Code.No: R07A10101

R07

SET-1

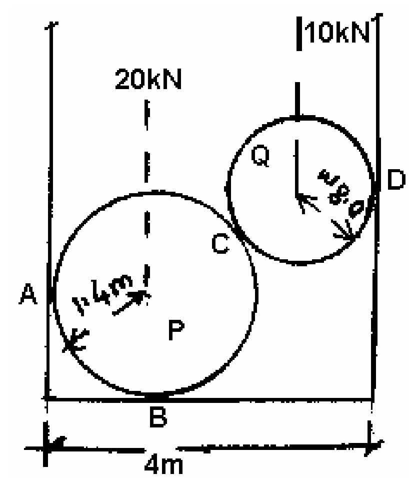
I B.TECH – EXAMINATIONS, DECEMBER - 2010
APPLIED MECHANICS
(CIVIL ENGINEERING)

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

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

1.a) State the conditions of equilibrium of coplanar non-concurrent force system.

b) The cylinders P and Q weigh 20kN and 10kN respectively. The corresponding diameters are 2.8m and 1.6m as shown in figure. Determine the reactions at A, B, C and D. [5+11]



2.a) Define the terms:
i) Static friction
ii) Kinetic friction
iii) Cone of friction.

b) A uniform ladder of length 15m rests against a vertical wall making an angle of 60^0 with the horizontal. Coefficient of friction between wall and ladder, and grand and ladder are 0.3 and 0.25. A man weighing 500N ascends the ladder. How high will he able to go before the ladder slips? Find the weight necessary to put at the bottom of the ladder so as to just sufficient to permit the man to go to top. Assume weight of ladder as 850N. [6+10]

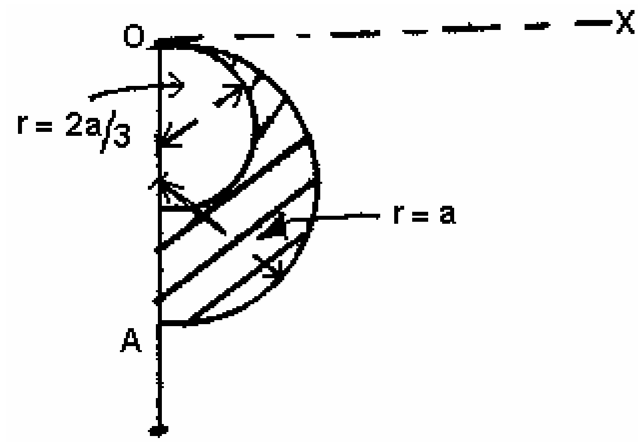
3.a) What are Stepped Pulleys, explain?

b) What maximum power can be transmitted per sq mm of belt section if the stress in the belt is limited to $2.5N/mm^2$ and the belt material weighs 5600 N/cum? The ratio of effective tension = 2. [3+13]

4.a) What is the difference between
i) Center of gravity
ii) Moment of inertia and second moment area.

b) If the lamina in figure is hinged freely at 'O', what angle does the edge OA make with OY when in equilibrium.
Also find the Moment of Inertia of the lamina with reference to horizontal centroidal axis. [6+10]

Code.No: R07A10101 R07 SET-1



5.a) State the parallel axis theorem with reference to the mass moment of inertia.

b) Determine the mass moment of inertia for a hollow cylinder of inner radius R_1 and outer radius R_2 and axial length 'l' about the longitudinal and transverse axes at the center of mass. [4+12]

6.a) Explain the terms:
i) Displacement
ii) Velocity
iii) Acceleration.

b) An electric train runs between stations A and B 600m apart. The maximum speed of the train during the journey is 6m/s and it covers the distance AB in two minutes. If both acceleration and retardation are uniform and retardation is twice that of acceleration, find the value of each of them. Calculate the distance travelled by the train during its maximum speed. [6+10]

7.a) Explain the terms:
i) Work
ii) Energy
iii) Power
iv) Momentum.

b) A hammer of mass 8500N falls over a pile, which penetrates 18mm into the ground. The hammer falls freely from a height of 3m before striking the pile. Determine the ground resistance and the loss of energy due to impact. The weight of pile is equal to 1500N. [8+8]

8.a) Define the terms:
i) Amplitude of oscillation
ii) Time period
iii) Frequency of oscillation.

