

Unit 7 - Week 6

Course outline

How does an NPTEL online course work?

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Engineering Mechanics - Statics and Dynamics: Week 6 Feedback Form

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Assignment 6

The due date for submitting this assignment has passed. **Due on 2020-03-11, 23:59 IST.**
 As per our records you have not submitted this assignment.

1) For what acceleration of the frame will the uniform slender rod remain in the position shown in the figure? Assume that rollers at A and B are frictionless and have no mass.(take $g = 10m/s^2$) **1 point**

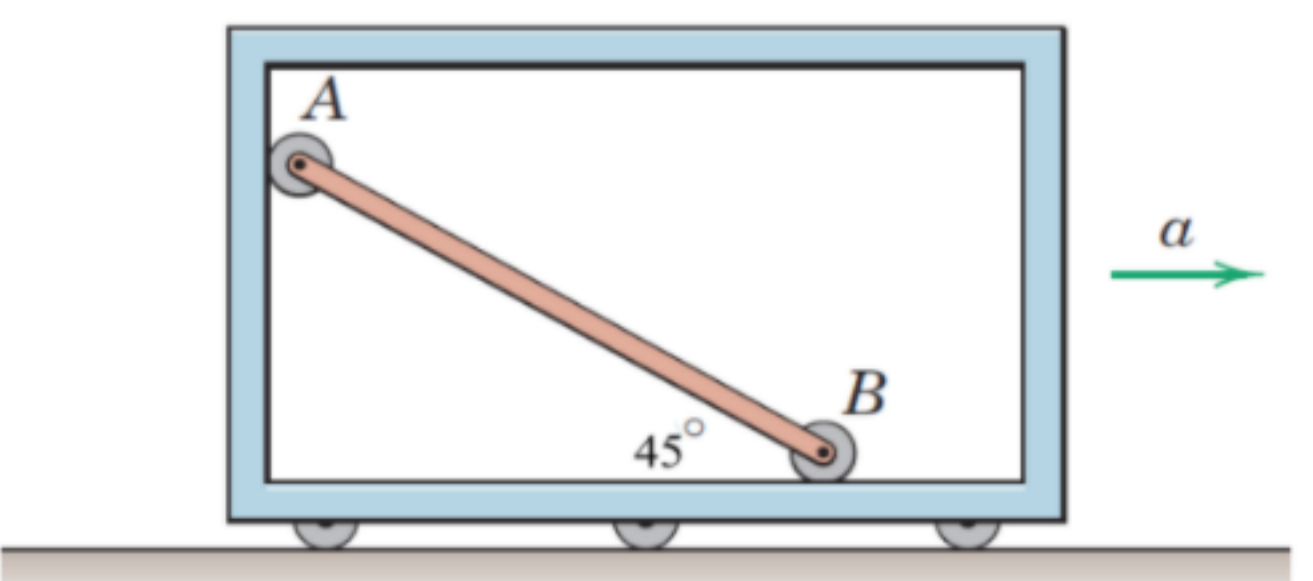


Figure 1: Figure for question No.1

- $g\sqrt{2}$
- g
- $g/\sqrt{2}$
- The rod can never be retained in that position

No, the answer is incorrect. Score: 0

Accepted Answers: g

2) M is the mass of the cart and m is the mass of the homogeneous cylinder. If P is the minimum force required for the homogeneous cylinder to begin to roll up out of its rectangular recess then what is the value of $(P/(M + m)g)^2$? **1 point**

