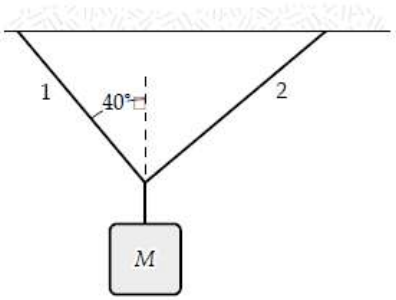
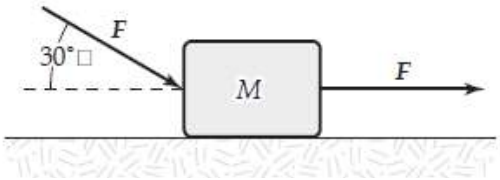
Physics Department Physics Homework (2)
University of Jordan **The Laws of Motion**

1. In the figure, if the tension in string 1 is 34 N and the tension in string 2 is 24 N, what is the mass of the object shown?



a. 7.3 kg
b. 5.5 kg
c. 1.8 kg
d. 3.7 kg
e. 4.5 kg

2. The horizontal surface on which the block slides is frictionless. If F = 20 N and M = 5.0 kg, what is the magnitude of the resulting acceleration of the block?

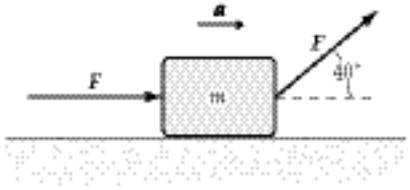


a. 5.3 m/s^2
b. 6.2 m/s^2
c. 7.5 m/s^2
d. 4.7 m/s^2
e. 3.2 m/s^2

3. If the only forces acting on a 2.0-kg mass are $\mathbf{F}_1 = (3\mathbf{i} - 8\mathbf{j})$ N and $\mathbf{F}_2 = (5\mathbf{i} + 3\mathbf{j})$ N, what is the magnitude of the acceleration of the particle?

a. 1.5 m/s^2
b. 6.5 m/s^2
c. 4.7 m/s^2
d. 9.4 m/s^2
e. 7.2 m/s^2

4. If F = 4.0 N and m = 2.0 kg, what is the magnitude a of the acceleration for the block shown below? The surface is frictionless.



a. 5.3 m/s^2
b. 4.4 m/s^2
c. 3.5 m/s^2
d. 6.2 m/s^2
e. 8.4 m/s^2

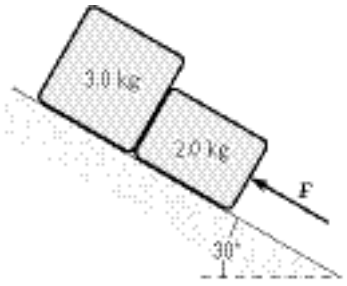
5. A 5.0-kg object is suspended by a string from the ceiling of an elevator that is accelerating downward at a rate of 2.6 m/s^2. What is the tension in the string?

a. 49 N
b. 36 N
c. 62 N
d. 13 N
e. 52 N

6. A 3.0-kg block slides on a frictionless 20° inclined plane. A force of 16 N acting parallel to the incline and up the incline is applied to the block. What is the acceleration of the block?

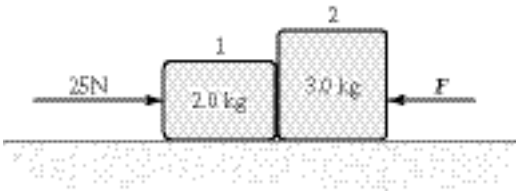
a. 2.0 m/s^2 down the incline
b. 5.3 m/s^2 up the incline
c. 2.0 m/s^2 up the incline
d. 3.9 m/s^2 down the incline
e. 3.9 m/s^2 up the incline

7. The surface of the inclined plane shown is frictionless. If F = 30 N, what is the magnitude of the force exerted on the 3.0-kg block by the 2.0-kg block?



