

Name: _____ Date: _____

1. A ball is in free fall. Upward is taken to be the positive direction. The displacement of the ball during a short time interval is:
 - A) positive during both ascent and descent
 - B) negative during both ascent and descent
 - C) negative during ascent and positive during descent
 - D) positive during ascent and negative during descent
 - E) none of the above

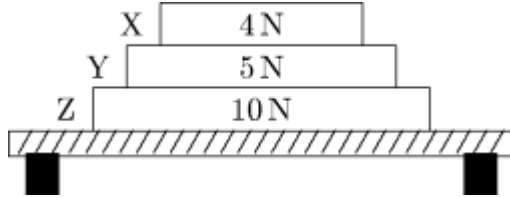
2. An object is thrown straight down with an initial speed of 4 m/s from a window which is 8 m above the ground. The time it takes the object to reach the ground is:
 - A) 0.80 s
 - B) 0.93 s
 - C) 1.3 s
 - D) 1.7 s
 - E) 2.0 s

3. A car travels east at constant velocity. The net force on the car is:
 - A) east
 - B) west
 - C) up
 - D) down
 - E) zero

4. A freely falling body has a constant acceleration with a magnitude of 9.8 m/s^2 . This means that:
 - A) the body falls 9.8 m during each second
 - B) the body falls 9.8 m during the first second only
 - C) the speed of the body increases by 9.8 m/s during each second
 - D) the magnitude of the acceleration of the body increases by 9.8 m/s^2 during each second
 - E) the magnitude of the acceleration of the body decreases by 9.8 m/s^2 during each second

5. When a certain force is applied to the standard kilogram its acceleration is 5.0 m/s^2 . When the same force is applied to another object its acceleration is one-fifth as much. The mass of the object is:
- A) 0.2 kg
 - B) 0.5 kg
 - C) 1.0 kg
 - D) 5.0 kg
 - E) 10 kg
6. An object dropped from the window of a tall building hits the ground in 12.0 s. If its acceleration has a magnitude of 9.80 m/s^2 , the height of the window above the ground is:
- A) 29.4 m
 - B) 58.8 m
 - C) 118 m
 - D) 353 m
 - E) 706 m
7. One object is thrown vertically upward with an initial velocity of 100 m/s and another object with an initial velocity of 10 m/s. The maximum height reached by the first object will be _____ that of the other.
- A) 10 times
 - B) 100 times
 - C) 1000 times
 - D) 10,000 times
 - E) none of these
8. An object is thrown straight up from ground level with a speed of 50 m/s. If the magnitude of the local gravitational strength is $g = 10 \text{ N/kg}$ its distance above ground level 6.0 s later is:
- A) 0.00 m
 - B) 270 m
 - C) 330 m
 - D) 480 m
 - E) none of these

9. Three books (X, Y, and Z) rest on a table. The gravitational force on each book is indicated. The net force on book Y is:

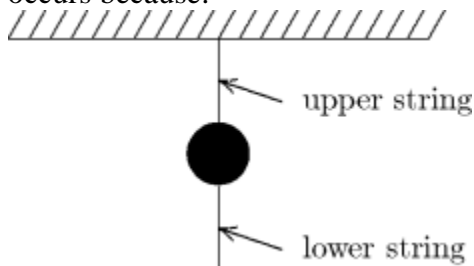


- A) 4 N down
B) 5 N up
C) 9 N down
D) zero
E) none of these
10. A feather and a lead ball are dropped from rest in vacuum on the Moon. The acceleration of the feather is:
A) more than that of the lead ball
B) the same as that of the lead ball
C) less than that of the lead ball
D) 9.8 m/s^2
E) zero since it floats in a vacuum
11. Acceleration is always in the direction:
A) of the displacement
B) of the initial velocity
C) of the final velocity
D) of the net force
E) opposite to the frictional force
12. An example of an inertial reference frame is:
A) any reference frame that is not accelerating
B) a reference frame attached to a particle on which there are no forces
C) any reference frame that is at rest
D) a reference frame attached to the center of the universe
E) a reference frame attached to Earth
13. An object rests on a horizontal frictionless surface. A horizontal force of magnitude F is applied. This force produces an acceleration:
A) only if F is larger than the weight of the object
B) only while the object suddenly changes from rest to motion
C) always
D) only if the inertia of the object decreases
E) only if F is increasing

14. An object is thrown straight up from ground level with a speed of 50 m/s. If $g = 10 \text{ m/s}^2$ its distance above ground level 1.0 s later is:
- A) 40 m
 - B) 45 m
 - C) 50 m
 - D) 55 m
 - E) 60 m

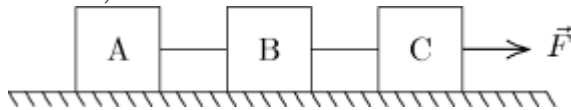
15. A lead block is suspended from your hand by a string. The reaction to the force of gravity on the block is the force exerted by:
- A) the string on the block
 - B) the block on the string
 - C) the string on the hand
 - D) the hand on the string
 - E) the block on Earth

16. A heavy ball is suspended as shown. A quick jerk on the lower string will break that string but a slow pull on the lower string will break the upper string. The first result occurs because:



- A) the force is too small to move the ball
 - B) action and reaction is operating
 - C) the ball has inertia
 - D) air friction holds the ball back
 - E) the ball has too much energy
17. The unit of force called the newton is:
- A) $9.8 \text{ kg} \cdot \text{m/s}^2$
 - B) $1 \text{ kg} \cdot \text{m/s}^2$
 - C) defined by means of Newton's third law
 - D) 1 kg of mass
 - E) 1 kg of force

18. A newton is the force:
- A) of gravity on a 1 kg body
 - B) of gravity on a 1 g body
 - C) that gives a 1 g body an acceleration of 1 cm/s^2
 - D) that gives a 1 kg body an acceleration of 1 m/s^2
 - E) that gives a 1 kg body an acceleration of 9.8 m/s^2
19. A stone is released from rest from the edge of a building roof 190 m above the ground. Neglecting air resistance, the speed of the stone, just before striking the ground, is:
- A) 43 m/s
 - B) 61 m/s
 - C) 120 m/s
 - D) 190 m/s
 - E) 1400 m/s
20. Three blocks (A,B,C), each having mass M , are connected by strings as shown. Block C is pulled to the right by a force \vec{F} that causes the entire system to accelerate. Neglecting friction, the net force on block B is:



- A) zero
- B) $\vec{F}/3$
- C) $\vec{F}/2$
- D) $2\vec{F}/3$
- E) \vec{F}

Answer Key

1. D
2. B
3. E
4. C
5. D
6. E
7. B
8. E
9. D
10. B
11. D
12. B
13. C
14. B
15. E
16. C
17. B
18. D
19. B
20. B