T  F  1. The amount of force that gives a mass of one kilogram an acceleration of 1 m/s$^2$ is one newton.

T  F  2. According to Newton’s first law, a body at rest will remain at rest unless acted upon by an unbalanced force.

T  F  3. Mass is a measure of the inertia of an object.

T  F  4. Newton’s 2nd law states that if a constant unbalanced force acts on an object, it will move at constant velocity.

T  F  5. For a constant mass, the acceleration of an object is directly proportional to the applied force.

T  F  6. Work is the rate at which you expend energy.

T  F  7. The energy an object has because of its position is called potential energy.

T  F  8. Kinetic energy depends on mass and speed.

T  F  9. A 50 horsepower motor can do as much work as a 100 horsepower motor if given enough time.

T  F  10. You do less work when you run up the stairs than when you walk slowly.

T  F  11. The attractive force a 70 kg person exerts on the earth is the same amount of force the earth exerts on the person.

T  F  12. The acceleration due to gravity on the Earth is 9.8 m/s$^2$.

13. Which one of the following has an appropriate unit?
A. work - Joule  B. force - Newton  C. energy - calorie  D. all of these.

14. The watt (W) is a unit of
A. work  B. electrical energy  C. power  D. force

15. When a light bulb is rated at 60 W, it means that
A. the bulb uses 60 J of power when it is lit.
B. current is traveling at 60 m/sec through the filament.
C. each second, the bulb converts 60 J of electrical energy to heat and light.

16. A force causes a mass to experience an acceleration, $a$. If the force is doubled and the mass is doubled, the acceleration is
A. $a$  B. $2a$  C. $4a$  D. $9a$.

17. If the acceleration is zero, then the speed is _______.
A. zero.  B. constant.  C. a variable.  D. NOTA

18. A common way to define force is
A. an outward pressure.  B. a push or a pull.  C. strain.  D. the energy effect.

19. A sheet of paper can be withdrawn from under a glass of water without spilling if the paper is jerked quickly.
   The reason for this is that
A. the glass has no acceleration.  B. there is an action-reaction pair.
C. gravity pulls on the glass.  D. the glass has inertia.
E. NOTA.
20. Two students stand poised to leap off a high dive structure into a swimming pool below. Student B is twice as massive as student A. Which of the following is true?
A. Student B will reach the ground sooner than student A.
B. Both students have the same gravitational potential energy.
C. Both students will have the same kinetic energy just before impact.
D. Student B did twice as much work climbing to the top of the structure.

21. While exploring an ancient Mayan tomb, you discover that the walls are closing in on you. By exerting 400 N of force, you are able to keep the wall from coming closer. The work you are doing on the wall after you stop it is
A. 400 J
B. 3920 J
C. unknown, because the mass of the wall is not given.
D. zero

22. A 100 horsepower motor lifts an elevator car to the top of an 5 story building in 20 seconds. An 50 horsepower motor will lift the car to the top in ___________ seconds.
A. 40 B. 10 C. 80 D. 20

23. What type of energy is stored in the gas that you put into your car?
A. potential B. kinetic C. heat D. chemical

A. 8400 B. 840000 C. 1680000 D. 2100000

25. A pendulum is pulled back to position A, then released. Where is its kinetic energy the maximum?
A. A B. B C. C D. D E. E

26. An object is dropped off a cliff. What is its speed three seconds later?
A. 20 m/s B. 30 m/s C. 60 m/s D. 40 m/s

27. If a ball falls 80 meters, how fast will it be going when it hits the ground?
A. 30m/s B. 64 m/s C. 39 m/s D. 100 m/s

28. How far will a ball fall in 4.5 seconds if we ignore air resistance?
A. 200 m B. 60 m C. 100 m D. 500 m

29. If you try to compare the frictional force produced by two tennis shoes, you must make sure that _______.
A. they are the same brand B. they are the same size
C. they are the same weight D. they are made from the same materials

30. Which statement best describes the motion of the ball shown in the diagram below? The position of the ball is marked at one second intervals. (Assume the ball moves from left to right.) The ball is _____.

