T F 1. An unbalanced force acting on a body produces an acceleration.

T F 2. Work is the rate at which you expend energy.

T F 3. The energy an object has because of its position is called potential energy.

T F 4. The increase in potential energy caused by lifting an object can be calculated by multiplying its weight by its change in height.

T F 5. Your electric bill for 1500 kilowatt-hours is a charge for the power you have used that month.

T F 6. You do more work on yourself when you run up the stairs than when you walk slowly.

T F 7. Energy is not conserved when a moving object slows to a stop.

T F 8. Mass is a measure of the inertia of an object.

T F 9. Newton’s 2nd law states that if an unbalanced force acts on an object, it will move at constant velocity.

T F 10. For a constant mass the acceleration of an object is directly proportional to the applied force.

T F 11. The reason a moving object slows down is that its force of motion gradually runs out.

T F 12. A child on a carousel moving at constant speed has an acceleration of zero.

T F 13. The attractive force a 70 kg person exerts on the earth is much, much smaller than the force the earth exerts on the person.

T F 14. The amount of force that gives a mass of one kilogram an acceleration of 1 m/s² is one newton.

T F 15. According to Newton’s third law, forces always occur in pairs.

T F 16. According to Newton’s first law, a body at rest will remain at rest unless acted upon by an unbalanced force.

17. _____ is the property that resists changes in motion.
   A. Inertia
   B. Acceleration
   C. Heavyness
   D. Movement

18. The _____ of a body is the gravitational force acting upon it.
   A. weight
   B. mass
   C. density
   D. matter

19. A sky diver falling at terminal velocity _____.
   A. is in free fall
   B. has a net force of zero
   C. has an acceleration due to gravity
   D. must fall from rest
20. The newton is a unit of
   A. motion  
   B. energy  
   C. power  
   D. force

21. The weight of a 50 kg box is closest to
   A. 5 N  
   B. 50 N  
   C. 500 N  
   D. 5000 N

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

23. Which one of the following has an appropriate unit?
   A. work - joule  
   B. force - newton  
   C. power - watt  
   D. all of the above.

24. A car traveling 20 mph can stop in about 40 ft. If the same car were traveling twice as fast, its stopping distance would be roughly
   A. 40 ft  
   B. 60 ft  
   C. 80 ft  
   D. 160 ft

25. What is the power of a toy car that lifts a 2 Newton block 50 centimeters in 10 seconds.
   A. 0.1 watt  
   B. 1.0 watt  
   C. 2 watt  
   D. 1000 watt

26. 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.  
   D. the bulb loses 60 W of potential energy each second

27. Kinetic energy refers to
   A. energy of motion  
   B. energy of position  
   C. energy stored in fossil fuels  
   D. electrical energy

28. When you throw a ball into the air, its kinetic energy
   A. equals $1/2 \cdot mv^2$  
   B. equals the work you did on the ball  
   C. is converted to potential energy as it goes higher  
   D. all of the above
29. Two students stand poised to leap off a high dive structure into the 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.

30. 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 is
A. 400 J
B. 3920 J
C. unknown, because the mass of the wall is not given.
D. zero, because the wall is not moving.

31. A 40 horsepower motor lifts an elevator car to the top of an 8 story building in 40 seconds. An 80 horsepower motor will lift the car to the top in __________ seconds.
A. 40
B. 10
C. 80
D. 20

32. Roughly, what fraction of our nation’s current energy needs is supplied by coal?
A. 10%
B. 25%
C. 40%
D. 50%

33. A drink can weighing 0.2 pounds is dropped off the edge of the Grand Canyon and attains a terminal speed of 66 feet/second. What is the force of air friction at terminal speed?
A. 0.2 pounds
B. 1.4 pounds
C. 0.32 slugs
D. 0.1 slugs
E. 0.66 pounds

34. The law of inertia is another name for Newton’s
A. third law.
B. second law.
C. first law.
D. law of the masses.

35. According to Newton’s second law, acceleration is
A. inversely proportional to the applied force.
B. directly proportional to the mass of the object.
C. something that increases if the mass increases.
D. NOTA.

36. The ratio of weight to mass at the surface of the earth is
A. \(g = 32 \text{ feet/sec}^2\).
B. \(g = 9.8 \text{ meters/sec}^2\).
C. the acceleration of gravity.
D. all of the above.
37. A bus driver slams on the brakes while moving at high speed. The passengers will keep moving for a short time. This is an attention-grabbing example of Newton’s _______ law.
A. first  
B. second  
C. third  
D. fourth

38. A man pushes a 50 kilogram box and causes an acceleration of one meter/sec². What is the net force acting on the box?
A. 0.5 Newtons  
B. 5 Newtons  
C. 50 Newtons  
D. 50 pounds  
E. 5 pounds

39. A force causes a mass to experience an acceleration a. If the force is tripled and the mass is reduced by 1/3, the acceleration is
A. a  
B. 2a  
C. 3a  
D. 9a

40. 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

41. If a = zero then v =
A. zero.  
B. constant.  
C. a variable.  
D. NOTA

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

43. A 100 Calorie (food calorie) candy bar contains __________ joules of energy.
A. 4200  
B. 420000  
C. 100000  
D. 100

44. A car increases its speed form 30 mph to 60 mph. By what factor did its kinetic energy increase?
A. 2  
B. 4  
C. 6  
D. 8
45. The most common lever in the human body is a __________ class lever.
A. first
B. second
C. third
D. fourth

46. What is the IMA of the pulley shown below?
A. 1
B. 2
C. 4
D. 5

47. The human body uses levers to __________.
A. amplify force
B. diminish distance
C. amplify distance
D. diminish force

48. A pendulum below 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