

Phys11 Work/Energy/Power : W.S. - 10

- 1) A man pushes a box with a force of 85 N. through a horizontal distance of 3.7 m.
 - a) If the friction is zero the work done is _____ .
 - b) If the friction force is -85 N and the box moves at a constant speed, the work done by the man is _____ .
- 2) If 1200 J of work is required to move a box through a horizontal distance of 50. m, the force required is _____ .
- 3)a) A 35 kg box is lifted to a height of 4.2 m. The work done is _____ .
 - b) If the gravitational potential energy of the box increases by 690 J, then the height through which it was raised is _____ .
 - c) If the same box is then carried horizontally a distance of 7.3 m, the additional work done is _____ .
- 4) A 32 kg boy on a 12 kg bike travels horizontally at 2.6 m/s. The total kinetic energy is _____ .
- 5) If the kinetic energy of a 790 kg car is 28,000 J, its speed is _____ .
- 6)a) A baseball bat exerts a force on a stationary ball of 580 N over a distance of 5.0 cm. The work done is _____ .
 - b) The change in kinetic energy of the ball is _____ .
 - c) If the mass of the ball is 0.15 kg, the final speed is _____ .
- 7)a) The work done in lifting a 3.6 kg box to a height of 2.5 m is _____
 - b) The new potential energy is _____ . (assume $E_p = 0.0$ J on the floor)
- 8) If 630 J of work is done to lift a 17 kg box, it has been lifted to a height of _____ m.

- 9) A 1.2 kg book is held at a height of 1.6 m for 5.0 minutes. How much work is done ? _____
- 10) If someone does 2300 J of work in 32 seconds, the power output is _____ .
- 11) If the power output of a machine is 1200 Watts, how much work can it do in 3.5 minutes ? _____ .
- 12)a) A 52 kg person runs up 12 stairs. Each stair is 25 cm wide and 25 cm high. The work done is _____ .
- b) The change in potential energy is _____ .
- c) If the person takes 2.3 seconds to climb the stairs, the power exerted is _____ .
- 13) One horsepower (hp) = 746 Watts. How much work can an average horse do in one hour ? _____ .
- 14) One kilowatt-hour = _____ Joules.
- 15) An electron has a mass of 9.1×10^{-31} kg. If the velocity of the electron is 4.0×10^7 m/s, find the kinetic energy. _____ .
- 16) Find the kinetic energy of a 0.50 g insect flying at a rate of 0.45 m/s. _____ .
- 17) What is the law of conservation of energy ?
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18)a) A ball rolls down an incline. At some point on the incline the kinetic energy of a ball is 5.0 J and its gravitational potential energy is 3.0 J. The total energy is _____ .

b) A short time later the kinetic energy of the ball is 6.0 J. The potential energy is _____ . The total energy is _____ .

Answers : 1)a) 310 J, b) 310 J, 2) 24 N, 3)a) 1400 J, b) 2.0 m, c) 0.0 J, 4) 150 J, 5) 8.4 m/s, 6)a) 29 J, b) 29 J, c) 20. m/s, 7)a) 88 J, b) 88 J, 8) 3.8 m, 9) 0.0 J, 10) 72 W, 11) 2.5×10^5 J, 12)a) 1.5×10^3 J, b)

1.5x10³ J, c) 660 W, 13) 2.69x10⁶ J, 14) 3.6x10⁶, 15) 7.3x10⁻¹⁶ J,
16) 5.1x10⁻⁵ J, 17) Energy can be transformed from one form to
another but cannot be created or destroyed. Also; The total energy of
an isolated system remains constant. 18)a) 8.0 J, b) 2.0 J, 8.0 J.