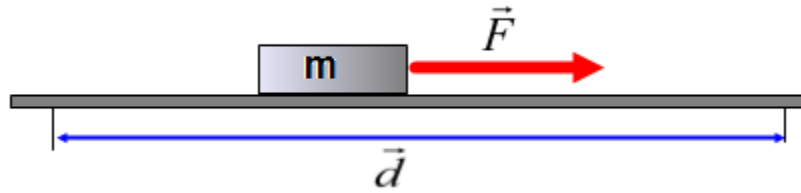
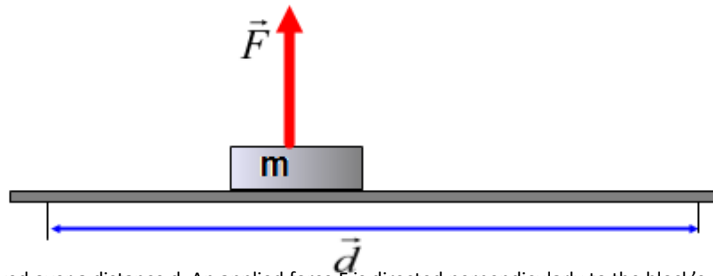


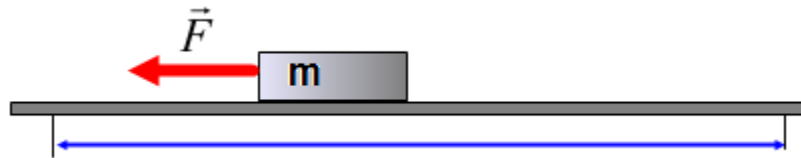
**Multiple Choice Questions**



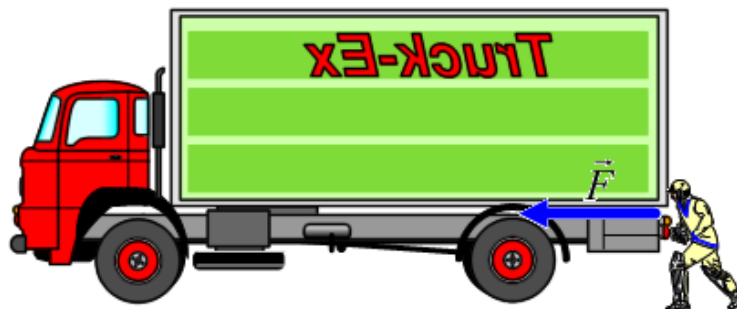
1. A block of mass  $m$  is pulled over a distance  $d$  by an applied force  $F$  which is directed in parallel to the displacement. How much work is done on the block by the force  $F$ ?
  - A.  $mFd$
  - B. zero
  - C.  $Fd$
  - D.  $\frac{F}{d}$
  - E.  $-Fd$



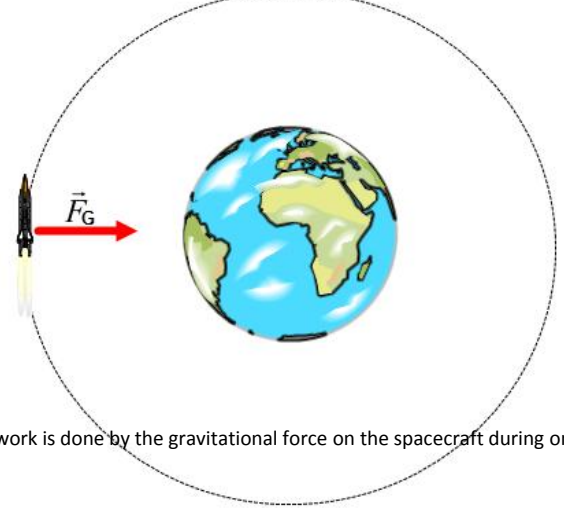
2. A block of mass  $m$  is moved over a distance  $d$ . An applied force  $F$  is directed perpendicularly to the block's displacement. How much work is done on the block by the force  $F$ ?
  - A.  $mFd$
  - B. zero
  - C.  $Fd$
  - D.  $\frac{F}{d}$
  - E.  $-Fd$



3. A block of mass  $m$  is moved over a distance  $d$ . An applied force  $F$  is opposite to the block's displacement. How much work is done on the block by the force  $F$ ?
  - A.  $mFd$
  - B. zero
  - C.  $Fd$
  - D.  $\frac{F}{d}$
  - E.  $-Fd$



