

Please do not write on the test!

True/False

Indicate whether the statement is true or false. Select [A] for True statements and [B] for False statements.

- 1. As an object falls its potential energy is lost to the air around it. *False*
- 2. When a machine is used to do work, the force applied by the machine is called the effort force. *False*
- 3. When you ride a playground swing, your potential energy is greatest at the highest point. *True*
- 4. Lowering an object decreases its potential energy. *True*
- 5. Energy is the ability to cause change in motion. *True*
- 6. In order for work to be done on a object, the object must move. *True*
- 7. As mass decreases, kinetic energy increases. *False*
- 8. Energy doesn't have to involve motion. *True*
- 9. The sum of potential and kinetic energy in a system is called the total energy. *False*
- 10. In a car engine, burning fuel produces heat, which causes gases to expand, producing kinetic energy. *True*
- 11. Energy is measured in joules. *True*
- 12. Carbohydrates and fats provide our bodies with energy in the form of calories. *True*

Multiple Choice

- 13. The SI unit for energy is the _____.
 - a. calorie
 - b. joule**
 - c. meter per second
 - d. kilogram
- 14. Which energy transformation takes place when a match is struck against the side of a matchbox and bursts into flames?
 - a. electrical energy --> light energy
 - b. heat energy --> kinetic energy
 - c. chemical energy --> heat energy**
 - d. potential energy --> electrical energy
- 15. A slanted surface used to raise an object is a(n) _____.
 - a. efficiency board
 - b. effort ramp
 - c. inclined plane**
 - d. screw
- 16. A device that does work with only one movement and changes the size or direction of a force is a(n) _____.
 - a. compound machine
 - b. effort machine
 - c. screw
 - d. simple machine**
- 17. The rate at which work is done is called _____.
 - a. efficiency
 - b. effort time
 - c. force
 - d. power**
- 18. An inclined plane with one or two sloping sides forms a machine called a _____.
 - a. pulley
 - b. lever
 - c. ramp
 - d. wedge**

19. In a nuclear fusion reaction, mass is transformed into ____.
- matter
 - nuclei
 - energy
 - light
20. If a weight lifter is holding barbells above his head, what does he have to do to perform work?
- stand still
 - move barbells sideways
 - step forward
 - lower barbells
21. Albert stirs a mug of hot chocolate with a metal spoon. What type of heat transfer is responsible for the spoon getting hot?
- conduction
 - convection
 - thermoelectric
 - radiation
22. An inclined plane is used to move a heavy box from the ground into the bed of a truck.



If 100 N of force is required to move the load up the ramp, how much work is done? Disregard any force of friction.

- 100 J
 - 300 J
 - 400 J
 - 500 J
23. A copper ornament has a mass of 0.0693 kg and changes from a temperature of 20.0°C to 27.4°C. How much heat energy did it gain? [The specific heat of copper is 390 J/ kg °C]
- 200 J
 - 460 J
 - 540 J
 - 740 J
24. When two or more simple machines work together, they are called a(n) ____.
- compound machine
 - effort machine
 - screw
 - simple machine
25. An inclined plane wrapped around a cylindrical post is a ____.
- block and tackle
 - lever
 - ramp
 - screw
26. Increasing the speed of an object ____ its potential energy.
- does not affect
 - increases
 - decreases
 - changes
27. The kinetic energy of an object increases as its ____ increases.
- gravitational energy
 - potential energy
 - specific heat
 - velocity
28. The unit of power is the ____.
- joule
 - watt
 - m/s
 - second
29. The stored energy in a battery can BEST be described as
- thermal
 - chemical
 - nuclear
 - kinetic

30. Connor uses a shovel to dig a hole to plant a tree. A shovel is an example of a compound machine because it is made up of what two simple machines?

- a. wheel and axle and lever
- b. lever and wedge
- c. screw and wedge
- d. inclined plane and wedge

31. A bar that is free to pivot about a fixed point is a _____.

- a. fulcrum
- b. lever
- c. ramp
- d. screw

32. Which of the following devices does not make use of electrical energy?

- a. upright piano
- b. radio
- c. toaster
- d. digital camera

33. A car was sitting in sunlight all day long. The heat that is now contained in the car was transferred to the car primarily by which of the following processes?

- a. convection
- b. conduction
- c. radiation
- d. electrical energy transfer

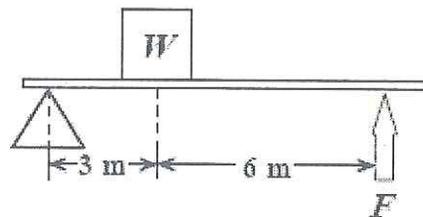
34. A bus engine transfers chemical potential energy into _____ so that the bus **moves**.

- a. thermal energy
- b. gravitational potential energy
- c. electrical energy
- d. kinetic energy

35. A winding mountain road is an example of a(n) _____.

- a. block and tackle
- b. lever
- c. inclined plane
- d. wheel and axle

36. A box of weight W is lifted by a force F using a lever as shown below.



What is the mechanical advantage of the lever?

- a. $1/2$
- b. 2
- c. 3
- d. 6

37. The amount by which a machine multiplies an effort force is called the _____.

- a. efficiency factor
- b. fulcrum
- c. mechanical advantage
- d. resistance force

38. According to the law of conservation of energy, the total amount of energy in the universe _____.

- a. remains constant
- b. changes constantly
- c. increases
- d. decreases

39. An arrangement of pulleys designed to reduce the effort force is called a _____.

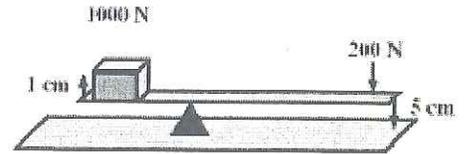
- a. block and tackle
- b. fixed pulley
- c. movable pulley
- d. simple pulley

40. Three of the following simple machines are basically the same. The one that does NOT belong with the group is the _____.

- a. lever
- b. pulley
- c. wedge
- d. wheel and axle

41. Which of the following situations violates the law of conservation of energy?
- A ball dropped from the top of a building increases in speed until it hits the ground.
 - A block sliding freely on level ice increases in speed until it hits a wall.
 - A child playing on a swing moves fastest at the bottom of the swing's path.
 - The height a ball bounces decreases with each bounce.
42. Two simple machines that are part of a bicycle are a(n)_____.
- gear and a wheel and axle
 - inclined plane and a lever
 - inclined plane and a wedge
 - screw and an inclined plane

43. A lever is used to lift a box, as shown in the diagram below.



What is the mechanical advantage of the lever?

- 4
 - 5
 - 10
 - 25
44. Conduction can BEST be described as the transfer of heat energy by
- waves traveling through empty space
 - fluids traveling through other fluids
 - gases expanding within a fluid medium
 - atoms colliding with their neighbors

Matching

- | | |
|-------------------------|----------------------|
| a. Work | d. Kinetic Energy |
| b. Power | e. Potential Energy |
| c. Mechanical Advantage | f. Mechanical Energy |

45. Transfer of energy through motion **A**
46. Stored energy due to position **E**
47. Energy of an object which can become work **AB**
48. How much a machine amplifies or reduces force **C**
49. Energy of motion **D**
50. Rate at which work is done **E**