Name: __ Pretest Class: _____ Date: _____ ID: A

Chapter 5 Work and Machines (83 points)

Modified True/False

Indicate whether the sentence or statement is true or false. If false, change the identified word or phrase to make the sentence or statement true.

____ 1. You do work on an object when you lift it from the floor to a shelf. _____

____ 2. Holding a 25-N bag of sugar 1 meter above the floor requires 25 joules of work.
_____

____ 3. The force exerted by a machine is called the output force. _____

____ 4. The mechanical advantage of a machine that changes only the direction of a force is 1.
_____

____ 5. Efficiency compares the output work to the output force. _____

____ 6. A wheel and axle is a compound machine. _____

____ 7. A second-class lever always multiplies distance. _____

____ 8. The ideal mechanical advantage of an inclined plane is the length of the inclined plane times the height of the inclined plane. _____

____ 9. Your jaw and teeth act together as a simple machine. _____

____ 10. When you raise your leg, the knee acts as a fulcrum for the upper leg. _____

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

____ 11. For work to be done on an object,
a. some force need only be exerted on the object.
b. the object must move some distance as a result of a force.
c. the object must move, whether or not a force is exerted on it.
d. the object must not move.

____ 12. Which of these is an example of work being done on an object?
a. holding a heavy piece of wood at a construction site
b. trying to push a car that doesn't move out of deep snow
c. pushing a child on a swing
d. holding a door shut on a windy day so it doesn't blow open

____ 13. In order to do work on an object, the force you exert must be
a. the maximum amount of force you are able to exert.
b. in the same direction as the object's motion.
c. in a direction opposite to Earth's gravitational force.
d. quick and deliberate.

____ 14. Work equals force times
a. energy.
b. velocity.
c. distance.
d. mass.

____ 15. If you exert a force of 20 newtons to push a desk 10 meters, how much work do you do on the desk?
a. 200 joules
b. 30 joules
c. 10 joules
d. 100 joules

____ 16. Work is measured in
a. meters.
b. pounds.
c. joules.
d. newtons.

____ 17. What do machines do?
a. change the amount of force you exert or the distance over which you exert the force
b. increase the amount of work that is done
c. decrease the amount of work that is done
d. eliminate friction

____ 18. Which of these is located in the middle on a third class lever?
a. input force.
b. output force
c. fulcrum
d. rope

____ 19. How can a hockey stick be considered a machine?
a. It multiplies force.
b. It multiplies distance.
c. It changes direction.
d. It reduces friction.

____ 20. Pulling down on a rope to hoist a sail on a sailboat is an example of a machine
a. multiplying the force you exert.
b. multiplying the distance over which a force is exerted.
c. changing the direction in which a force is exerted.
d. reducing friction.

____ 21. If you exert a force of 20 newtons on a can opener, and the opener exerts a force of 60 newtons on the can, the ideal mechanical advantage of the can opener is
a. 6.
b. 2.
c. 1,200.
d. 3.

____ 22. The mechanical advantage of a machine that changes only the direction of force is
a. 1.
b. less than 1.
c. greater than 1.
d. 0.

____ 23. Without friction there would be
a. less machine efficiency.
b. greater output work than input work.
c. greater input work than output work.
d. equal input and output work.

____ 24. An ideal machine would have an efficiency of
a. 1 percent.
b. 10 percent.
c. 50 percent.
d. 100 percent.

____ 25. The efficiency of a machine compares
a. force to mass.
b. output work to input work.
c. force to friction.
d. friction to mass.

____ 26. If tight scissors have an efficiency of 50 percent, how much of your work is wasted overcoming friction?
a. all of it
b. none of it
c. one half of it
d. 10 percent of it

____ 27. A ramp is an example of a simple machine called a(n)
a. inclined plane.
b. wedge.
c. lever.
d. pulley.

____ 28. The ideal mechanical advantage for an inclined plane is equal to the length of the incline divided by the
a. mass of the incline.
b. slope of the incline.
c. height of the incline.
d. angle of the incline.

____ 29. A simple machine that might be thought of as an inclined plane that moves is a
a. lever.
b. wheel and axle.
c. wedge.
d. pulley.

____ 30. Which of these could be considered an inclined plane wrapped around a cylinder?
a. lever
b. screw
c. wheel and axle
d. pulley

____ 31. The fixed point that a lever pivots around is called the
a. axle.
b. pulley.
c. gear.
d. fulcrum.

____ 32. Which of these is an example of a third-class lever?
a. scissors
b. pliers
c. fishing pole
d. nutcracker

____ 33. The ideal mechanical pulley system (block and tackle) is equal to
a. the total number of ropes on the pulley system
b. the number of ropes supporting the object
c. the total number of pulleys in the system
d. 1 always

____ 34. When you raise or lower a flag on a flagpole, you are using a
a. wheel and axle.
b. pulley.
c. wedge.
d. inclined plane.

____ 35. A machine that uses two or more simple machines is called a
a. combination machine.
b. compound machine.
c. mechanical machine.
d. mixed machine.

____ 36. A device with toothed wheels that fit into one another is called a
a. system of gears.
b. wheel and axle.
c. pulley.
d. fulcrum.

