

Name: _____

AP Physics 1: Rotational Motion Torque

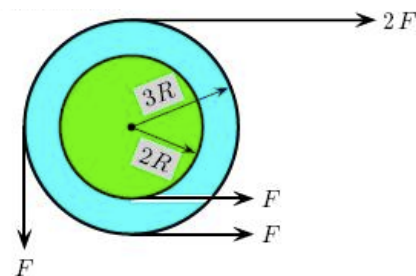
Conceptual Questions

1. Could a smaller force exert a greater torque than a larger force? Explain

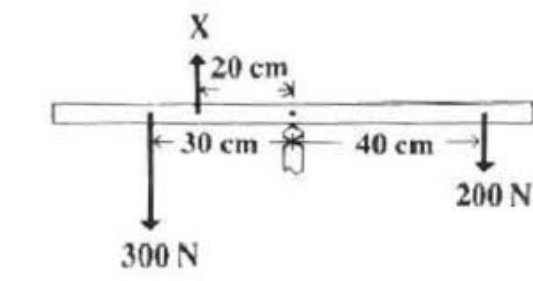
2. If a force acts on an object in such a way that the lever arm is zero, does it have any effect on the object's motion? Explain

Mathematical Questions

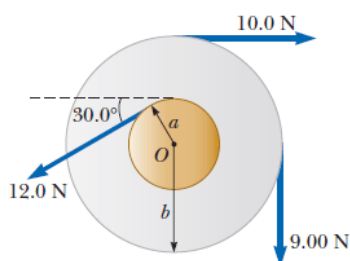
3. A system of two wheels fixed to each other is free to rotate about a frictionless axis through the common center of the wheels and perpendicular to the page. Four forces are exerted tangentially to the rims of the wheels, as shown. The magnitude of the net torque on the system is...
A. zero
B. FR
C. $2FR$
D. $5FR$
E. $14FR$



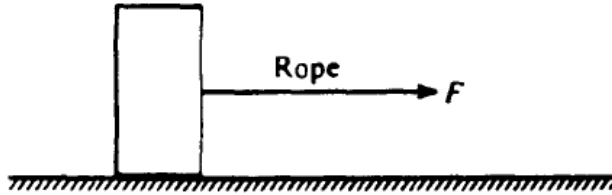
4. A uniform meter stick is balanced at its midpoint with several forces applied as shown below. If the stick is in equilibrium, the magnitude of the force x is
A. 50 N
B. 100 N
C. 200 N
D. 300 N
E. Cannot be determined



5. Find the net torque on the two-wheel system shown. Assume that $a = 10.0$ cm and $b = 25.0$ cm. Carefully consider the angle of your forces.

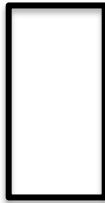


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A box of uniform density weighing 100 N moves in a straight line with constant speed along a horizontal surface. The coefficient of sliding friction is 0.4 and a rope exerts a force F in the direction of motion as shown above.

- A. On the diagram below, draw and identify all the forces on the box.



- B. Calculate the force F exerted by the rope that keeps the box moving with constant speed.

- C. A horizontal force F' , applied at a height $\frac{5}{3}$ meters above the surface as shown in the diagram above, is just sufficient to cause the box to begin to tip forward about an axis through point P . The box is 1 meter wide and 2 meters high. Calculate the force F' .

