Multiple Choice

9.1 Work, Power, and the Work–Energy Theorem 22.

Which expression represents power?

a. fd
b. mgh
c. \frac{mv^2}{2}
d. \frac{W}{t}

23.

The work–energy theorem states that the change in the kinetic energy of an object is equal to what?

a. The work done on the object
b. The force applied to the object
c. The loss of the object's potential energy
d. The object's total mechanical energy minus its kinetic energy

24.

A runner at the start of a race generates 250 W of power as he accelerates to 5 m/s . If the runner has a mass of 60 kg, how long did it take him to reach that speed?

a. 0.33 s
b. 0.83 s
c. 1.2 s
d. 3.0 s

25.

A car's engine generates 100,000 W of power as it exerts a force of 10,000 N. How long does it take the car to travel 100 m?

a. 0.001 s
b. 0.01 s
c. 10 s
d. 1,000 s

9.2 Mechanical Energy and Conservation of Energy 26.

Why is this expression for kinetic energy incorrect? \text{KE} = (m)(v)^2.

a. The constant g is missing.
b. The term v should not be squared.
c. The expression should be divided by 2.
d. The energy lost to friction has not been subtracted.

27.

What is the kinetic energy of a 10\text{kg} object moving at 2.0\,\text{m/s}?

a. 10\,\text{J}
b. 20\,\text{J}
c. 40\,\text{J}
d. 100\,\text{J}

28.

Which statement best describes the PE-KE transformations for a javelin, starting from the instant the javelin leaves the thrower's hand until it hits the ground.

a. Initial PE is transformed to KE until the javelin reaches the high point of its arc. On the way back down, KE is transformed into PE. At every point in the flight, mechanical energy is being transformed into heat energy.
b. Initial KE is transformed to PE until the javelin reaches the high point of its arc. On the way back down, PE is transformed into KE. At every point in the flight, mechanical energy is being transformed into heat energy.
c. Initial PE is transformed to KE until the javelin reaches the high point of its arc. On the way back down, there is no transformation of mechanical energy. At every point in the flight, mechanical energy is being transformed into heat energy.
d. Initial KE is transformed to PE until the javelin reaches the high point of its arc. On the way back down, there is no transformation of mechanical energy. At every point in the flight, mechanical energy is being transformed into heat energy.

29.

At the beginning of a roller coaster ride, the roller coaster car has an initial energy mostly in the form of PE. Which statement explains why the fastest speeds of the car will be at the lowest points in the ride?

a. At the bottom of the slope kinetic energy is at its maximum value and potential energy is at its minimum value.
b. At the bottom of the slope potential energy is at its maximum value and kinetic energy is at its minimum value.
c. At the bottom of the slope both kinetic and potential energy reach their maximum values
d. At the bottom of the slope both kinetic and potential energy reach their minimum values.

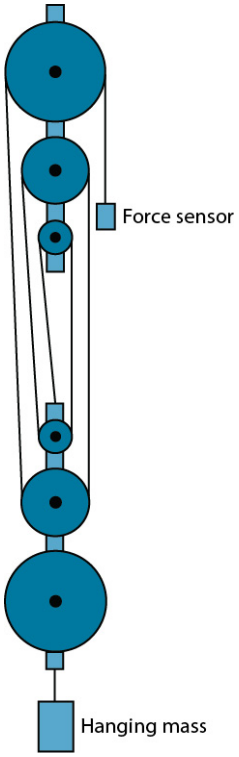
9.3 Simple Machines 30.

A large radius divided by a small radius is the expression used to calculate the IMA of what?

a. A screw
b. A pulley
c. A wheel and axle

d. An inclined plane.

31.



(credit: modification of work by Shona Leonard|/DocPlayer)