____ 37. One example of a compound machine is a
a. door.
b. pair of scissors.
c. bicycle.
d. shovel.

____ 38. Most of the machines in your body consist of bones and muscles and are called
a. wedges.
b. levers.
c. pulleys.
d. compound machines.

____ 39. Which body parts act as the fulcrums of levers?
a. muscles
b. bones
c. joints
d. tendons

____ 40. Which body parts are shaped like wedges?
a. muscles
b. tendons
c. incisors - Teeth
d. bones in your legs

Completion

Complete each sentence or statement.

41. When you drop a rock, the object that does work on the rock as it falls is _____.

42. A gardener pushes on the angled handle of a lawn mower, causing it to move forward across a lawn. The only portion of the gardener's force that does work on the lawn mower is the force in the _____ direction.

43. A newton-meter is a measure of work also known as the _____.

44. The amount of work done in lifting a 25-N bag of sugar 2 meters is the same as lifting two 25-N bags of sugar _____ meter(s).

45. The force applied to a machine is called the _____ force.

46. A simple machine makes work easier by multiplying force or _____, or by changing direction.

47. The _____ mechanical advantage of a machine cannot be predicted in advance because it depends on the efficiency of the machine.

48. The ideal mechanical advantage would equal the actual mechanical advantage if there were no losses due to _____.
49. The efficiency of an actual machine is always less than _____%.
50. The output work of a certain machine is 12,600 J. If the input work is 18,000 J, the efficiency is _____.
51. When you use a paint can opener to open a can of paint, you use the paint can opener as a simple machine called a(n) _____.
52. A jar lid is an example of a simple machine called a(n) _____.
53. A screwdriver is a simple machine called a(n) _____.
54. A ramp in a parking garage is an example of a simple machine called a(n) _____.
55. You can increase the ideal mechanical advantage of a first-class lever by moving the fulcrum closer to the _____ force.
56. Raising one end of a ramp will _____ its ideal mechanical advantage.
57. The set of gears on a bicycle wheel is classified as a(n) _____ machine.
58. A chef sometimes holds the tip of a knife stationary when chopping food. Held this way, the knife is a compound machine made up of a wedge and a _____.
59. As you wave your hand at the wrist, your hand is acting as a simple machine called a(n) _____.
60. As you bite into a peach, your front teeth act as a simple machine called a(n) _____.

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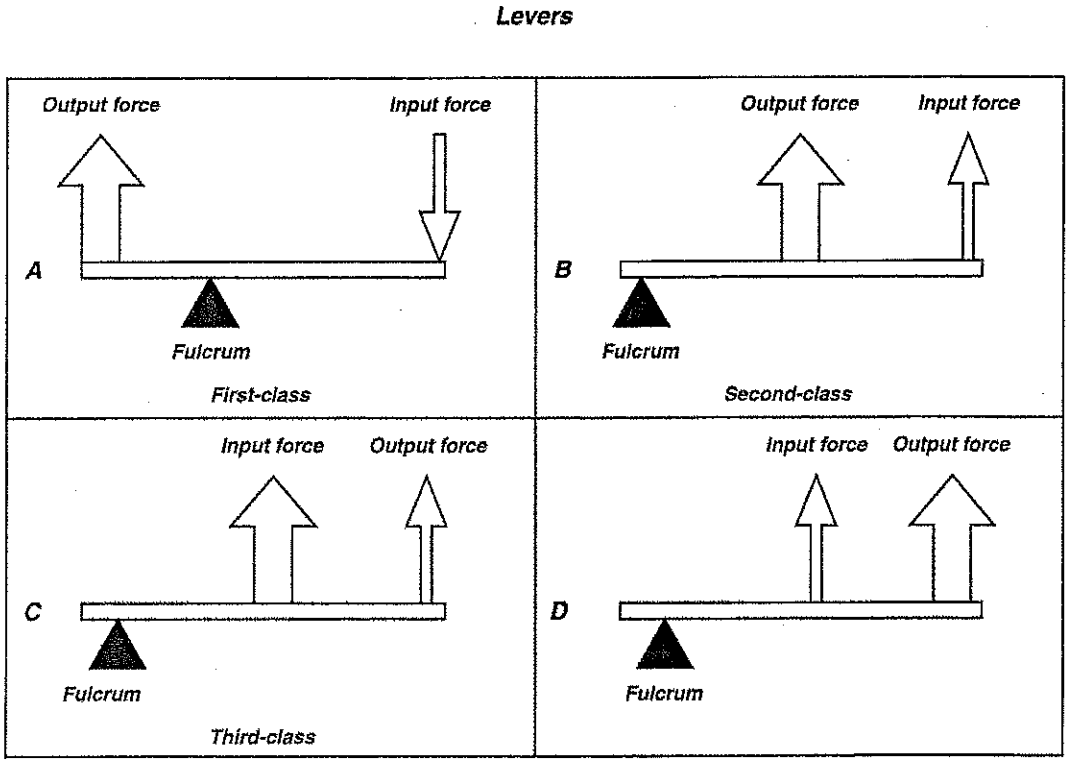
Short Answer



61. In what class of lever is the direction of the input force opposite to the direction of the output force? (1 point)

62. What class of lever is a pair of scissors? **Explain your answer.** (2 points)

63. Which class of lever does not multiply the input force? **What is its advantage**? (2 points)