McRoberts Secondary

Dynamics Unit Retest 2 2025-01-19

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0 1 2 3 4 5 6 7 8 9

In this section **no** changes or modifications must be made!

Scrambling 0 0

Type: 020

Exam ID(Physics 11): 25011900001

Please mark the boxes carefully: ☒ Not marked: ☐ or ■

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Only clearly marked and positionally accurate crosses will be processed!

Answers 1 - 15

	a	b	c	d
1	☐	☐		
2	☐	☐		
3	☐	☐		
4	☐	☐	☐	☐
5	☐	☐	☐	☐
6	☐	☐	☐	☐
7	☐	☐	☐	☐
8	☐	☐	☐	☐
9	☐	☐	☐	☐
10	☐	☐	☐	☐
11	☐	☐	☐	☐
12	☐	☐	☐	☐
13	☐	☐	☐	☐
14	☐	☐	☐	☐
15	☐	☐	☐	☐
	a	b	c	d

Answers 16 - 20

	a	b	c	d
16	☐	☐	☐	☐
17	☐	☐	☐	☐
18	☐	☐	☐	☐
19	☐	☐	☐	☐
20	☐	☐	☐	☐
	a	b	c	d

1. True or false? If an object is in equilibrium (i.e. all the forces on it are balanced), then the object must be at rest.

    a. True
    b. False

2. True or false? An object weighs less on the moon than it does on earth.

    a. True
    b. False

3. True or false? A ball is thrown upwards and rightwards. While it is in the air, the net force on the ball is directed upwards and rightwards.

    a. True
    b. False

4. A box that weighs 100 N rests on a digital scale on the floor of an elevator. When would the scale measure a value greater than 100 N? *Select all that apply.*

    a. moving upward with increasing speed.
    b. moving upward with decreasing speed.
    c. moving downward with increasing speed.
    d. moving downward with decreasing speed.

5. In a rugby game, Bob (mass = 98 kg) tackles Joe (mass = 76 kg) and knocks Joe to the ground. During the collision, who applied the greater force on whom?

    a. Bob applied a greater force on Joe (than Joe did on him).
    b. Joe applied a greater force on Bob (than Bob did on him).
    c. Bob and Joe applied the same magnitude force on each other.
    d. It depends on the relative speeds of Bob and Joe.

6. Why is a greater force needed to start moving a heavy box from rest than to keep pushing it with constant velocity? In the choices below, μ_k is the coefficient of kinetic friction and μ_s is the coefficient of static friction.

    a. $\mu_s < \mu_k$
    b. The normal force is greater when the box is at rest.
    c. $\mu_k < \mu_s$
    d. The inertia of the box is greater when it is at rest.

7. A physics textbook of mass m is at rest on a flat table. Earth's gravity applies a downward force mg on the book, which we will call the action force. What is the reaction force?

    a. The table pushing down on the floor with force mg.
    b. The book pushing down on the table with force mg.
    c. The table pushing up on the book with force mg.
    d. The book pulling upward on the Earth with force mg.

8. A box, of mass M, is suspended by a string from the ceiling inside an elevator. The elevator is traveling downward with a constant speed. The tension in the string is

    a. less than Mg.
    b. equal to Mg.
    c. greater than Mg.
    d. impossible to determine without knowing the speed.

9. You place a 49.13-kg object on a spring scale. If the scale reads 401.4 N, what is the acceleration of gravity at that location?

   a. $8.17\,\mathrm{m/s^2}$
   b. $10.57\,\mathrm{m/s^2}$
   c. $8.19\,\mathrm{m/s^2}$
   d. $8.41\,\mathrm{m/s^2}$

10. An object of mass $12.0\,\mathrm{kg}$ accelerates at $8.0\,\mathrm{m/s^2}$. What is the magnitude of the net force on the object?

    a. 58 N
    b. 130 N
    c. 96 N
    d. 110 N

11. An box slides down an inclined plane with a constant velocity. The angle of incline is $40.0°$. What is the coefficient of kinetic friction between the box and the inclined plane?

    a. 1.245
    b. 0.839
    c. 0.992
    d. 0.435

12. As the angle of an inclined plane increases, the parallel force _____ and the perpendicular force _____.

    a. decreases, decreases
    b. decreases, increases
    c. increases, decreases
    d. increases, increases

13. Adam pulls on a box with 14.0 N of force. Bob pulls on the the same box with 11.0 N of force, at a right angle to Adam's force. What is the magnitude of the net force on the box?

    a. 17.8 N
    b. 13.1 N
    c. 11.1 N
    d. 15.2 N

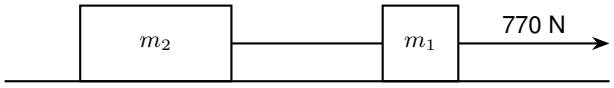
14. Xavier pulls on a box with 43.0 N of force at $0°$. Yuri pulls on the the same box with 47.0 N of force, at $90°$. What is the angle of the net force?

    a. $51.8°$
    b. $48.0°$
    c. $69.8°$
    d. $79.6°$

15. Charlie pulls on a box with 35.0 N of force at $160°$. Dan pulls on the the same box with 19.0 N of force at $-161°$. What is the angle of the net force on the box?

    a. $179.2°$
    b. $-177.6°$
    c. $173.5°$
    d. $-131.9°$

16. Two boxes connected by a light cord are on a frictionless table as shown in the diagram. The masses are $m_1 = 89$ kg and $m_2 = 534$ kg. A 770-N force is applied horizontally on the right box. What is the tension in the cord?



    a. 781 N
    b. 594 N
    c. 660 N
    d. 646 N

17. Two forces act on an object. A 14.0-N force acts at $-102°$. A 39.0-N force acts at $-104°$. What is the angle of their equilibrant?

    a. $153.7°$
    b. $-50.7°$
    c. $76.5°$
    d. $-156.2°$

18. A box of mass 49 kg slides down a frictionless inclined plane. The angle of incline is $51°$ from the horizontal. What is the acceleration of the box?

    a. $9.2\,\mathrm{m/s^2}$
    b. $8.4\,\mathrm{m/s^2}$
    c. $7.6\,\mathrm{m/s^2}$
    d. $5.5\,\mathrm{m/s^2}$

19. A box of mass 18 kg slides down an inclined plane with friction. The angle of incline is $33°$ and $\mu_k = 0.19$. What is the acceleration of the box?

    a. $3.8\,\mathrm{m/s^2}$
    b. $1.3\,\mathrm{m/s^2}$
    c. $0.1\,\mathrm{m/s^2}$
    d. $2.3\,\mathrm{m/s^2}$

20. An 7-kg box slides down a $14°$ inclined plane with constant acceleration. The box starts from rest at the top. At the bottom, its velocity reaches 1.76 m/s. The length of the incline is 4.52 m. What is the coefficient of kinetic friction between the box and the plane?

    a. 0.154
    b. 0.098
    c. 0.213
    d. 0.015