Conceptual Physics 13th edition Hewitt Test Bank

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Conceptual Physics, 13e **(Hewitt)**
Chapter 2 Newton's First Law of Motion: Inertia

2.1 Multiple-Choice Questions

1) The earliest and most influential Greek philosopher was Aristotle, who among many contributions taught that
A) the four elements are earth, water, air, and fire.
B) all motion is either natural or violent.
C) violent motion requires a sustained push or pull.
D) all of the above
Answer: D
Diff: 1
Topic: Aristotle on Motion

2) Science later greatly advanced when Galileo favored
A) philosophical discussions over experiment.
B) experiment over philosophical discussions.
C) nonmathematical thinking.
D) none of the above
Answer: B
Diff: 1
Topic: Aristotle on Motion

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3) The first scientist to be credited for postulating that Earth circled the Sun was
A) Aristotle.
B) Copernicus.
C) Galileo.
D) Newton.
Answer: B
Diff: 1
Topic: Aristotle on Motion

4) The first scientist to introduce the concept of inertia was
A) Aristotle.
B) Galileo.
C) Newton.
D) Copernicus.
Answer: B
Diff: 1
Topic: Galileo's Experiments

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5) Inertia is defined as a
A) force.
B) property of matter.
C) change in motion.
D) none of the above
Answer: B
Diff: 1
Topic: Galileo's Experiments

6) Galileo's use of inclined planes allowed him to effectively
A) slow down the ball's changes in speed.
B) reduce the time of the ball's changes in speed.
C) eliminate all changes in speed.
D) eliminate friction.
Answer: A
Diff: 1
Topic: Galileo's Experiments

7) Galileo's interpretation of motion differed from Aristotle's in that Galileo emphasized
A) the acceleration of free fall.
B) rates of time.
C) the role of distance in describing motion.
D) none of the above
Answer: B
Diff: 2
Topic: Galileo's Experiments

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8) If no external forces act on a moving object, it will
A) continue moving at the same speed.
B) move slower and slower until it finally stops.
C) come to an abrupt halt.
D) none of the above
Answer: A
Diff: 1
Topic: Galileo's Experiments

9) Galileo taught us that if you roll a ball along a level surface it will
A) soon slow down due to its natural place.
B) keep rolling if friction is absent.
C) roll as long as its inertia nudges it along.
D) soon roll in the opposite direction.
Answer: B
Diff: 1
Topic: Galileo's Experiments

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10) A hockey puck sliding across the ice finally comes to rest because
A) it seeks its proper and natural state.
B) of friction.
C) that's just the way it is.
Answer: B
Diff: 1
Topic: Galileo's Experiments

11) A hockey puck is set in motion across a frozen pond. If ice friction and air resistance are neglected, the force required to keep the puck sliding at constant velocity is
A) equal to its weight.
B) equal to its weight divided by its mass.
C) equal to its mass times its weight.
D) none of the above
Answer: D
Diff: 1
Topic: Newton's First Law

12) The amount of force needed to sustain motion of a rock in outer space is
A) a force equal to its weight.
B) a force less than its weight if friction is absent.
C) none of these
Answer: C
Diff: 1
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Topic: Newton's First Law

13) When no forces act on moving objects their paths are normally
A) straight lines.
B) circles.
C) ellipses.
D) all of the above
Answer: A
Diff: 1
Topic: Newton's First Law

14) If gravity between the Sun and Earth suddenly vanished, Earth would continue moving in
A) a curved path.
B) an outward spiral path.
C) an inward spiral path.
D) a straight-line path.
Answer: D
Diff: 1
Topic: Newton's First Law

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15) Whirl a rock at the end of a string and it follows a circular path. If the string breaks, the tendency of the rock is to
A) follow a circular path.
B) slow down.
C) follow a straight-line path.
D) stop.
Answer: C
Diff: 1
Topic: Newton's First Law

16) Which concept is being illustrated when a tablecloth is quickly yanked beneath dishes resting on a table?
A) equilibrium
B) friction
C) support force
D) inertia
Answer: D
Diff: 1
Topic: Newton's First Law

17) When you flick a card from beneath a coin that hardly moves, you're illustrating
A) inertia.
B) equilibrium.
C) support force.
D) friction.
Answer: A
Diff: 1
Topic: Newton's First Law

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18) A sheet of paper can be quickly jerked beneath a container of milk without toppling, which best demonstrates
A) net force.
B) the difference between force and mass.
C) inertia.
Answer: C
Diff: 1
Topic: Newton's First Law