b) A particle moves with a simple harmonic motion in a straight line. In the first second starting from rest it travels a distance 'a' and in the next second it travels a distance 'b' in the same direction, show that the amplitude of the motion is $\frac{2a^2}{3a-b}$. [6+10]

-----o0o-----

Code.No: R07A10101

R07

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

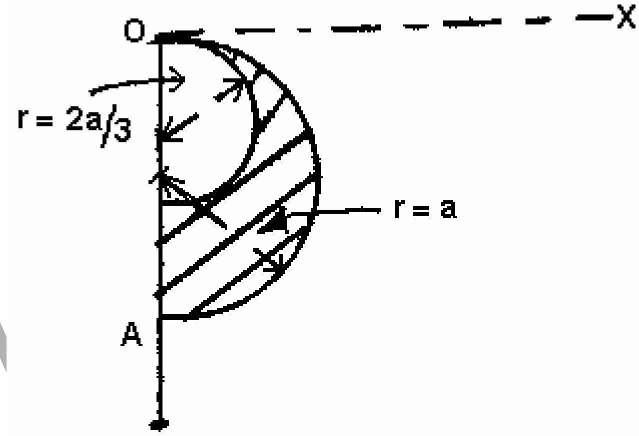
\- - -

1.a) What are Stepped Pulleys, explain?

b) What maximum power can be transmitted per sq mm of belt section if the stress in the belt is limited to $2.5 N/mm^2$ and the belt material weighs 5600 N/cum? The ratio of effective tension = 2. [3+13]

2.a) What is the difference between
i) Center of gravity
ii) Moment of inertia and second moment area.

b) If the lamina in figure is hinged freely at 'O', what angle does the edge OA make with OY when in equilibrium.
Also find the Moment of Inertia of the lamina with reference to horizontal centroidal axis. [6+10]



3.a) State the parallel axis theorem with reference to the mass moment of inertia.

b) Determine the mass moment of inertia for a hollow cylinder of inner radius R_1 and outer radius R_2 and axial length 'l' about the longitudinal and transverse axes at the center of mass. [4+12]

4.a) Explain the terms:
i) Displacement
ii) Velocity
iii) Acceleration.

b) An electric train runs between stations A and B 600m apart. The maximum speed of the train during the journey is 6m/s and it covers the distance AB in two minutes. If both acceleration and retardation are uniform and retardation is twice that of acceleration, find the value of each of them. Calculate the distance travelled by the train during its maximum speed. [6+10]

5.a) Explain the terms:
i) Work
ii) Energy
iii) Power
iv) Momentum.

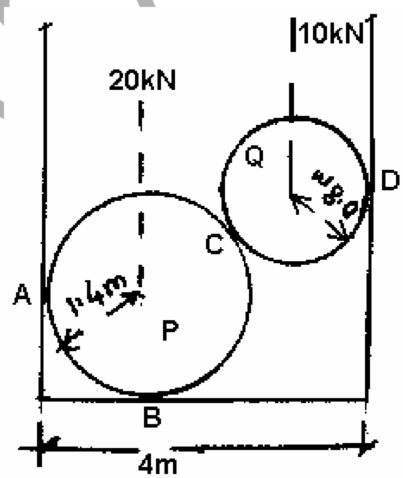
b) A hammer of mass 8500N falls over a pile, which penetrates 18mm into the ground. The hammer falls freely from a height of 3m before striking the pile. Determine the ground resistance and the loss of energy due to impact. The weight of pile is equal to 1500N. [8+8]

6.a) Define the terms:
i) Amplitude of oscillation
ii) Time period
iii) Frequency of oscillation.

b) A particle moves with a simple harmonic motion in a straight line. In the first second starting from rest it travels a distance 'a' and in the next second it travels a distance 'b' in the same direction, show that the amplitude of the motion is $\frac{2a^2}{3a-b}$. [6+10]

7.a) State the conditions of equilibrium of coplanar non-concurrent force system.

b) The cylinders P and Q weigh 20kN and 10kN respectively. The corresponding diameters are 2.8m and 1.6m as shown in figure. Determine the reactions at A, B, C and D. [5+11]



8.a) Define the terms:
i) Static friction
ii) Kinetic friction
iii) Cone of friction.

b) A uniform ladder of length 15m rests against a vertical wall making an angle of 60^0 with the horizontal. Coefficient of friction between wall and ladder, and grand and ladder are 0.3 and 0.25. A man weighing 500N ascends the ladder. How high will he able to go before the ladder slips? Find the weight necessary to put at the bottom of the ladder so as to just sufficient to permit the man to go to top. Assume weight of ladder as 850N. [6+10]

