

A- Read all the quiz once, or twice, before beginning to write. Make sure to comprehend all questions and start with those you feel most confident in.

B – Be clear and concise. There are no extra points for being verbose or writing extra.

C –Only use the white pages that I will provide. You have 50 minutes to answer the quiz.

Problem 2

One end of a uniform meter stick is placed against a vertical wall (Figure 2). The other end is held by a lightweight cord that makes an angle θ with the stick. The coefficient of static friction between the end of the meter stick and the wall is $\mu = 0.30$. (a) What is the maximum value the angle θ can have if the stick is to remain in equilibrium? (b) Let the angle θ be 15° . A block of the same weight as the meter stick is suspended from the stick, as shown, at a distance x from the wall. What is the minimum value of x for which the stick will remain in equilibrium? (c) When $\theta = 15^\circ$, how large must the coefficient of static friction be so that the block can be attached 10 cm from the left end of the stick without causing it to slip?

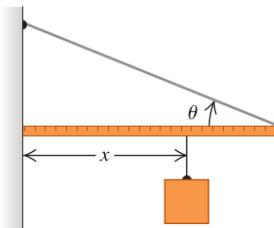


Figure 2

Problem 2

A cubical block rests on an inclined board with two sides parallel to the direction of the incline. The coefficient of static friction between block and board is 0.95. If the inclination angle of the board is increased, will the block first slide or first tip over?

Problem 3

A 4.2-m-long beam is supported by a cable at its center. A 65-kg steelworker stands at one end of the beam. Where should a 180-kg bucket of concrete be suspended if the beam is to be in static equilibrium? Draw a diagram.

Problem 4

Ahmad and Sebas were given some money each. After Ahmad spends B/.75 and Sebas spends B/. 25 each day during a fixed number of days, Ahmad still has B/.900 remaining while Sebas spent all her money. If Ahmad spends B/. 25 and Sebas B/. 75 each day during the same period, Ahmad will still have B/. 2100 while Sebas owes money. How much money does Sebas owes?

Key Concepts: (a) Static equilibrium. The Two conditions: $F=0$, $\text{Torques}=0$

(b) How to get torques from forces. What is the lever arm (c) Definition of moments of inertia.

(d) Conditions for tipping. (section 12.1)