WebAssign
CH05-HW01-SP12 (Homework)

Yinglai Wang
PHYS 172-SPRING 2012, Spring 2012
Instructor: Virendra Saxena

Current Score : 22.5 / 22.5 **Due :** Tuesday, February 7 2012 11:59 PM EST

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1. 3/3 points | Previous Answers MI3 5.1.X.012

The velocity of a 150 gram ball changes from < 7, -5, 0 > m/s to < 7.2, -5.4, 0 > m/s in 0.05 s, due to the gravitational attraction of the Earth and to air resistance.

(a) What is the acceleration of the ball?
$\vec{a}$ = < 4 ✓ , -8 ✓ , 0 > m/s/s

(b) What is the rate of change of momentum of the ball?
$\frac{d\vec{p}}{dt}$ = < 0.6 ✓ , -1.2 ✓ , 0 > kg · m/s/s

(c) What is the net force acting on the ball?
$\vec{F}_{net}$ = < 0.6 ✓ , -1.2 ✓ , 0 > N

- *Read the eBook*
- Section 5.1

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2. 1.5/1.5 points | Previous Answers MI3 5.2.X.003

If an object is moving with constant momentum < 16, −16, −4 > kg · m/s, what is the rate of change of momentum?
$d\vec{p}/dt$ = ✓ (kg · m/s)/s

What is the net force acting on the object?
$\vec{F}_{net}$ = ✓ N

- *Read the eBook*
- Section 5.2

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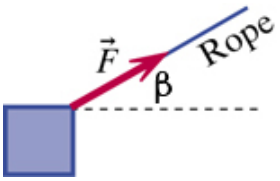
3. 4/4 points | Previous Answers MI3 5.2.X.013

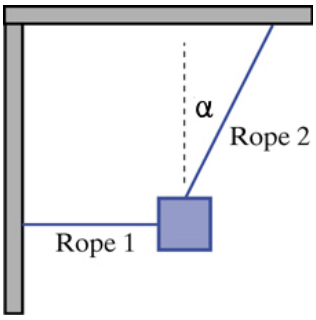


A rope is attached to a block. The rope pulls on the block with a force of 225 N, at an angle of 25 degrees to the horizontal (this force is equal to the tension in the rope).

What is the x-component of the force on the block due to the rope?
F_{T_x} = 203.92 ✓ N
What is the y-component of the force on the block due to the rope?
F_{T_y} = 95.09 ✓ N

- *Read the eBook*
- Section 5.2

4. 6/6 points | Previous Answers MI3 5.2.P.014

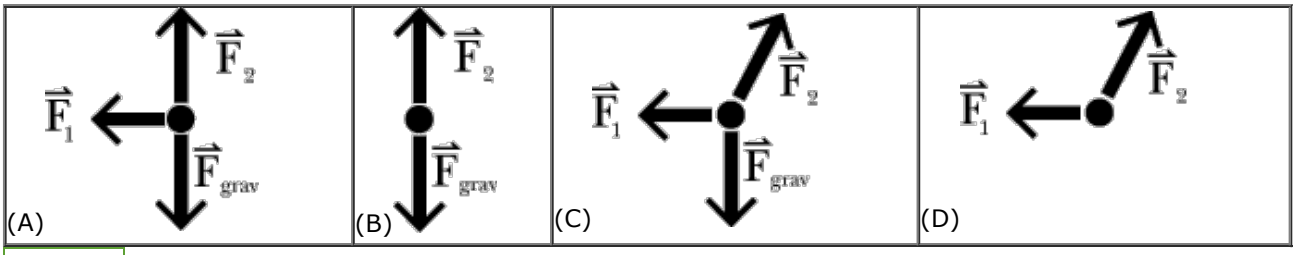


A box of mass 30 kg hangs motionless from two ropes, as shown in the diagram above. The angle α is 26 degrees. Choose the box as the system. The x-axis runs to the right, the y-axis runs up, and the z-axis is out of the page.

Is $\frac{d\vec{p}}{dt}$ of the box zero or nonzero?

- nonzero
- zero ✓

Which of the following "freebody" diagrams correctly describes the forces acting on the box?



- A
- B
- C ✓
- D

What is the y-component of the gravitational force acting on the block? (A component can be positive or negative).

F_{grav_y} = -294 ✓ N

What is the y-component of the force on the block due to rope 2?

F_{2_y} = 294 ✓ N

What is the magnitude of $\vec{F}_2$?

$|\vec{F}_2|$ = 327.105 ✓ N

What is the x-component of the force on the block due to rope 2?

F_{2_x} = 143.39 ✓ N

What is the x-component of the force on the block due to rope 1?

F_{1x} = -143.39 ✓ N

- *Read the eBook*
- Section 5.2

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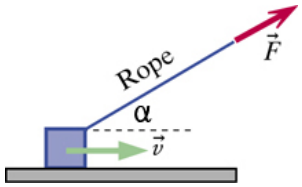
5. 8/8 points | Previous Answers MI3 5.2.P.015

You pull with a force of 290 N on a rope that is attached to a block of mass 20 kg, and the block slides across the floor at a constant speed of 1.6 m/s. The rope makes an angle of 25 degrees with the horizontal.



What is the direction of [?] of the block?

zero magnitude ✓

What is the net force on the block?

[?] = < 0 ✓ , 0 ✓ , 0> N

Which objects exert forces on the block with nonzero x-components?

- [x] floor
- [ ] you
- [ ] Earth
- [x] rope

✓

What is the x-component of the tension force exerted by the rope on the block? (A component may be positive or negative)

[?] = 262.83 ✓ N

What is the x-component of the force exerted by the floor on the block (the friction force)?

[?] = -262.83 ✓ N

Which objects exert forces on the block with nonzero y-components?

- [x] floor
- [x] Earth
- [ ] you
- [x] rope

✓

What is the y-component of the force exerted by the rope on the block?

[?] = 122.56 ✓ N

What is the y-component of the force exerted by the Earth on the block?

[?] = -196 ✓ N

What is the y-component of the force exerted by the floor on the block (sometimes called the "normal" force, because it is perpendicular to the floor)?

= 73.44 N

- *Read the eBook*
- Section 5.2