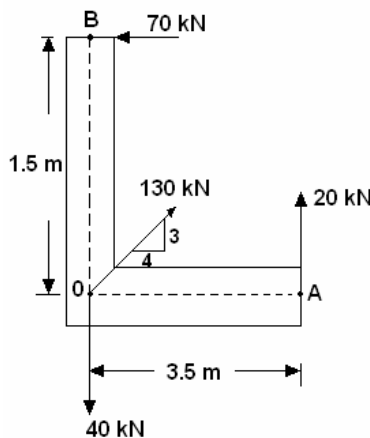


Fig: 8

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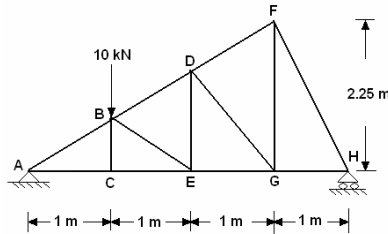


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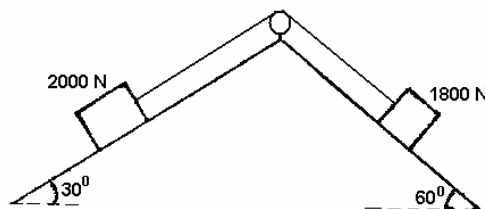


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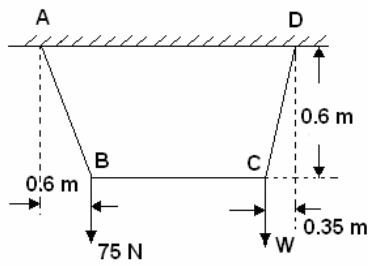


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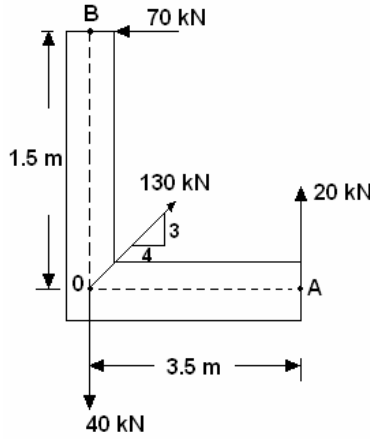


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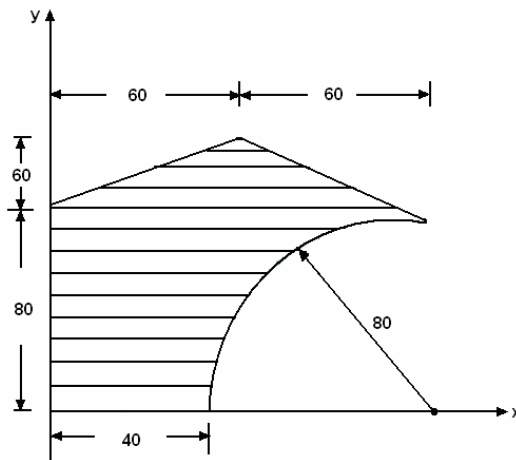


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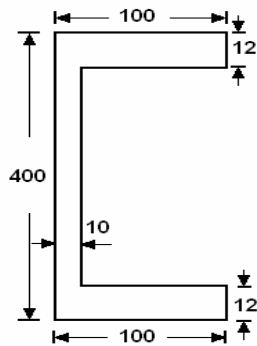


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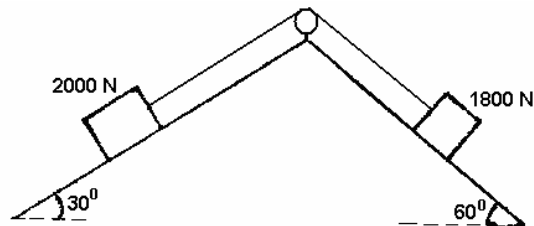


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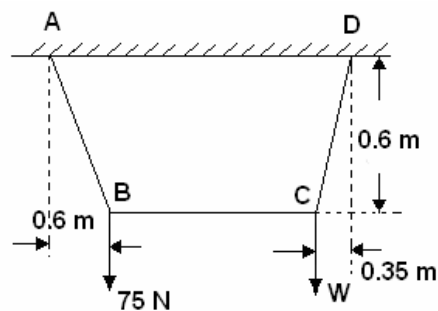


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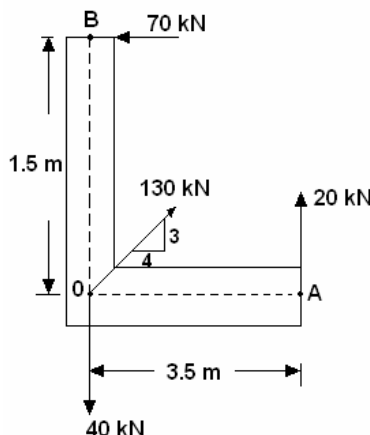


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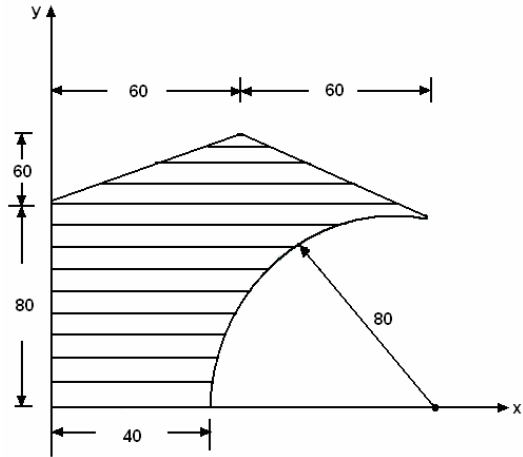


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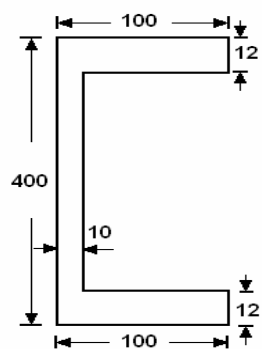


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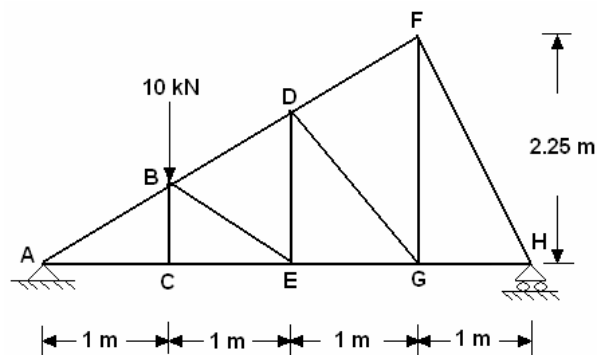


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