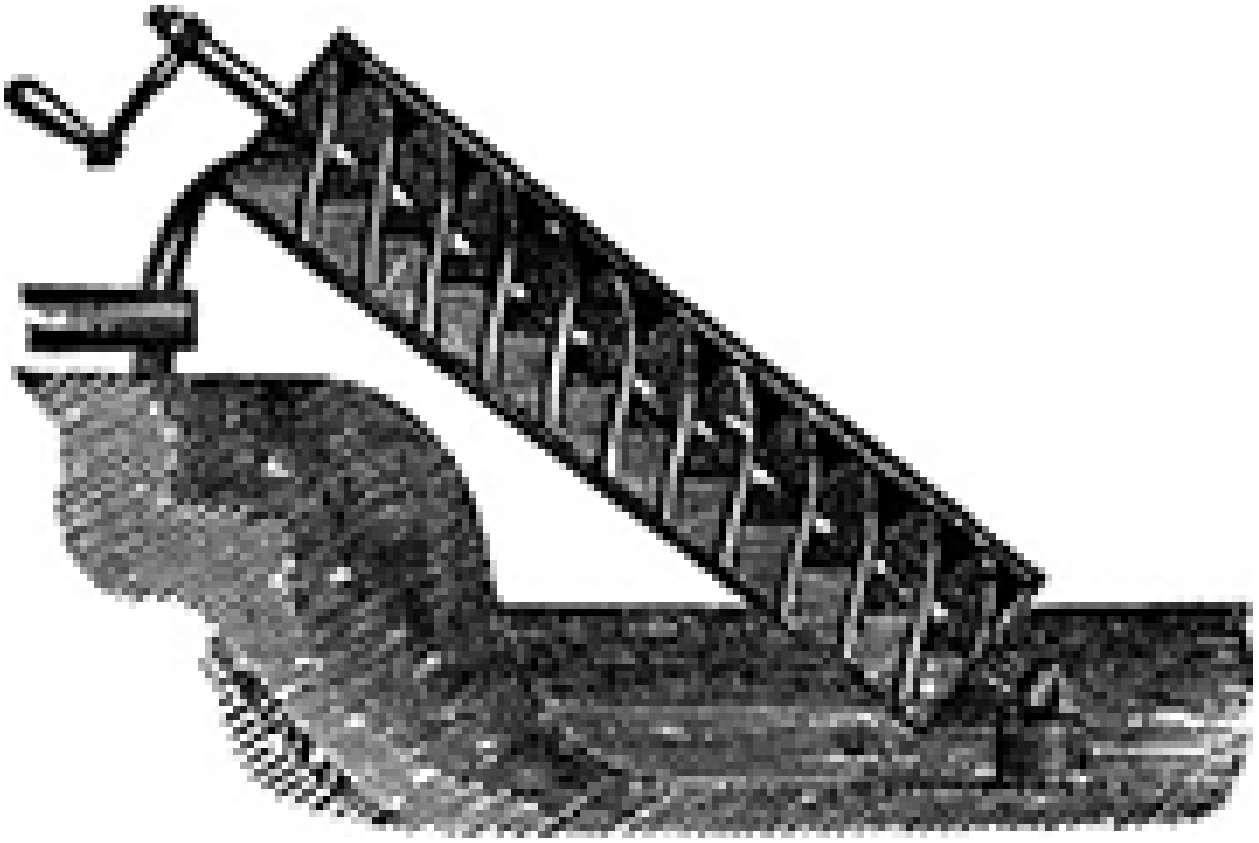
Study the given pulley system.

How much force is needed to lift an object with a mass of 50 kg using this system? (Take Earth's g as 10 m/s2.)

a. 83 N.
b. 100 N.
c. 125 N.
d. 133 N.

32.

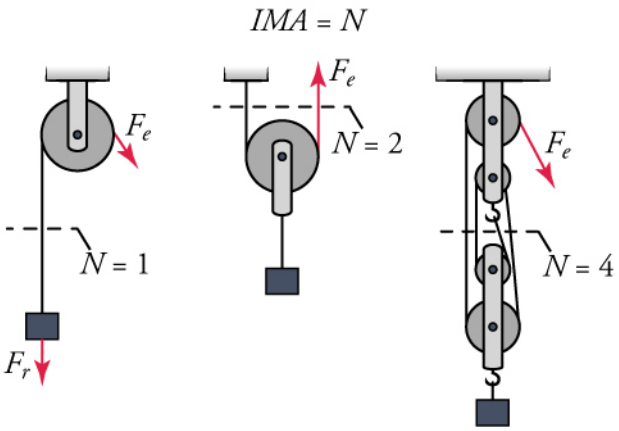
Which statement correctly describes the simple machines, like the crank in the image, that make up an Archimedes screw and the forces it applies?



a. The crank is a wedge in which the IMA is the length of the tube divided by the radius of the tube. The applied force is the effort force and the weight of the water is the resistance force.
b. The crank is an inclined plane in which the IMA is the length of the tube divided by the radius of the tube. The applied force is the effort force and the weight of the water is the resistance force.
c. The crank is a wheel and axle. The effort force of the crank becomes the resistance force of the screw.
d. The crank is a wheel and axle. The resistance force of the crank becomes the effort force of the screw.

33.

Refer to the pulley system on right in the image. Assume this pulley system is an ideal machine.
How hard would you have to pull on the rope to lift a 120 N load?
How many meters of rope would you have to pull out of the system to lift the load 1 m?



a. 480 N
   4 m
b. 480 N
   $\frac{1}{4}$ m
c. 30 N
   4 m
d. 30 N
   $\frac{1}{4}$ m