-----o0o-----

Code.No: R07A10101 | R07 | 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 parallel axis theorem with reference to the mass moment of inertia.

b) Determine the mass moment of inertia for a hollow cylinder of inner radius R_1 and outer radius R_2 and axial length 'l' about the longitudinal and transverse axes at the center of mass. [4+12]

2.a) Explain the terms:
i) Displacement
ii) Velocity
iii) Acceleration.

b) An electric train runs between stations A and B 600m apart. The maximum speed of the train during the journey is 6m/s and it covers the distance AB in two minutes. If both acceleration and retardation are uniform and retardation is twice that of acceleration, find the value of each of them. Calculate the distance travelled by the train during its maximum speed. [6+10]

3.a) Explain the terms:
i) Work
ii) Energy
iii) Power
iv) Momentum.

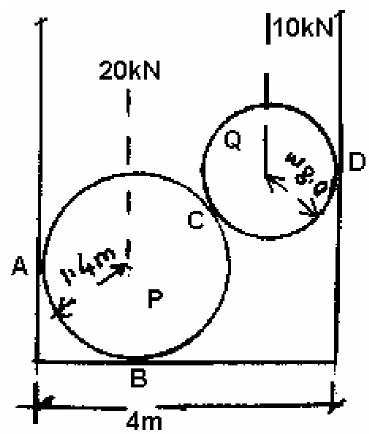
b) A hammer of mass 8500N falls over a pile, which penetrates 18mm into the ground. The hammer falls freely from a height of 3m before striking the pile. Determine the ground resistance and the loss of energy due to impact. The weight of pile is equal to 1500N. [8+8]

4.a) Define the terms:
i) Amplitude of oscillation
ii) Time period
iii) Frequency of oscillation.

b) A particle moves with a simple harmonic motion in a straight line. In the first second starting from rest it travels a distance 'a' and in the next second it travels a distance 'b' in the same direction, show that the amplitude of the motion is $\frac{2a^2}{3a-b}$. [6+10]

5.a) State the conditions of equilibrium of coplanar non-concurrent force system.

b) The cylinders P and Q weigh 20kN and 10kN respectively. The corresponding diameters are 2.8m and 1.6m as shown in figure. Determine the reactions at A, B, C and D. [5+11]



6.a) Define the terms:
i) Static friction
ii) Kinetic friction
iii) Cone of friction.

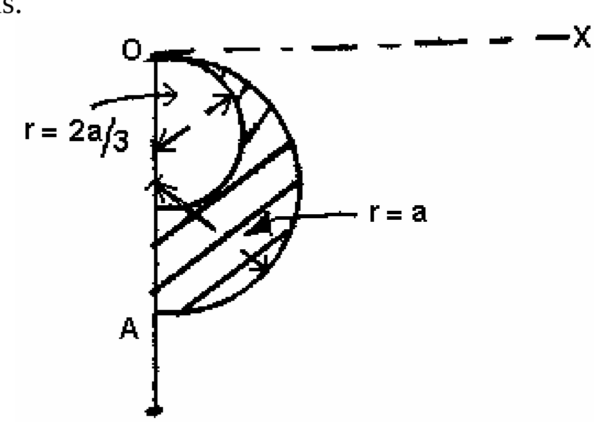
b) A uniform ladder of length 15m rests against a vertical wall making an angle of 60^0 with the horizontal. Coefficient of friction between wall and ladder, and grand and ladder are 0.3 and 0.25. A man weighing 500N ascends the ladder. How high will he able to go before the ladder slips? Find the weight necessary to put at the bottom of the ladder so as to just sufficient to permit the man to go to top. Assume weight of ladder as 850N. [6+10]

7.a) What are Stepped Pulleys, explain?

b) What maximum power can be transmitted per sq mm of belt section if the stress in the belt is limited to $2.5N/mm^2$ and the belt material weighs 5600 N/cum? The ratio of effective tension = 2. [3+13]

8.a) What is the difference between
i) Center of gravity
ii) Moment of inertia and second moment area.

b) If the lamina in figure is hinged freely at 'O', what angle does the edge OA make with OY when in equilibrium.
Also find the Moment of Inertia of the lamina with reference to horizontal centroidal axis. [6+10]



-----o0o-----

Code.No: R07A10101

R07

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
- - -

1.a) Explain the terms:
i) Work
ii) Energy
iii) Power
iv) Momentum.

