15SU practice Exam 2 Chapters 4-7

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

A 20-N falling object encounters 10 N of air resistance. The net force on the object is
1)
_____

1)

A) 0 N.

B) 5 N.

C) 10 N.

D) 20 N.

E) none of the above

A 2-kg mass at the Earth's surface weighs
2)
_____

2)

A) 2 N.

B) 10 N.

C) 20 N.

D) 24 N.

E) none of the above

3)

The mass of a lamb that weights 110 N is about

3)
_____

A) 1 kg.

B) **11 kg.**

C) 110 kg.

D) 1100 kg.

E) none of the above

A heavy ball hangs by a string, with a second string attached to its bottom. A slow pull on the bottom string breaks the

4)
_____

A) **top string.**

B) bottom string.

C) top or bottom string equally.

You drive your car at a constant 60 km/h along the highway. You apply the brakes until the car slows to 40 km/h. If at that moment you suddenly release the brakes, the car tends to

5)
_____

A) momentarily regain its higher initial speed.

B) **continue moving at 40 km/h.**

C) decrease in speed if no other forces act.

6)

A boulder following a straight-line path at constant velocity has

A boulder following a straight-line path at constant velocity has
6) _____

A) a net force acting upon it in the direction of motion.

B) zero acceleration.

C) no forces acting on it.

D) none of the above

A single brick falls with acceleration g. The reason a double brick falls with the same acceleration is
7) _____

A) that in free fall all accelerations are g.

B) its ratio of force to mass is the same.

C) an experimental fact tested many times.

D) none of the above

When a falling object has reached its terminal velocity, its acceleration is
8) _____

A) zero.

B) g.

C) constant.

When a boxer hits a punching bag, the strength of his punch depends on how much force the bag can
9) _____

A)

endure.

exert on the boxer's fist.

soften.

10)

A piece of rope is pulled by two people in a tug-of-war. Each exerts a 400-N force. What is the tension in the rope?
10)
_____

A)

zero

B)

400 N

C)

600 N

D)

800 N

E)

none of the above

11)

When you walk, you push on the floor to the left and the floor
11)
_____

A)

also pushes on you to the left.

B)

pushes you to the right.

C)

both of these simultaneously.

D)

can only wish it could push on you.

E)

none of the above

12)

For every action force, there must be a reaction force that

For every action force, there must be a reaction force that
12)
_____

acts in the same direction.

is slightly smaller in magnitude than the action force.

is slightly larger in magnitude than the action force.

is equal in magnitude.

A player catches a ball. If action is the force of the ball against the player's glove, reaction is the
13)
_____

player's grip on the glove.

glove against the ball.

friction of the ground against the player's shoes.

muscular effort in the player's arms.

none of the above

The force with which Earth pulls on the Moon is
14)
_____

somewhat greater than Moon's pull on Earth.

the only force acting between Earth and Moon.

equal in magnitude to the force that Moon pulls on Earth.

A pair of toy freight cars, one twice the mass of the other, fly apart when a compressed spring that joins them is released. The spring exerts the greater force on the

15)

_____

A)

heavier car.

B)

lighter car.

C)

same on each.

The force that propels a cannonball when fired from a cannon is

16)

_____

A)

huge compared to the recoil force on the cannon.

B)

equal and opposite to the force the ball exerts on the cannon.

C)

in some cases, equal and opposite to the force the ball exerts on the cannon.

Art museums use weaker wires than those used in homes because paintings in museums

17)

_____

A)

are suspended by pairs of vertical wires.

B)

are usually lighter in weight.

C)

are more firmly attached.

As the sloped surface supporting a shoe becomes steeper

18)

_____

A)

the shoe's weight mg remains unchanged.

B)

the normal force becomes less.

the normal force becomes less.

C)

friction needed to keep it at rest increases.

D)

all of the above

E)

none of the above

19)

Which of the following has the largest momentum relative to Earth's surface?
19)
_____

A)

a tightrope walker crossing Niagara Falls

B)

a pickup truck speeding along a highway

C)

a Mack truck parked in a parking lot

D)

the Science building on campus

E)

a mouse running across your room

20)

The speed of a 3-kg ball with a momentum of 12 kg m/s is
20)
_____

A)

3 m/s.

B)

4 m/s.

C)

12 m/s.

D)

48 m/s.

E)

none of the above

none of the above

It is correct to say that impulse is equal to
21)
_____

momentum.

a corresponding change in momentum.

force multiplied by the distance it acts.

velocity multiplied by time.

Padded dashboards in cars are safer in an accident than non-padded ones because passengers hitting the dashboard encounter
22)
_____

lengthened time of contact.

shorter time of contact.

decreased impulse.

increased momentum.

When you jump from an elevated position you usually bend your knees upon reaching the ground, which makes the time of the contact about 10 times that of a stiff-legged landing. In this way the average force your body experiences is
23)
_____

less than 1/10 as great.

more than 1/10 as great.

about 1/10 as great.

about 10 times as great.

Whether a truck comes to a stop by crashing into a haystack or a brick wall, the impulse is
24) _____

A)
greater with the haystack.

B)
greater with the brick wall.