19) A roller-coaster ride with 6 passengers takes 3 minutes. Neglecting friction, a similar ride with 12 passengers aboard would take
A) 1.5 minutes.
B) 3 minutes.
C) 6 minutes.
D) 18 minutes.
Answer: B
Diff: 3
Topic: Newton's First Law

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20) A package falls off a truck that is moving at 30 m/s. Neglecting air resistance, the horizontal speed of the package just before it hits the ground is
A) zero.
B) less than 30 m/s but more than zero.
C) about 30 m/s.
D) more than 30 m/s.
Answer: C
Diff: 2
Topic: Newton's First Law

21) If your automobile runs out of fuel while driving, the engine stops. You don't come to an abrupt stop due to
A) inertia.
B) gravity.
C) resistance.
D) the principle of continuation.
Answer: A
Diff: 2
Topic: Newton's First Law

22) When a rocket ship gaining speed in outer space runs out of fuel, it
A) gains speed for a short time, then slows down to a constant velocity.
B) gains speed for a short time, slows down, and eventually stops.
C) no longer gains speed.
Answer: C
Diff: 2
Topic: Newton's First Law

23) A moving van with a stone lightly glued to the midpoint of its ceiling smoothly moves at constant velocity. When the glue gives way, the stone falls and hits the floor
A) ahead of the midpoint of the ceiling.
B) exactly below the midpoint of the ceiling.
C) behind the midpoint of the ceiling.
D) none of the above
Answer: B
Diff: 2
Topic: Newton's First Law

24) While you are standing in the aisle of a bus, the driver suddenly makes a left turn. You lurch to the right due to
A) an unbalanced force.
B) your tendency to keep moving forward.
C) an equilibrium challenge.
Answer: B
Diff: 2
Topic: Newton's First Law

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25) Due to inertia, perhaps a railroad train in motion should continue moving indefinitely when its engine is turned off. This is not observed because railroad trains
A) aren't massive enough.
B) are too heavy.
C) ride on straight tracks.
D) encounter opposing forces.
Answer: D
Diff: 2
Topic: Newton's First Law

26) Tension is actually a force that tends to
A) stretch something.
B) compress something.
C) break something.
D) balance something.
Answer: A
Diff: 1
Topic: Newton's First Law

27) Nellie pulls with a force of 50 N on a horizontal rope tied to a tree at rest. The net force on the rope is
A) 50 N and rope tension is 0 N.
B) 50 N and rope tension is also 50 N.
C) zero and rope tension is 50 N.
D) zero and rope tension is also zero.
Answer: C
Diff: 2
Topic: Newton's First Law

28) Two students engaged in a tug-of-war each pull a rope in opposite directions with a force of 400 N. The net force on the rope is
A) zero and rope tension is 400 N.
B) zero and rope tension is 800 N.
C) 400 N and rope tension is 800 N.
D) 400 N and rope tension is also 400 N.
Answer: A
Diff: 2
Topic: Newton's First Law

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29) When you quickly jerk a cart forward that has a ball resting in the middle, the
A) front of the cart hits the ball.
B) back of the cart hits the ball.
C) neither, for the ball rides along in the middle as the cart moves forward.
D) All of the above depending on how quickly the cart is pulled.
Answer: B
Diff: 2
Topic: Newton's First Law

30) A force is a vector quantity because it has both
A) magnitude and direction.
B) mass and velocity.
C) action and reaction counterparts.
D) speed and direction.
Answer: A
Diff: 1
Topic: Net Force and Vectors

31) Which of the following is a vector quantity?
A) area
B) volume
C) mass
D) none of the above
Answer: D
Diff: 2
Topic: Net Force and Vectors

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32) A block pulled to the left with 15 N and to the right with 5 N at the same time experiences a net force of
A) 5 N.
B) 10 N.
C) 15 N.
D) 20 N.
Answer: B
Diff: 2
Topic: Net Force and Vectors

33) A tree stump is pulled northward by a 10-N force at the same time a 25-N force pulls it southward. The resultant force has a magnitude of
A) 0 N.
B) 15 N.
C) 25 N.
D) 150 N.
Answer: B
Diff: 2
Topic: Net Force and Vectors

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34) When a pair of 10-N forces act on a box of candy, the net force on the box is
A) zero.
B) about 14 N.
C) 20 N.
D) Any of the above depending on the directions of forces.
Answer: D
Diff: 2
Topic: Net Force and Vectors

35) A pair of 10-N vectors at right angles to each other has a resultant of about
A) 10 N.
B) 14 N.
C) 20 N.
D) none of the above
Answer: B
Diff: 2
Topic: Net Force and Vectors