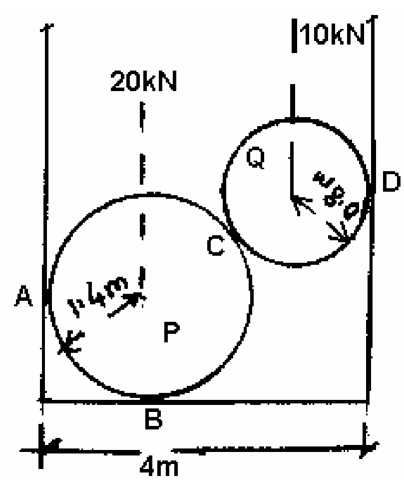
b) A hammer of mass 8500N falls over a pile, which penetrates 18mm into the ground. The hammer falls freely from a height of 3m before striking the pile. Determine the ground resistance and the loss of energy due to impact. The weight of pile is equal to 1500N. [8+8]

2.a) Define the terms:
i) Amplitude of oscillation
ii) Time period
iii) Frequency of oscillation.

b) A particle moves with a simple harmonic motion in a straight line. In the first second starting from rest it travels a distance 'a' and in the next second it travels a distance 'b' in the same direction, show that the amplitude of the motion is $\frac{2a^2}{3a-b}$. [6+10]

3.a) State the conditions of equilibrium of coplanar non-concurrent force system.

b) The cylinders P and Q weigh 20kN and 10kN respectively. The corresponding diameters are 2.8m and 1.6m as shown in figure. Determine the reactions at A, B, C and D. [5+11]



4.a) Define the terms:
i) Static friction ii) Kinetic friction iii) Cone of friction.

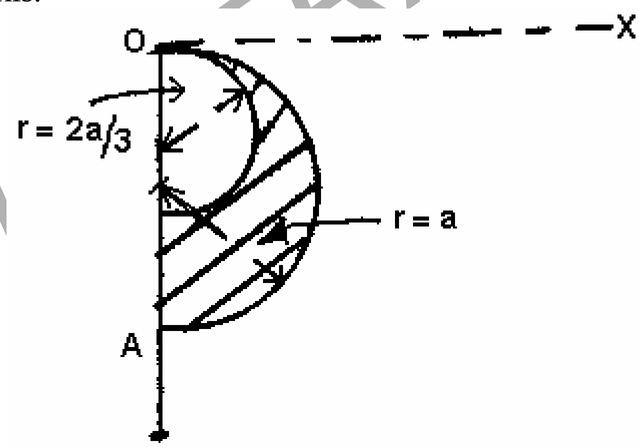
b) A uniform ladder of length 15m rests against a vertical wall making an angle of 60^0 with the horizontal. Coefficient of friction between wall and ladder, and grand and ladder are 0.3 and 0.25. A man weighing 500N ascends the ladder. How high will he able to go before the ladder slips? Find the weight necessary to put at the bottom of the ladder so as to just sufficient to permit the man to go to top. Assume weight of ladder as 850N. [6+10]

5.a) What are Stepped Pulleys, explain?

b) What maximum power can be transmitted per sq mm of belt section if the stress in the belt is limited to $2.5 N/mm^2$ and the belt material weighs 5600 N/cum? The ratio of effective tension = 2. [3+13]

6.a) What is the difference between
i) Center of gravity
ii) Moment of inertia and second moment area.

b) If the lamina in figure is hinged freely at 'O', what angle does the edge OA make with OY when in equilibrium.
Also find the Moment of Inertia of the lamina with reference to horizontal centroidal axis. [6+10]



7.a) State the parallel axis theorem with reference to the mass moment of inertia.

b) Determine the mass moment of inertia for a hollow cylinder of inner radius R_1 and outer radius R_2 and axial length 'l' about the longitudinal and transverse axes at the center of mass. [4+12]

8.a) Explain the terms:
i) Displacement ii) Velocity iii) Acceleration.

b) An electric train runs between stations A and B 600m apart. The maximum speed of the train during the journey is 6m/s and it covers the distance AB in two minutes. If both acceleration and retardation are uniform and retardation is twice that of acceleration, find the value of each of them. Calculate the distance travelled by the train during its maximum speed. [6+10]

-----o0o-----