

Quiz 8

Multiple-choice questions on work, energy and power

1. State which of the following is incorrect:
(a) $1 \text{ W} = 1 \text{ J/s}$ (b) $1 \text{ J} = 1 \text{ N/m}$ (c) $\eta = \frac{\text{output energy}}{\text{input energy}}$ (d) $\text{energy} = \text{power} \times \text{time}$
2. An object is lifted 2000 mm by a crane. If the force required is 100 N, the work done is:
(a) $\frac{1}{20} \text{ Nm}$ (b) 200 kNm (c) 200 Nm (d) 20 J
3. A motor having an efficiency of 0.8 uses 800 J of electrical energy. The output energy of the motor is:
(a) 800 J (b) 1000 J (c) 640 J (d) 6.4 J
4. 6 kJ of work is done by a force in moving an object uniformly through 120 m in 1 minute. The force applied is:
(a) 50 N (b) 20 N (c) 720 N (d) 12 N
5. For the object in question 4, the power developed is:
(a) 6 kW (b) 12 kW (c) $\frac{5}{6} \text{ W}$ (d) 0.1 kW
6. Which of the following statements is false?
(a) The unit of energy and work is the same
(b) The area under a force/distance graph gives the work done
(c) Electrical energy is converted to mechanical energy by a generator
(d) Efficiency is the ratio of the useful output energy to the input energy
7. A machine using a power of 1 kW requires a force of 100 N to raise a mass in 10 s. The height the mass is raised in this time is:
(a) 100 m (b) 1 km (c) 10 m (d) 1 m
8. A force/extension graph for a spring is shown in Figure 20.11. Which of the following statements is false? The work done in extending the spring:
(a) from 0 to 100 mm is 5 J
(b) from 0 to 50 mm is 1.25 J
(c) from 20 mm to 60 mm is 1.6 J
(d) from 60 mm to 100 mm is 3.75 J

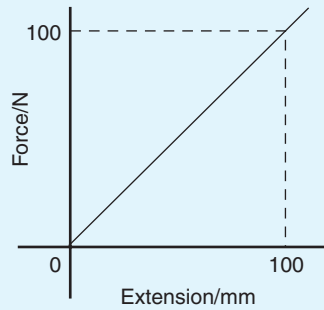


Figure 20.11

9. A vehicle of mass 1 t climbs an incline of 30° to the horizontal. Taking the acceleration due to gravity as 10 m/s^2 , the increase in potential energy of the vehicle as it moves a distance of 200 m up the incline is:
(a) 1 kJ (b) 2 MJ (c) 1 MJ (d) 2 kJ
10. A bullet of mass 100 g is fired from a gun with an initial velocity of 360 km/h. Neglecting air resistance, the initial kinetic energy possessed by the bullet is:
(a) 6.48 kJ (b) 500 J (c) 500 kJ (d) 6.48 MJ
11. A small motor requires 50 W of electrical power in order to produce 40 W of mechanical energy output. The efficiency of the motor is:
(a) 10% (b) 80% (c) 40% (d) 90%
12. A load is lifted 4000 mm by a crane. If the force required to lift the mass is 100 N, the work done is:
(a) 400 J (b) 40 Nm (c) 25 J (d) 400 kJ
13. A machine exerts a force of 100 N in lifting a mass through a height of 5 m. If 1 kJ of energy is supplied, the efficiency of the machine is:
(a) 10% (b) 20% (c) 100% (d) 50%
14. At the instant of striking an object, a hammer of mass 40 kg has a velocity of 10 m/s. The kinetic energy in the hammer is:
(a) 2 kJ (b) 1 kJ (c) 400 J (d) 8 kJ
15. A machine which has an efficiency of 80% raises a load of 50 N through a vertical height of 10 m. The work input to the machine is:
(a) 400 J (b) 500 J (c) 800 J (d) 625 J

11. (b) 12. (a) 13. (d) 14. (a) 15. (d)
6. (c) 7. (a) 8. (d) 9. (c) 10. (b)
1. (b) 2. (c) 3. (c) 4. (a) 5. (d)