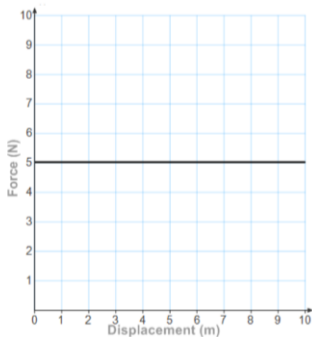
4. A truck driver is trying to push a loaded truck with an applied force. Unfortunately, his attempt was unsuccessful the truck stays stationary no matter how hard the driver pushes. How much work is done by the driver?
  - A.  $Fd$
  - B.  $-Fd$
  - C.  $\frac{F}{d}$
  - D.  $\frac{d}{F}$
  - E. Zero



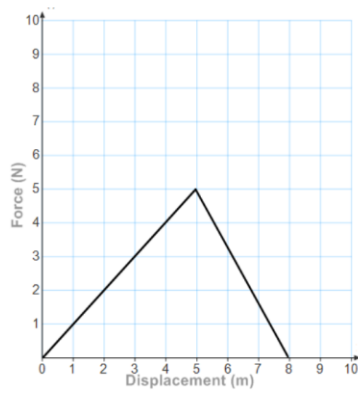
5. A spacecraft moves around Earth in a circular orbit with a constant radius. How much work is done by the gravitational force on the spacecraft during one revolution?  
 A.  $F_G d$       B.  $-F_G d$       C.  $mgh$       D.  $\frac{1}{2}mv^2$       E. zero



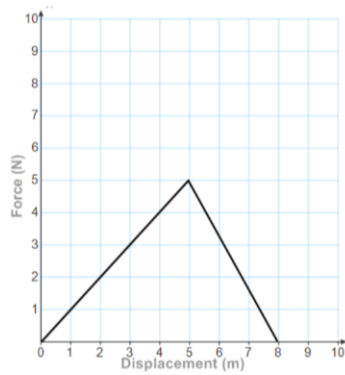
6. A construction worker holds a heavy tool box. How much work is done by the worker?  
 A.  $F_G d$   
 B.  $-F_G d$   
 C.  $mgh$   
 D.  $\frac{1}{2}mv^2$   
 E. zero
7. A container with a mass of 5 kg is lifted to a height of 8 m. How much work is done by the gravitational force?  
 A. 400 J      B. -400 J      C. zero      D. 50 J      E. -50J
8. A container with a mass of 5 kg is lifted to a height of 8 m. How much work is done by the external force?  
 A. 400 J      B. -400 J      C. zero      D. 50 J      E. -50J
9. A container with a mass of 5 kg is lifted to a height of 8 m and then returned back to the ground level. How much work is done by the gravitational force?  
 A. 400 J      B. -400 J      C. zero      D. 50 J      E. -50J
10. An object is thrown straight up. Which of the following is true about the sign of work done by the gravitational force while the object moves up and then down?  
 A. Work is positive on the way up, work is positive on the way down  
 B. Work is negative on the way up, work is negative on the way down  
 C. Work is negative on the way up, work is positive on the way down  
 D. Work is positive on the way up, work is negative on the way down  
 E. Work is zero the way up, work is zero on the way down



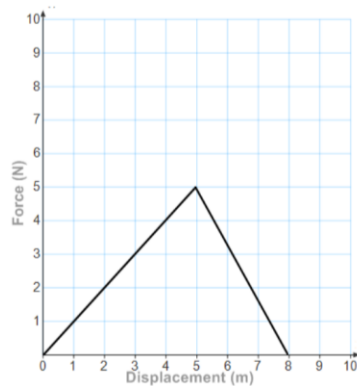
11. The force as a function of displacement of a moving object is presented by the graph. How much work is done when the object moves from 0 m to 8 m?  
 A. 40 J      B. 20 J      C. 0 J      D. 10 J      E. 5 J



12. The force as a function of displacement of a moving object is presented by the graph. How much work is done when the object moves from 0 m to 5 m?  
 A. 30 J      B. 12.5 J      C. 18 J      D. 9 J      E. 24 J



13. The force as a function of displacement of a moving object is presented by the graph. How much work is done when the object moves from 5 m to 8 m?  
 A. 30 J      B. 15 J      C. 18 J      D. 7.5 J      E. 24 J

