Code.No: R05010105

R05

SET-1

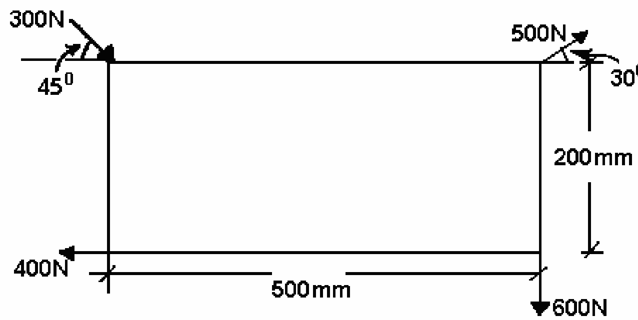
**I B.TECH – EXAMINATIONS, DECEMBER - 2010**
**APPLIED MECHANICS**
**(CIVIL ENGINEERING)**

**Time: 3hours** **Max.Marks:80**

**Answer any FIVE questions**
**All questions carry equal marks**
**- - -**

1.a) Distinguish between:
i) Force and a couple
ii) Resultant and equilibrant
iii) Composition and resolution of force.

b) Find the equilibrant of the force system in figure. Locate the equilibrant with respect to point 'O'. [6+10]



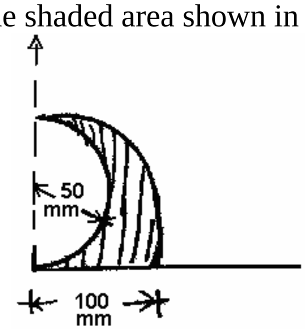

2.a) State the laws of static friction. Mention 2 examples where friction is desirable.

b) A uniform ladder of length 10m rests against a vertical wall with which it makes an angle of $45^0$. The coefficient of friction between the ladder and the wall is 0.3 and that between the ladder and the grand is 0.45. If a man whose weight is one half that of the ladder ascends the ladder, how high will be when the ladder slips? [6+10]

3. A belt 100mm wide and 10mm thick is transmitting power at 1000rpm. The net driving tension is 1.8 times the tension on the slack side. The safe permissible pull on the belt section is $1.6N/mm^2$. Calculate the maximum power that can be transmitted at this speed. Assume the weight of leather as 5600N/cum. Calculate also the absolute maximum power that can be transmitted by this belt and the speed at which this can be transmitted. [16]

4.a) Determine the centroid of a semi circular lamina of radius 'r'.

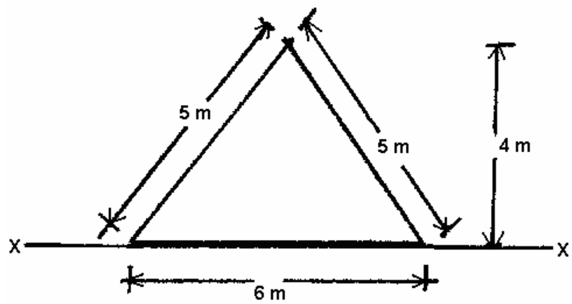
b) Locate the centroid of the shaded area shown in figure. [8+8]



Code.No: R05010105 | R05 | SET-1

5.a) State the steps involved in the computation of moment of inertia of composite bodies?

b) A triangular metal sheet of uniform thickness 100mm and uniform density 50000 N/$m^3$ is hinged at its base 6m long as shown in figure. Determine the moment of inertia about the hinge. [6+10]




6.a) A plane is traveling in a horizontal circle, with angle of banking of its wings $25^0$. The speed of the plane is 360 kmph. Find radius of its turning.

b) A vehicle starts from rest and accelerates at the rate of 2.0m/$sec^2$ for 10 seconds. It travels at the constant speed for sometime and decelerates at the rate of 1m/$sec^2$ and comes to a halt. The total time of travel is 50sec. Find the distance between points. [8+8]

7.a) Explain D'Alembert's principle.

b) A train weighing 1400 kN is traveling with an uniform velocity on a level track The resistance due to friction is 10N/kN. A wagon weighing 300 kN becomes uncoupled from the train. If the pull of the engine remains same, determine the distance of separation between the two portions of the train in 20 seconds. [4+12]

8.a) Differentiate between simple and compound pendulum.

b) A compound pendulum consists of a thin uniform bar of length 1.20m. Find the position of the center of suspension for which the period of the pendulum is least. [8+8]