36) The resultant of a 40-N force at right angles to a 30-N force is
A) 30 N.
B) 40 N.
C) 50 N.
D) greater than 50 N.
Answer: C
Diff: 2
Topic: Net Force and Vectors

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37) When Nellie Newton hangs by the ends of a rope draped over a large pulley, the tension in each supporting vertical strand is
A) half her weight.
B) equal to her weight.
C) twice her weight.
D) none of the above
Answer: A
Diff: 2
Topic: Net Force and Vectors

38) If Nellie hangs from a horizontal bar that is supported by four vertical ropes, the tension in the ropes
A) are each half her weight.
B) are each equal to her weight.
C) add to equal her weight.
D) none of the above
Answer: C
Diff: 2
Topic: Net Force and Vectors

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39) A parallelogram is a four-sided figure with opposite sides that are
A) equal.
B) parallel.
C) at right angles.
D) none of the above
Answer: B
Diff: 2
Topic: Net Force and Vectors

40) A pair of wires support a heavy painting. Tension in the wires is greater when they are
A) vertical.
B) not vertical.
C) the same regardless of the wire orientation.
D) none of the above
Answer: B
Diff: 3
Topic: Net Force and Vectors

41) Suspend your body from a pair of vertical ropes and the tension in each rope will be
A) half your weight.
B) equal to your weight.
C) greater than your weight.
D) none of the above
Answer: A
Diff: 2
Topic: Net Force and Vectors

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42) Suspend your body from a pair of ropes slightly angled from the vertical and the tension in each rope will be
A) equal your weight.
B) half your weight.
C) greater than half your weight.
D) none of these
Answer: C
Diff: 3
Topic: Net Force and Vectors

43) When Nellie Newton hangs at rest in the middle of a clothesline, tensions will be the same in each side of the rope when
A) the lengths of each rope are the same.
B) the angles for both sides of the rope are equal.
C) she is in equilibrium.
Answer: B
Diff: 2
Topic: Net Force and Vectors

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44) When Nellie Newton hangs at rest in the middle of a clothesline, the tension will *not* be the same in each side of the rope when
A) the lengths of rope on each side are different.
B) the angles at each side of the rope are unequal.
C) she is in equilibrium.
D) none of the above
Answer: B
Diff: 2
Topic: Net Force and Vectors

45) Monkey Mo hangs from the middle of a horizontal rope. Tension in the rope is greatest if the rope
A) sags a lot.
B) sags very little.
C) sags or doesn't sag, for tension is the same in any case.
D) none of the above
Answer: B
Diff: 2
Topic: Net Force and Vectors

46) Nellie hangs from a pair of ropes at an angle. Tension in the ropes depends on the
A) length of the ropes.
B) angle of the ropes.
C) both of these
D) neither of these
Answer: B
Diff: 2
Topic: Net Force and Vectors

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47) The net force on any object in equilibrium is
A) zero.
B) equal to its weight.
C) less than its weight.
D) non-zero when motion is involved.
Answer: A
Diff: 1
Topic: Equilibrium Rule

48) The equilibrium rule, $\Sigma F = 0$, applies to
A) objects or systems at rest.
B) objects or systems in uniform motion in a straight line.
C) both of these
D) neither of these
Answer: C
Diff: 2
Topic: Equilibrium Rule

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49) The equilibrium rule applies to
A) vector quantities.
B) quantities that are equal in magnitude.
C) scalar quantities.
D) any kind of quantities.
Answer: A
Diff: 2
Topic: Equilibrium Rule

50) An object in mechanical equilibrium is an object
A) moving with constant velocity.
B) having no changes in velocity.
C) at rest.
D) all of the above
Answer: D
Diff: 2
Topic: Equilibrium Rule

51) When Burl and Paul stand on opposite ends of a sign-painting scaffold, the tensions in the supporting ropes
A) are equal.
B) depend on the relative weights of Burl and Paul.
C) combine to equal zero.
D) are in equilibrium.
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Answer: B
Diff: 2
Topic: Equilibrium Rule

52) If Burl carries Paul piggy-back while standing in the *middle* of a scaffold, the tensions in the two supporting ropes would
A) cancel to zero.
B) be equal.
C) be in dynamic equilibrium.
D) more easily support Burl and Paul.
Answer: B
Diff: 2
Topic: Equilibrium Rule

53) Burl and Paul paint signs together on a scaffold. Compared to their weights plus the weight of the scaffold, the sum of tensions in the supporting ropes is
A) less.
B) the same.
C) greater.
D) zero.
Answer: B
Diff: 1
Topic: Equilibrium Rule