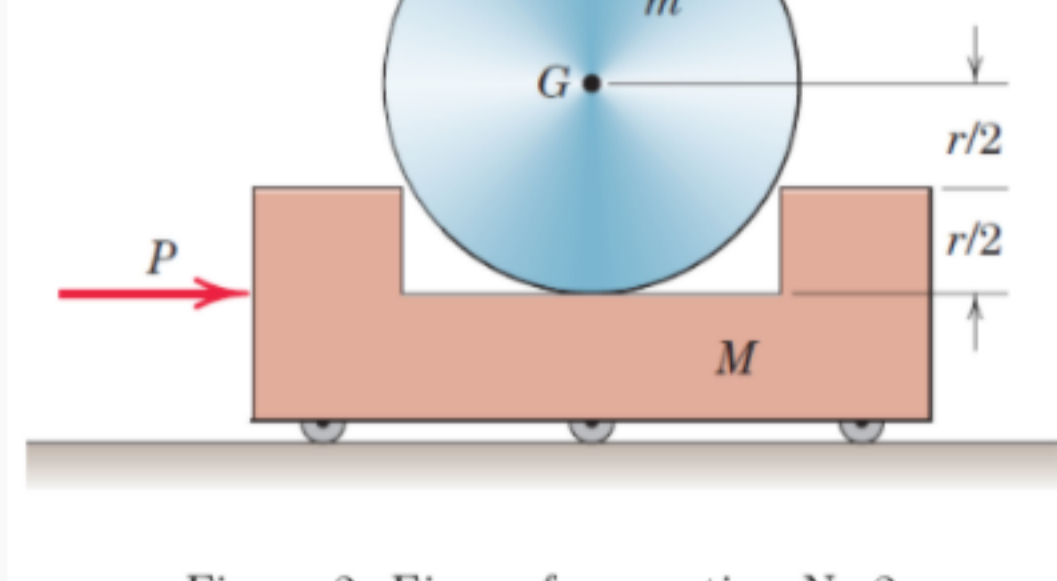


Figure 2: Figure for question No.2

- 1
- 2
- 3
- 4

No, the answer is incorrect. Score: 0

Accepted Answers: 3

3) A log of wood of mass $m = \sqrt{3}kg$ is tied with two cables and is released from the position shown in the figure from rest. What is the angular acceleration of the cables at this instant(in rad/s^2)(take $g = 10m/s^2$)? **1 point**

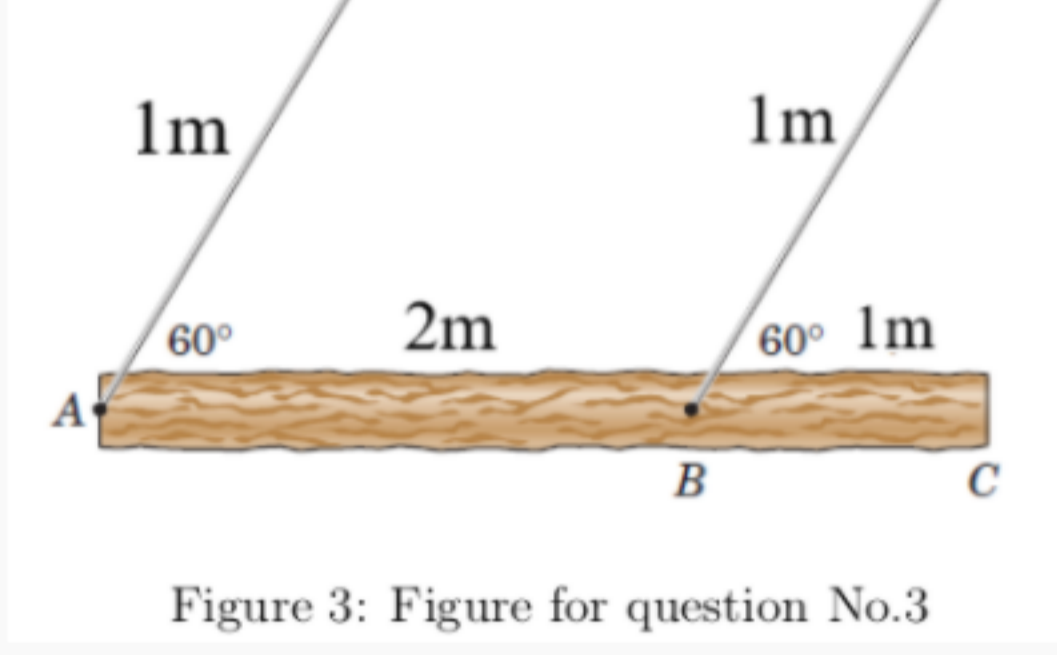


Figure 3: Figure for question No.3

- 0
- 5
- 10
- None of the above

No, the answer is incorrect. Score: 0

Accepted Answers: 5

4) For the same system as in question 3, what will be the difference in the magnitudes tensions in the two cables at that instant(in N)(take $g = 10m/s^2$)? **1 point**

- 0
- 5
- 10
- 15

No, the answer is incorrect. Score: 0

Accepted Answers: 15

5) What is the angular acceleration of the disk for the given system(in rad/s^2)? The moment of inertia of a disk with radius R and mass M is given as $I = MR^2/2$. (Take $g = 10m/s^2$) **1 point**

