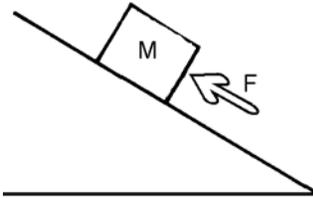


1. What power is needed to lift a person of mass 50 kg a vertical distance of 5.0 m in 20 seconds?

- 1) 12.5 W
- 2) 25 W
- 3) 60 W
- 4) 125 W
- 5) 210 W

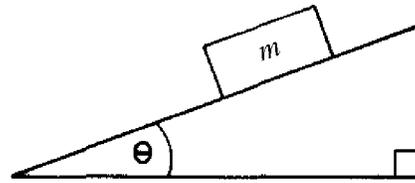
2.



A block of mass M is moved up a frictionless incline by a constant force F . The incline has an angle θ . The block moves up the incline at a constant velocity of 5 m/s. What is the power required accomplish this situation?

- 1) $5F\cos\theta$
- 2) $F\cos\theta$
- 3) $5Mg\sin\theta$
- 4) $5Mg\cos\theta$
- 5) $F\sin\theta$

3. In the diagram, a box of mass m is sliding down a frictionless ramp of length L with an incline of θ to the horizontal. The mass takes t seconds to slide down the ramp.



The power exerted by gravity during the slide is

- 1) $\frac{mg\sin\theta}{t}$
 - 2) $mg\cos\theta$
 - 3) $mg\sin\theta$
 - 4) $\frac{mgL\sin\theta}{t}$
 - 5) $\frac{mgL\cos\theta}{t}$
4. A crate with mass 40 kg is pulled by a worker along a surface at a constant velocity for 10 m. If the crate is pulled for 5 s, and the coefficient of kinetic friction between the surface and the crate is 0.5, the power exerted by the worker over this time is most nearly
- 1) 20 W
 - 2) 40 W
 - 3) 100 W
 - 4) 200 W
 - 5) 400 W
5. Of the following, which is NOT a unit of power?
- 1) Watt
 - 2) Joule per second
 - 3) Kilogram meter squared per second cubed
 - 4) Kilowatt-hour
 - 5) Ampere-volt

6. A person pushes an object with a mass of 50 kg across a surface with a coefficient of friction of 0.2. If the box moves with a constant velocity of 2.0 m/s, the power supplied to the box by the person is

- 1) 20 W
- 2) 25 W
- 3) 50 W
- 4) 100 W
- 5) 200 W

7. How much power is needed to lift a 100 kg block vertically upward at a constant speed of 5 m/s?

- 1) 2,500 W
- 2) 5,000 W
- 3) 7,500 W
- 4) 10,000 W
- 5) 0 W because the object is at a constant velocity

8. A crane lifts a box upward that weighs 2000 N at a constant speed of 8 m/s. What is the power input of the crane to lift the box?

- 1) 250 W
- 2) 1,250 W
- 3) 8,000 W
- 4) 16,000 W
- 5) 32,000 W

9. A helicopter lifts a large crate weighing 4000 N expending a constant power of 8 kW. The crate is moving upward at a constant velocity of

- 1) 2 m/s
- 2) 4 m/s
- 3) 8 m/s
- 4) 16 m/s
- 5) 50 m/s

10. A 300 N object is lifted 10 m by a crane at a constant rate in 15 s. The average power expended to lift the object is

- 1) 2 W
- 2) 20 W
- 3) 200 W
- 4) 2,000 W
- 5) 20,000 W

11. A 500 N student expends an average power of 250 W to climb a 6 m vertical rope at constant velocity. How long does it take for the student to climb the rope?

- 1) 1 s
- 2) 2 s
- 3) 3 s
- 4) 6 s
- 5) 12 s

12. The work done by an object is given by the equation $W(t) = 3t^2 - 5t + 1$, where W is in Joules and t is in seconds. What is the power delivered by the object at $t = 2$?

- 1) 3 W
- 2) 6 W
- 3) 7 W
- 4) 8 W
- 5) 10 W

13. The power delivered by an object is given by the equation $P(t) = 6t - 3$, where P is in Watts and t is in seconds. How much work is done by the object during the interval $0 < t < 4$ s?
- 1) 16 J
 - 2) 21 J
 - 3) 24 J
 - 4) 36 J
 - 5) 48 J
14. The position of an object is given by the equation $x(t) = t^2 + 3t + 4$, where x is in meters and t is in seconds. A constant force of 10 N acts on the object. What is the power delivered to the object at $t = 5$ s?
- 1) 100 W
 - 2) 104 W
 - 3) 130 W
 - 4) 134 W
 - 5) 200 W
15. The velocity of an object is given by the equation $v(t) = 2t + 5$, where x is in m/s and t is in seconds. A constant force of 6 N acts on the object. What is the power delivered to the object at $t = 3$ s?
- 1) 55 W
 - 2) 61 W
 - 3) 66 W
 - 4) 71 W
 - 5) 77 W
16. The acceleration of an object is given by the equation $a(t) = 2$, where a is in m/s^2 and t is in seconds. The object is initially at rest at the origin. A constant force of 30 N acts on the object. What is the power delivered to the object at $t = 9$ s?
- 1) 240 W
 - 2) 360 W
 - 3) 540 W
 - 4) 600 W
 - 5) 810 W
17. The power delivered to an object at $t = 2$ s is 170 W. The position of the object along the x -axis is given by the equation $x(t) = 3t^2 + 5t + 1$, where x is in meters and t is in seconds. Which of the following is closest to the force acting on the object?
- 1) 8 N
 - 2) 9 N
 - 3) 10 N
 - 4) 11 N
 - 5) 12 N
18. If a mass of 10 kg moves with the velocity $v(t) = t^2 - 2t + 1$, what is the power exerted by the force pushing the mass at $t = 2$?
- 1) 5 W
 - 2) 10 W
 - 3) 20 W
 - 4) 30 W
 - 5) 50 W

Answer Key
Conservation of Energy with Friction MC Questions [Mar 28, 2011]

1. 4

2. 3

3. 4

4. 5

5. 4

6. 5

7. 2

8. 4

9. 1

10. 3

11. 5

12. 3

13. 4

14. 3

15. 3

16. 3

17. 3

18. 3

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Class _____

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