

Name:

Tuesday, May 14, 2013

Ku:

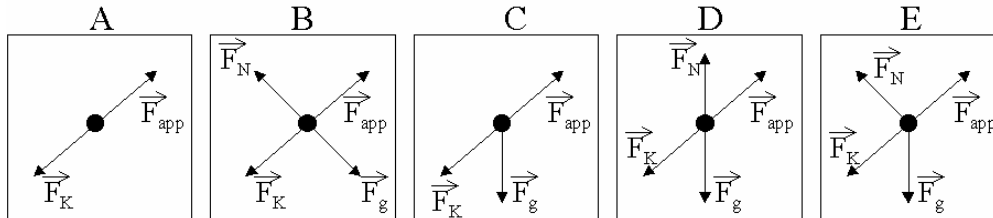
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Com:

Multiple Choice [ku: 6]

Identify the letter of the choice that best completes the statement or answers the question.

___1. The free-body diagram of a block being pushed up a rough ramp is best represented by [1]



a. A

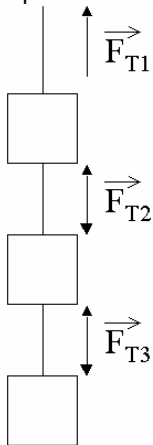
b. B

c. C

d. D

e. E

___2. Three masses are suspended vertically as shown in the diagram below. The system is accelerating upward. What is the relationship among the forces of tension? [1]



a. $|\vec{F}_{T1}| = |\vec{F}_{T2}| = |\vec{F}_{T3}|$

b. $|\vec{F}_{T1}| > |\vec{F}_{T2}| < |\vec{F}_{T3}|$

c. $|\vec{F}_{T1}| < |\vec{F}_{T2}| < |\vec{F}_{T3}|$

d. $|\vec{F}_{T1}| > |\vec{F}_{T2}| > |\vec{F}_{T3}|$

e. $|\vec{F}_{T1}| > |\vec{F}_{T3}| < |\vec{F}_{T2}|$

SHOW YOUR WORK FOR THE FOLLOWING QUESTION ONLY. [4]___3. A 1.5-kg cart is pulled with a force of 7.3 N at an angle of 40° above the horizontal. If a kinetic friction force of 3.2 N acts against the motion, the cart's acceleration along the horizontal surface will be

a. 5.0 m/s^2

b. 2.7 m/s^2

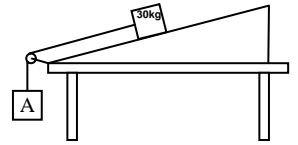
c. 1.6 m/s^2

d. 2.4 m/s^2

e. 1.0 m/s^2

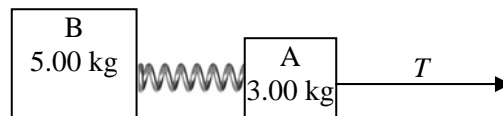
Problem Solving: Answer all questions in the GRFS format and include FBDs as part of your solution.

1. Determine the **acceleration** and the **tension** in the rope of the system below where the mass of A is 50kg, the mass of B is 30kg, the coefficient of friction is 0.039 and the ramp is angled at 20° . Solve algebraically for acceleration first [**ku:10**]



2. Two masses are held together by a spring as shown below. The first mass is being pulled with some unknown tension. If the spring is being extended by 3.00 cm and the force constant of the spring is 300 N/m, assuming no friction: **[ku:10]**

- a) Draw the FBD of mass A and B [4]
- b) Find the acceleration of the system (assume the spring is not oscillating but moving the mass steadily) [3]
- c) Find the tension [3]



3. During an aggressive game of tether ball, Napoleon kicks the ball so hard that it makes an angle of 75° to the vertical. If the length of the rope is 1.75m [ku: 14]
- draw the FBD of the tether ball. [3]
 - derive an equation for the velocity of the tether ball in terms of length (l), the angle (θ), gravity (g) [6]
 - derive an equation for the frequency of the tether ball in terms of length (l), the angle (θ), gravity (g) [3]
 - find the velocity and frequency [2]