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Code.No: R05010105

R05

SET-2

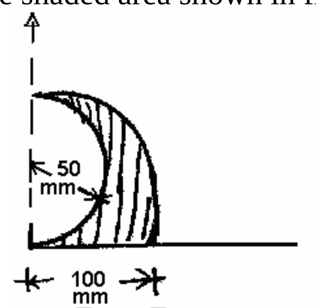
**I B.TECH – EXAMINATIONS, DECEMBER - 2010**
**APPLIED MECHANICS**
**(CIVIL ENGINEERING)**

**Time: 3hours** **Max.Marks:80**

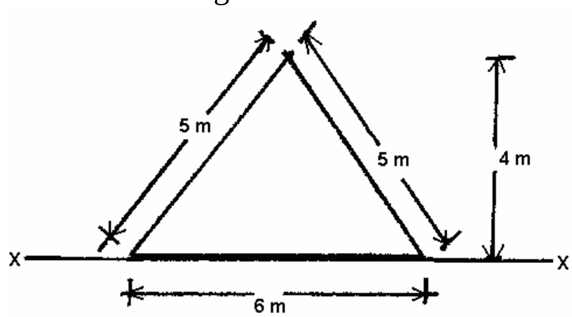
**Answer any FIVE questions**
**All questions carry equal marks**
**- - -**

1. A belt 100mm wide and 10mm thick is transmitting power at 1000rpm. The net driving tension is 1.8 times the tension on the slack side. The safe permissible pull on the belt section is 1.6N/mm$^2$. Calculate the maximum power that can be transmitted at this speed. Assume the weight of leather as 5600N/cum. Calculate also the absolute maximum power that can be transmitted by this belt and the speed at which this can be transmitted. [16]

2.a) Determine the centroid of a semi circular lamina of radius ‘r’.
b) Locate the centroid of the shaded area shown in figure. [8+8]




3.a) State the steps involved in the computation of moment of inertia of composite bodies?
b) A triangular metal sheet of uniform thickness 100mm and uniform density 50000 N/m$^3$ is hinged at its base 6m long as shown in figure. Determine the moment of inertia about the hinge. [6+10]




4.a) A plane is traveling in a horizontal circle, with angle of banking of its wings $25^0$. The speed of the plane is 360 kmph. Find radius of its turning.
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Code.No: R05010105

R05

SET-2

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7.a) Distinguish between:
i) Force and a couple
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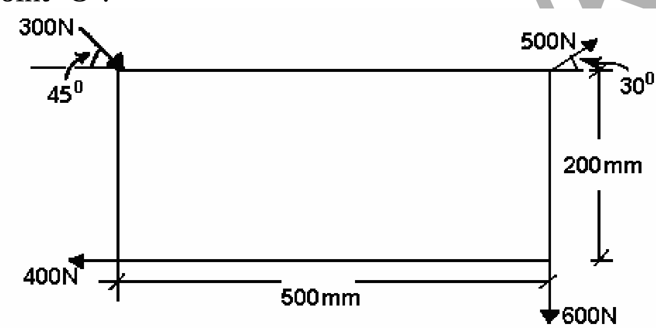
b) Find the equilibrant of the force system in figure. Locate the equilibrant with respect to point 'O'. [6+10]




8.a) State the laws of static friction. Mention 2 examples where friction is desirable.

b) A uniform ladder of length 10m rests against a vertical wall with which it makes an angle of $45^0$. The coefficient of friction between the ladder and the wall is 0.3 and that between the ladder and the grand is 0.45. If a man whose weight is one half that of the ladder ascends the ladder, how high will be when the ladder slips? [6+10]

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Code.No: R05010105 | R05 | SET-3

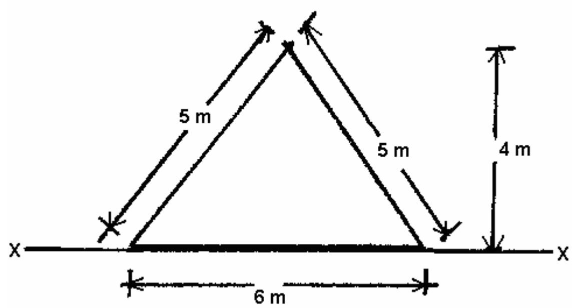
**I B.TECH – EXAMINATIONS, DECEMBER - 2010**
**APPLIED MECHANICS**
**(CIVIL ENGINEERING)**