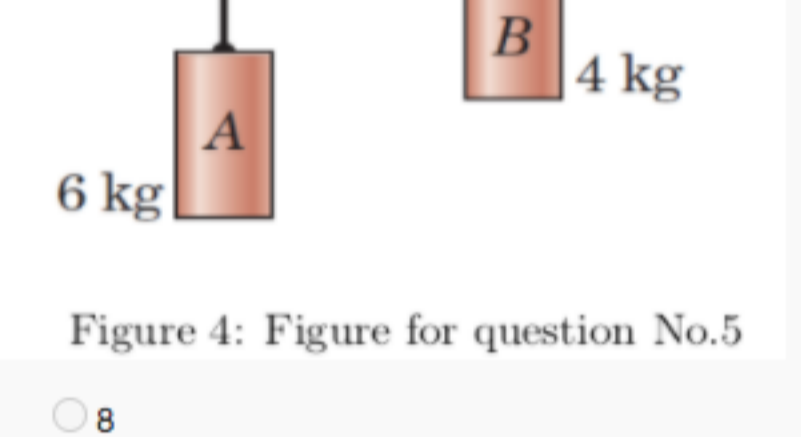


Figure 4: Figure for question No.5

- 8
- 6.4
- 10.67
- 16

No, the answer is incorrect. Score: 0

Accepted Answers: 6.4

6) Choose alternative(s) which is/are true for the system mentioned in question 5.(One or more than one may be correct) **1 point**

- The cable will have same tension throughout if the moment of inertia of the disc is considered as zero
- The tension in the part of the string attached to mass A is 50.4N, when moment of inertia of the disc is considered non-zero
- The tension in the part of the string attached to mass B is 46.4N, when moment of inertia of the disc is considered non-zero
- If the radius of the disc is increased keeping the mass of the disc the same so as to increase its moment of inertia, then the angular acceleration of the disc will increase

No, the answer is incorrect. Score: 0

Accepted Answers: The cable will have same tension throughout if the moment of inertia of the disc is considered as zero

The tension in the part of the string attached to mass A is 50.4N, when moment of inertia of the disc is considered non-zero

The tension in the part of the string attached to mass B is 46.4N, when moment of inertia of the disc is considered non-zero

7) Determine the value of the normal reaction(in N) on a circular disk of mass $m = 1kg$ and radius $r = 1m$ when it is rolling through the bottom of a circular path of radius $R = 2m$ with an angular velocity of $\omega = 2rad/s$.(Take $g = 10m/s^2$) **1 point**

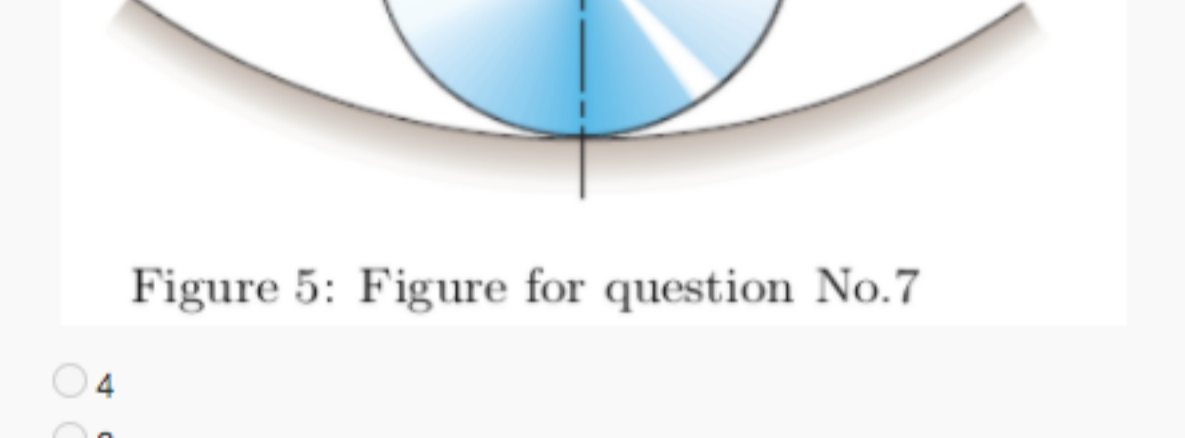


Figure 5: Figure for question No.7

- 4
- 8
- 10
- 14

No, the answer is incorrect. Score: 0

Accepted Answers: 14

8) The four fan blades have total mass of 2kg and moment of inertia $I_0 = 5kg \cdot m^2$ about an axis passing through the fan's centre. There is a moment M acting on the fan given by $M(t) = (2t + 3)N \cdot m$. If the fan starts from rest at time $t = 0s$ what will be its angular velocity(in rad/s) at time $t = 2s$? **1 point**