A. moving with constant speed. B. speeding up.
C. moving with zero acceleration. D. slowing down.

31. The slope of the straight line distance vs. time graph can be used to determine ________________.
A. the speed of the object B. how long the object traveled
C. how far the object traveled D. All of the above can be determined.
32. Which of the following types of motion is (are) classified correctly?
   A. sliding – interaction of objects  
   B. parabolic – interaction of objects  
   C. gliding – interaction of objects  
   D. circular – interaction of objects  
   E. A and C  

33. What is the acceleration of a car that maintains a constant velocity of 100 km/h for 10 seconds?
   A. 0.  
   B. 10 km/h/s.  
   C. 10 m/s/s.  
   D. 1000 km/h/s.  

34. The acceleration due to gravity on the moon is one-sixth the acceleration due to gravity on the earth. An object that weighs 60 Newtons on the earth will weigh ______ Newtons on the moon.
   A. 10  
   B. 60  
   C. 360  
   D. None of these  

35. The mass that was accelerated in the Scootin’ Newton activity was _________.
   A. the mass of the cart  
   B. the mass of the cart and any masses placed on the cart  
   C. the mass of the cart, any masses placed on it and the mass in the cup.  
   D. NOTA, it depends on how much mass was in the cup  

36. A rope is attached to a wooden block that is placed upon a table as shown below. A student pulls on the rope to produce a pulling force, F. Which of the other forces shown represents the component of the pulling force that reduces the friction force between the block and the table?
   A. A  
   B. B  
   C. C  
   D. D  

37. In the above picture, which two forces add to produce F?
   A. A and D  
   B. A and C  
   C. B and C  
   D. A and B  

38. Which of the following is a vector?
   A. velocity  
   B. 100 m/s @ 180 north of east  
   C. force  
   D. how tall you are  
   E. A, B and C, but not D.  

REFER TO THE CASE 1 AND CASE 2 GRAPHS AT THE END OF THE TEST IN ORDER TO ANSWER THE FOLLOWING QUESTIONS.

39. What type of motion in CASE 1 occurs from 14 to 20 seconds?
A. The object is slowing down.
B. The object is speeding up.
C. The object has constant speed.
D. None of the above

40. The motion of an object that is represented between points 0 and J on the CASE 1 graph and the motion of an object that is represented between points L and M on the CASE 2 graph have something in common. What is it that they have in common?
A. Both objects possess non-zero acceleration.
B. Both objects possess zero acceleration.
C. Both objects are traveling at constant speed.
D. Both object's motions possess nothing in common.
E. Both B and C are correct

41. What is the velocity of the object in CASE 2 during the time interval between points L and M?
A. 3 m/s
B. 6.9 m/s
C. 55 m/s
D. Zero

42. What was the average velocity of the object represented by CASE 2 over the interval from 0 to 20 seconds?
A. 6 m/s
B. 50 m/s
C. 17 m/s
D. NOTA

Common Chemical Questions

43. The chemical name of CH₄ is:
A. Methane  B. Acetic Acid  C. Carbonic acid  D. Sulfuric acid  E. NOTA

44. Which of the following is the formula of battery acid:
A. NaOH  B. Fe₂O₃  C. NaOCl  D. H₂SO₄  E. NOTA

45. Sodium hypochlorite has the common name of:
A. Limestone  B. Baking soda  C. Bleach  D. Lye  E. NOTA

46. Acetic acid has the formula of:
A. NaHCO₃  B. CH₃COOH  C. NaOCl  D. NH₃  E. NOTA

47. Calcium carbonate is commonly called:
A. Muratic acid  B. Rust  C. Baking soda  D. Bleach  E. NOTA
DISTANCE OF FALL VS. TIME

VELOCITY OF FALL VS. TIME