**Time: 3hours** **Max.Marks:80**

**Answer any FIVE questions**
**All questions carry equal marks**
**- - -**

1.a) State the steps involved in the computation of moment of inertia of composite bodies?

b) A triangular metal sheet of uniform thickness 100mm and uniform density 50000 $N/m^3$ is hinged at its base 6m long as shown in figure. Determine the moment of inertia about the hinge. [6+10]




2.a) A plane is traveling in a horizontal circle, with angle of banking of its wings $25^0$. The speed of the plane is 360 kmph. Find radius of its turning.

b) A vehicle starts from rest and accelerates at the rate of 2.0m/sec$^2$ for 10 seconds. It travels at the constant speed for sometime and decelerates at the rate of 1m/sec$^2$ and comes to a halt. The total time of travel is 50sec. Find the distance between points. [8+8]

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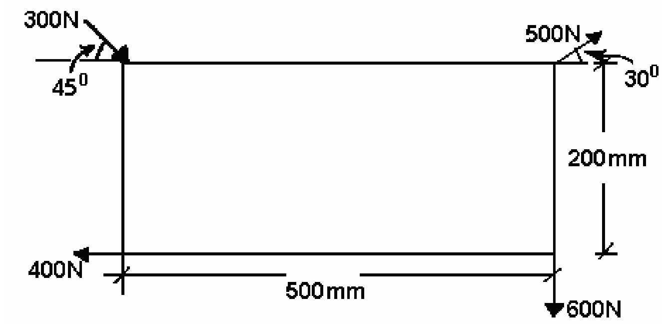


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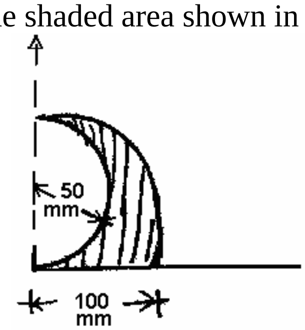


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Code.No: R05010105 | R05 | SET-4

**I B.TECH – EXAMINATIONS, DECEMBER - 2010**
**APPLIED MECHANICS**
**(CIVIL ENGINEERING)**

**Time: 3hours** **Max.Marks:80**

**Answer any FIVE questions**
**All questions carry equal marks**
**- - -**

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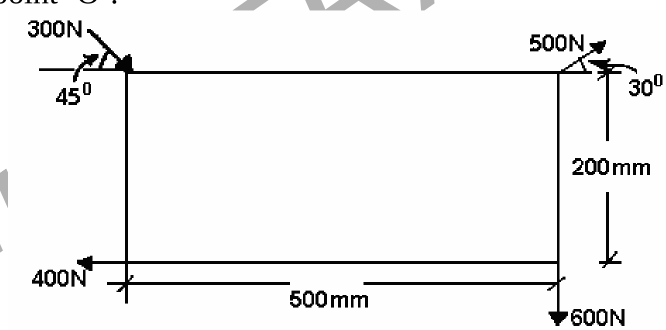


4.a) State the laws of static friction. Mention 2 examples where friction is desirable.
b) A uniform ladder of length 10m rests against a vertical wall with which it makes an angle of $45^0$. The coefficient of friction between the ladder and the wall is 0.3 and that between the ladder and the grand is 0.45. If a man whose weight is one half that of the ladder ascends the ladder, how high will be when the ladder slips? [6+10]

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Code.No: R05010105 | R05 | SET-4

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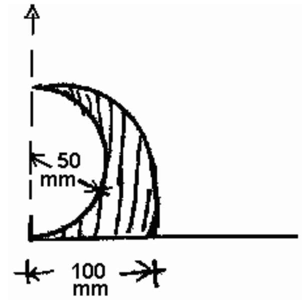
b) Locate the centroid of the shaded area shown in figure. [8+8]

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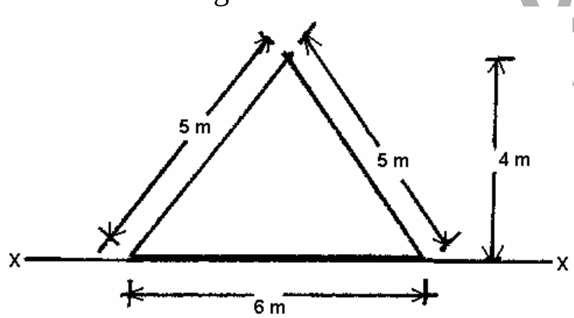


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