C)
both the same

24)

When a boxer is moving away from a punch, the force experienced is reduced because
25) _____

A)
momentum transfer is reduced.

B)
the time of contact is increased.

C)
the force is less effective.

D)
all of the above

25)

The change in momentum that occurs when a 2.0 kg ball traveling at 4.0 m/s strikes a wall and
bounces back at 2.0 m/s is
26) _____

A)
4 kg m/s.

B)
8 kg m/s.

C)
12 kg m/s.

D)
16 kg m/s.

26)

When bullets are fired from an airplane in the forward direction, the momentum of the airplane is
27) _____

A)
decreased.

B)

27)

decreased.

unchanged.

increased.

A 4-kg shark swimming at 1 m/s swallows an absent-minded 2-kg fish swimming toward it at 3 m/s. The speed of the shark after his meal is
28)
_____

1/6 m/s.

1/5 m/s.

1/3 m/s.

2/3 m/s.

3/2 m/s.

Consider massive gliders that slide friction-free along a horizontal air track. Glider A has a mass of 1 kg, a speed of 1 m/s, and collides with Glider B that has a mass of 5 kg and is at rest. If they stick upon collision, their speed after collision will be
29)
_____

1/4 m/s.

1/5 m/s.

1/6 m/s.

1 m/s.

none of the above

The work you do when pushing a shopping cart twice as far while applying twice the force is
30)
_____

half as much.

half as much.

twice as much.

four times as much.

the same amount.

The amount of work done on a heavy box carried by Nellie across a room at a constant speed
31)
_____

depends on the weight of the box.

depends on the distance walked.

depends on both weight of the box and distance walked.

is none.

none of the above

The power expended doing 100 J of work in 50 s is
32)
_____

1/2 W.

2 W.

4 W.

50 W.

5,000 W.

Both a 50-kg sack is lifted 2 meters from the ground and a 25-kg sack is lifted 4 meters in the same time. The power expended in raising the 50-kg sack is
33)
_____

33)
_____

twice as much as the 25-kg sack.

half as much as the 25-kg sack.

the same.

need more information

34)

A crate of grapes lifted 10 meters gains 200 J of potential energy. If the same crate is instead lifted 20 meters, its gain in potential energy is
34)
_____

A)

half as much.

B)

the same.

C)

twice as much.

D)

four times as much.

E)

more than four times as much.

35)

Two identical particles move toward each other, one twice as fast as the other. Just before they collide, one has a kinetic energy of 25 J and the other 50 J. At this instant their total kinetic energy is
35)
_____

A)

25 J.

B)

50 J.

C)

75 J.

D)

none of the above

E)

need more information

need more information

About 40 J is required to push a crate 4 m across a floor. If the push is in the same direction as the motion of the crate, the force on the crate is about
36)
_____

36)

A) 4 N.

B) 10 N.

C) 40 N.

D) 160 N.

If the speed of a bicycle is reduced to half before skidding to a stop, it will skid
37)
_____

37)

A) one-eighth as far.

B) one-fourth as far.

C) one-half as far.

D) none of the above

Two identical arrows, one with twice the *kinetic energy* of the other, are fired into a bale of hay. Compared with penetration of the slow arrow, the faster arrow penetrates
38)
_____

38)

A) the same distance.

B) twice as far.

C) four times as far.

D) more than four times as far.

E) none of the above

none of the above

39)

A block of ice sliding down an incline has half its maximum kinetic energy
39)
_____

A)
at the top.

B)
at the bottom.

C)
halfway down.

D)
need more information

40)

Acrobat Bart at the circus drops vertically onto the end of a see-saw, with his partner Art equidistant from the fulcrum at the other end. Art is propelled straight upward a distance twice that of Bart's dropping distance. Neglecting inefficiencies we see
40)
_____

A)
the masses of Art and Bart are equal.

B)
Art has half the mass of Bart.

C)
need more information

41)

A machine puts out 200 watts of power for every 1000 watts put into it. The efficiency of the machine is
41)
_____

A)
20%.

B)
50%.

C)
90%.

D)
110%.

E)

none of the above

none of the above

42)

A hydraulic jack is used to lift objects such as automobiles. If the input force is 100 N over a distance of 1 meter, the output force over a distance of 0.1 meter is ideally
42)

_____

A)

100 N.

B)

250 N.

C)

500 N.

D)

1000 N.

E)

none of the above

43)

A primary difference between momentum and kinetic energy is
43)

_____

A)

momenta can cancel; kinetic energy cannot.

B)

kinetic energy can cancel; momenta cannot.

C)

either of the above depending on circumstances

D)

none of the above

1)

C

2)

C

3)

C

B

A

B

B

B

A

B

B

B

D

B

C

C

B

A

D

B

B

B

3)

4)

5)

6)

7)

8)

9)

10)

11)

12)

13)

14)

15)

16)

17)

18)

19)

20)

21)

22)

B

A

C

C

B

C

A

C

C

D

B

C

C

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B

C

B

22)

23)

24)

25)

26)

27)

28)

29)

30)

31)

32)

33)

34)

35)

36)

37)

38)

39)

40)

B

A

D

A