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54) Burl and Paul have a total weight of 1300 N. The tensions in the supporting ropes that support their scaffold add to 1700 N. The weight of the scaffold itself must be
A) 300 N.
B) 400 N.
C) 500 N.
D) 600 N.
Answer: B
Diff: 2
Topic: Equilibrium Rule

55) A hockey puck sliding at constant velocity across the ice is
A) in equilibrium.
B) nearly in equilibrium.
C) is nowhere near being in equilibrium.
D) none of the above
Answer: A
Diff: 1
Topic: Equilibrium Rule

56) The net force acting on an insect falling downward at constant velocity is
A) zero.
B) the weight of the insect.
C) upward air resistance.
D) none of the above
Answer: A
Diff: 1
Topic: Equilibrium Rule

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57) The force of friction on a sliding object is 10 N. The applied force needed to maintain a constant velocity is
A) more than 10 N.
B) less than 10 N.
C) 10 N.
Answer: C
Diff: 1
Topic: Equilibrium Rule

58) The minimum number of forces that act on a book resting on a table is
A) 1.
B) 2.
C) 3.
D) 4.
E) none of the above
Answer: B
Diff: 1
Topic: Support Force

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59) The support force on a 10-N book at rest on a table is
A) slightly less than 10 N.
B) 10 N.
C) slightly greater than 10 N.
D) dependent on the position of the book.
Answer: B
Diff: 1
Topic: Support Force

60) Jason weighs 150 N and sits on his big brother's shoulders. Big brother weighs 400 N. The support force supplied by the floor must be
A) 150 N.
B) 400 N.
C) 550 N.
D) more than 550 N.
Answer: C
Diff: 2
Topic: Support Force

61) The support force on a 30-kg dog sleeping on the floor is
A) less than 300 N.
B) about 300 N.
C) more than 300 N.
D) nonexistent while asleep.
Answer: B
Diff: 2
Topic: Support Force

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62) When you stand at rest on a pair of bathroom scales, the reading on each scale
A) is half your weight.
B) equals your weight.
C) add up to equal your weight.
Answer: C
Diff: 2
Topic: Support Force

63) Weigh yourself on a weighing scale and the scale shows your normal weight. If you carefully stand on tiptoes, the scale reading will be
A) slightly more.
B) slightly less.
C) about half as much.
D) no different.
Answer: D
Diff: 2
Topic: Support Force

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64) An 800-N man stands at rest on two bathroom scales so that his weight is distributed evenly over both scales. The reading on each scale is
A) 200 N.
B) 400 N.
C) 800 N.
D) 1600 N.
E) none of the above
Answer: B
Diff: 2
Topic: Support Force

65) The force that causes Earth to orbit the Sun is due to gravity, while the force needed to keep Earth moving as it circles the Sun is
A) inertia.
B) due to gravity.
C) due to both inertia and gravity.
D) no force at all.
Answer: D
Diff: 2
Topic: The Moving Earth

66) If you toss a coin straight upward while in a train moving at constant velocity, the coin will land
A) as if you were at rest.
B) in front of you.
C) in back of you.
Answer: A
Diff: 2
Topic: The Moving Earth

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67) If you toss a coin straight upward in train that gains speed while the coin is in the air, the coin will land
A) as if you were at rest.
B) in front of you.
C) in back of you.
Answer: C
Diff: 2
Topic: The Moving Earth

68) If you toss a coin straight upward in train that slows while the coin is in the air, the coin will land
A) as if you were at rest.
B) in front of you.
C) in back of you.
Answer: B
Diff: 2
Topic: The Moving Earth

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69) A gymnast performing somersaults in a high-flying plane moving at constant velocity needs to make
A) small adjustments to compensate for the airplane's velocity.
B) major adjustments to compensate for the airplane's velocity.
C) no adjustments.
D) none of the above
Answer: C
Diff: 2
Topic: The Moving Earth

70) Earth continually moves about 30 km/s through space, which means the wall you stand next to also is moving at 30 km/s. When you jump vertically the wall doesn't slam into you because
A) the speeds of you and Earth cancel out.
B) you're moving horizontally just as fast as the wall.
C) your upward motion is small compared with Earth's speed.
D) motion of the Sun counteracts your motion.
Answer: B
Diff: 2
Topic: The Moving Earth

71) A bird sitting on the limb of a tree is moving about 30 km/s with respect to the Sun. If the bird takes 1 second to drop down to a worm below, the worm would be 30 km downrange from the bird when it reached the ground. This faulty reasoning is best countered with Newton's
A) law of inertia.
B) law of gravity.
C) laws of motion.
D) none of the above
Answer: A
Diff: 2
Topic: The Moving Earth

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