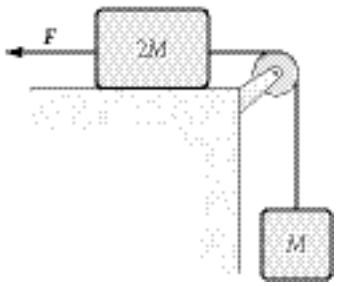
a. 18 N
b. 27 N
c. 24 N
d. 21 N
e. 15 N

8. If F = 5.0 N, what is the magnitude of the force exerted by block 2 on block 1?



a. 17 N
b. 19 N
c. 21 N
d. 23 N
e. 5.0 N

9. If F = 40 N and M = 1.5 kg, what is the tension in the string connecting M and $2M$? Assume that all surfaces are frictionless.

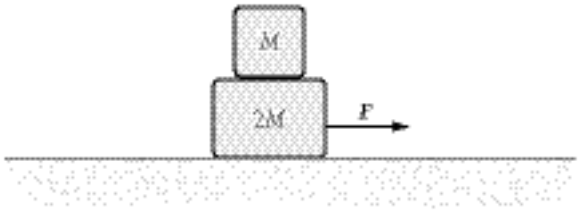


a. 13 N
b. 23 N
c. 36 N
d. 15 N
e. 28 N

10. A box rests on the (horizontal) back of a truck. The coefficient of static friction between the box and the surface on which it rests is 0.24. What maximum distance can the truck travel (starting from rest and moving horizontally with constant acceleration) in 3.0 s without having the box slide?

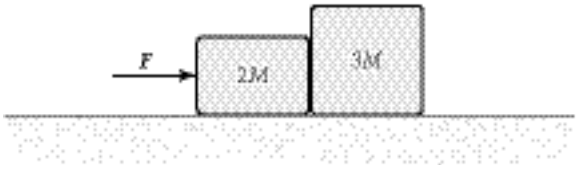
a. 14 m
b. 11 m
c. 19 m
d. 24 m
e. 29 m

11. Two blocks are accelerated across a horizontal frictionless surface as shown. Frictional forces keep the two blocks from sliding relative to each other, and the two move with the same acceleration. If F = 1.2 N and M = 1.0 kg, what is the horizontal component (frictional force) of the force of the large block on the small block?



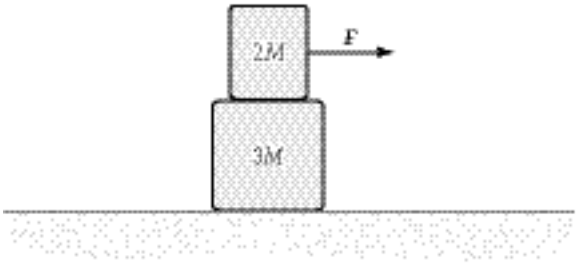
a. 0.40 N to the left
b. 0.80 N to the right
c. 0.40 N to the right
d. 0.80 N to the left
e. 1.20 N to the left

12. The coefficient of kinetic friction between the surface and the larger block is 0.25, and the coefficient of kinetic friction between the surface and the smaller block is 0.40. If F = 22N and M = 1.0 kg in the figure, what is the magnitude of the acceleration of either block?



a. 1.8 m/s^2
b. 2.6 m/s^2
c. 1.4 m/s^2
d. 2.2 m/s^2
e. 3.7 m/s^2

13. Two blocks are accelerated across a horizontal frictionless surface as shown. Frictional forces keep the two blocks from sliding relative to each other, and the two move with the same acceleration. If F = 1.2 N and M = 1.0 kg, what is the horizontal component (frictional force) of the force of the small block on the large block?



a. 0.48 N to the right
b. 0.72 N to the right
c. 0.72 N to the left
d. 0.48 N to the left
e. 0.65 N to the left

14. The frictional force of the floor on a large suitcase is least when the suitcase is

a. pushed by a force parallel to the floor.
b. dragged by a force parallel to the floor.
c. pulled by a force directed at an angle θ above the floor.
d. pushed by a force directed at an angle θ into the floor.
e. turned on its side and pushed by a force parallel to the floor.

15. A chair is placed on a rug. Then a book is placed on the chair. The floor exerts a normal force

a. on all three.
b. only on the book.
c. only on the rug.
d. upwards on the rug and downwards on the chair.
e. only on the objects you have defined to be part of the system.

16. The apparent weight of a fish in an elevator is greatest when the elevator

a. moves downward at constant velocity.
b. moves upward at constant velocity.
c. accelerates downward.
d. accelerates upward.
e. is not moving.