Exam 1 CHAPTERS 1-3

Name_____

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

This is a 40 question multiple choice test. There are four bonus question at the end. Each correctly answered bonus question will replace one of the 40 questions answered incorrectly (if any). Your max score is 40 points

1) Eratosthenes' measurements of Earth's size involved 1) _____
A) a deep well in Syene.
B) a pillar's shadow in Alexandria.
C) surveying the distance between Alexandria and Syene.
D) all of the above

2) Spots of sunlight on the ground cast through openings between leaves in trees above are actually 2) _____
A) images of the Sun. B) part of a solar eclipse.
C) due to refraction of sunlight. D) all of the above

3) A simple method of measuring the distance between the Earth and the Moon is to place in your line of sight to the Moon a 3) _____
A) magnifying glass. B) telescope.
C) meterstick. D) coin.

4) A theory in the field of science is 4) _____
A) an educated guess.
B) less than a fact.
C) a synthesis of a large body of well–tested knowledge.
D) unchangeable.

5) An educated scientific guess is a 5) _____
A) hypothesis. B) theory.
C) either of these D) neither of these

6) For a scientific hypothesis to be valid, there must be a test for proving it 6) _____
A) right.
B) wrong.
C) conclusively one way or the other.

7) Which of the following is a scientific statement? 7) _____
A) candy Bon Bons contain no sugar
B) there are things we will never know about
C) matter is filled with undetectable particles
D) there are parts of the universe that will never be discovered by humans
E) none of the above

8) Inertia is defined as a 8) _____
A) force. B) property of matter.
C) change in motion. D) none of the above

9) If no external forces act on a moving object, it will 9) _____
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

10) When no forces act on moving objects their paths are normally 10) _____
A) straight lines. B) circles.
C) ellipses. D) all of the above

11) 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 11) _____
A) follow a circular path. B) slow down.
C) follow a straight–line path. D) stop.

12) Which concept is being illustrated when a tablecloth is quickly yanked beneath dishes resting on a table? 12) _____
A) equilibrium B) friction C) support force D) inertia

13) When a rocket ship gaining speed in outer space runs out of fuel, it 13) _____
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.

14) When you quickly jerk a cart forward that has a ball resting in the middle, the 14) _____
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.

15) A force is a vector quantity because it has both 15) _____
A) magnitude and direction. B) mass and velocity.
C) action and reaction counterparts. D) speed and direction.

16) 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 16) _____
A) 0 N. B) 15 N. C) 25 N. D) 150 N.

17) If Nellie hangs from a horizontal bar that is supported by four vertical ropes, the tension in the ropes 17) _____
A) are each half her weight. B) are each equal to her weight.
C) add to equal her weight. D) none of the above

18) Nellie hangs from a pair of ropes at an angle. Tension in the ropes depends on the 18) _____
A) length of the ropes. B) angle of the ropes.
C) both of these D) neither of these

19) Suspend your body from a pair of ropes slightly angled from the vertical and the tension in each rope will be 19) _____

A) equal your weight. B) half your weight.
C) greater than half your weight. D) none of these

20) The equilibrium rule, $\Sigma F = 0$, applies to 20) _____

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

21) 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 21) _____

A) less. B) the same. C) greater. D) zero.

22) 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 22) _____

A) 300 N. B) 400 N. C) 500 N. D) 600 N.

23) The support force on a 10–N book at rest on a table is 23) _____

A) slightly less than 10 N. B) 10 N.
C) slightly greater than 10 N. D) dependent on the position of the book.

24) A gymnast performing somersaults in a high–flying plane moving at constant velocity needs to make 24) _____

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

25) A mosquito flying at 3 m/s that encounters a breeze blowing at 3 m/s in the same direction has a speed of 25) _____

A) 0 m/s. B) 3 m/s. C) 4 m/s. D) 6 m/s.

26) Jogging Jake runs at 4 m/s along a train flatcar that moves at 10 m/s in the same direction. Jake's speed relative to the ground is 26) _____

A) 6 m/s. B) 10 m/s.
C) 14 m/s. D) none of the above

27) The speedometer of an automobile reads 27) _____

A) average speed. B) instantaneous speed. C) accelerated speed.

28) When you walk at an average speed of 4 m/s, in 5 s you'll cover a distance of 28) _____

A) 2 m. B) 10 m. C) 15 m. D) 20 m.

29) A vehicle undergoes acceleration when it 29) _____

A) gains speed. B) loses speed.
C) changes its direction. D) all of the above

30) The average speed of a horse that gallops 10 kilometers in 30 minutes is 30) _____
A) 15 km/h. B) 20 km/h. C) 30 km/h. D) 40 km/h.

31) While a car travels around a circular track at a constant speed, its 31) _____
A) acceleration is zero. B) velocity is zero.
C) inertia is zero. D) none of the above

32) If a car increases its velocity from zero to 60 m/s in 10 seconds, its acceleration is 32) _____
A) 3 m/s^2. B) 6 m/s^2. C) 60 m/s^2. D) 60 m/s.

33) A cart changes its speed from 90 m/s to 100 m/s in 10 seconds. During this interval its acceleration is 33) _____
A) zero. B) 1 m/s^2.
C) 10 m/s^2. D) none of the above

34) A ball tossed vertically upward rises, reaches its highest point, and then falls back to its starting point. During this time the acceleration of the ball is always 34) _____
A) in the direction of motion.
B) opposite its velocity.
C) directed upward.
D) directed downward.
E) none of the above

35) What is the acceleration of a car that starts from rest and 5 seconds later reaches a speed of 20 m/s? 35) _____
A) 1 m/s^2 B) 2 m/s^2 C) 3 m/s^2 D) 4 m/s^2 E) 5 m/s^2

36) If a freely falling object were equipped with a speedometer, its speed reading would increase each second by about 36) _____
A) 5 m/s.
B) 10 m/s.
C) 15 m/s.
D) a variable amount.
E) depends on its initial speed

37) Twelve seconds after starting from rest, a freely–falling cantelope has a speed of 37) _____
A) 10 m/s. B) 50 m/s.
C) 100 m/s. D) more than 100 m/s.

38) If an object falling freely were somehow equipped with an odometer to measure the **distance** it travels, then the amount of **distance** it travels each succeeding second would be 38) _____
A) constant. B) less and less each second.
C) greater than the second before. D) doubled.

39) A ball is thrown upwards and returns to the same location. Compared with its initial speed its speed when it returns is about 39) _____
A) half as much. B) the same.
C) twice as much. D) four times as much.

40) At one instant a heavy object in air is moving upward at 50 m/s. One second later its speed is approximately 40) _____

A) 40 m/s. B) 50 m/s. C) 55 m/s. D) 60 m/s.

The following questions are bonus questions. If you answer them correctly they will replace a missed question above

41) If an object moves with constant acceleration, its velocity must 41) _____

A) be constant also.
B) change by the same amount each second.
C) change by varying amounts depending on its speed.
D) always decrease.

42) 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 42) _____

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.

43) 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 43) _____

A) less than 30 m/s but more than zero. B) zero.
C) about 30 m/s. D) more than 30 m/s.

44) Neglecting air resistance, a bullet fired straight down from the top of a high cliff has an acceleration of (using g=10 m/s^2) 44) _____

A) less than 10 m/s^2. B) 10 m/s^2.
C) more than 10 m/s^2. D) depends on the height of the cliff.