Figure 6: Figure for question No.8

No, the answer is incorrect. Score: 0

Accepted Answers: (Type: Numeric) 2

9) The 20kg disk A is attached to the 10kg block B using the cable and pulley system. For the disk to roll without slipping if μ_{min} is the value of the minimum coefficient of static friction between the disk and the surface, then find value of $1/\mu_{min}$ **1 point**

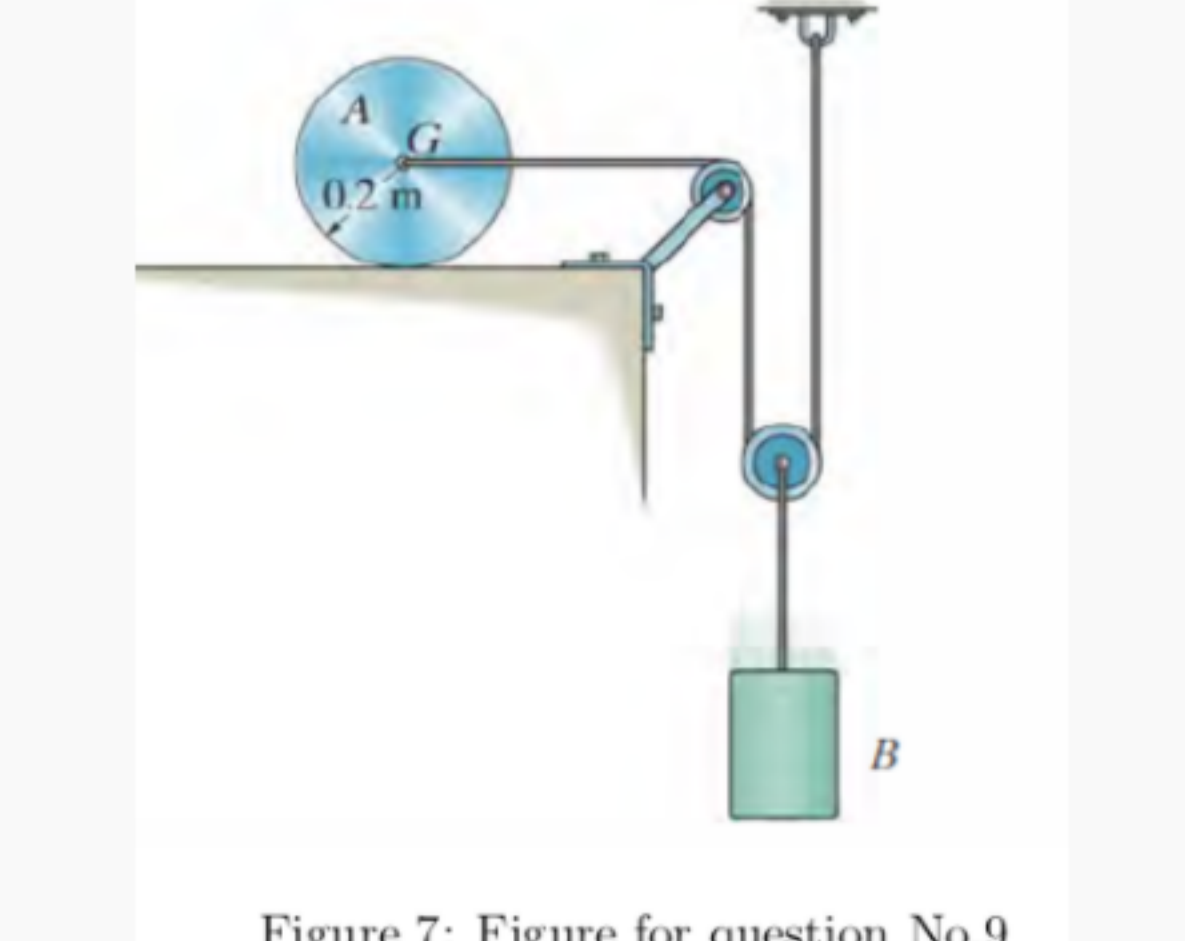


Figure 7: Figure for question No.9

No, the answer is incorrect. Score: 0

Accepted Answers: (Type: Range) 12.5,13.5

10) If an object has to roll without slipping the frictional force acting on the object will always be a static friction force. True or False? **1 point**

- True
- False
- Cannot be said certainly

No, the answer is incorrect. Score: 0

Accepted Answers: True