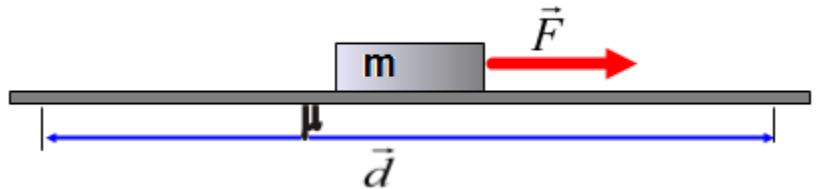


14. The force as a function of displacement of a moving object is presented by the graph. How much work is done when the object moves from 0 m to 8 m?  
 A. 30 J      B. 15 J      C. 18 J      D. 5 J      E. 20 J

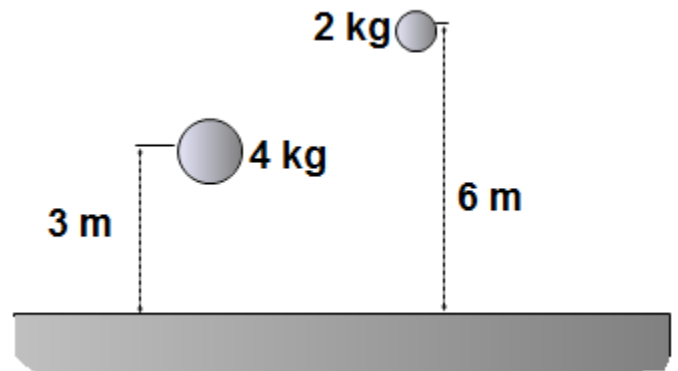


15. An applied force  $F$  accelerates an object from rest to a velocity  $v$ . How much work is done by the applied force  $F$ ?  
 A.  $\frac{1}{2} mv^2$   
 B.  $mgh$   
 C.  $\frac{1}{2} kx^2$   
 D.  $mFd$   
 E. Zero

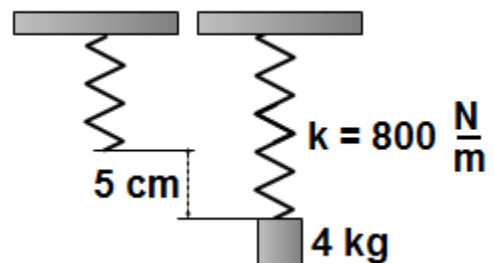
16. What happens to the kinetic energy of a moving object if the net work done is positive?
- The kinetic energy increases
  - The kinetic energy decreases
  - The kinetic energy remains the same
  - The kinetic energy is zero
  - The kinetic energy becomes negative



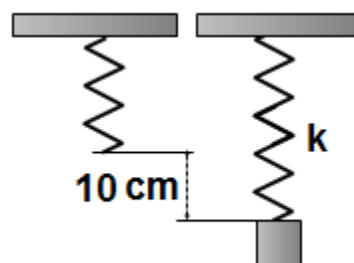
17. A block of mass  $m = 50 \text{ kg}$  moves on a rough horizontal surface with a coefficient of kinetic friction  $\mu = 0.5$ . The traveled distance is  $20 \text{ m}$ . How much work is done by the friction force?
- 1000 J
  - 2000 J
  - 3000 J
  - 4000 J
  - 5000 J



18. An object I with a mass of  $4 \text{ kg}$  is lifted vertically  $3 \text{ m}$  from the ground level; another object II with a mass of  $2 \text{ kg}$  is lifted  $6 \text{ m}$  up. Which of the following statements is true?
- Object I has greater potential energy since it is heavier
  - Object II has greater potential energy since it is lifted to a higher position
  - Two objects have the same potential energy
- I
  - II
  - III
  - I and II
  - II and III

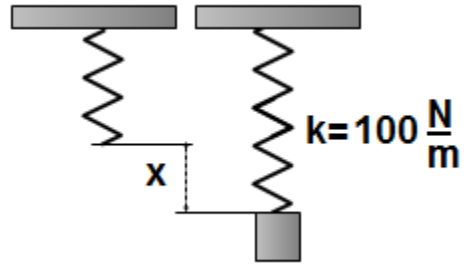


19. A  $4 \text{ kg}$  block is attached to a vertical spring with a spring constant  $800 \text{ N/m}$ . The spring stretches  $5 \text{ cm}$  down. How much elastic potential energy is stored in the system?
- 1.0 J
  - 0.5 J
  - 1.5 J
  - 2.0 J
  - 2.5 J



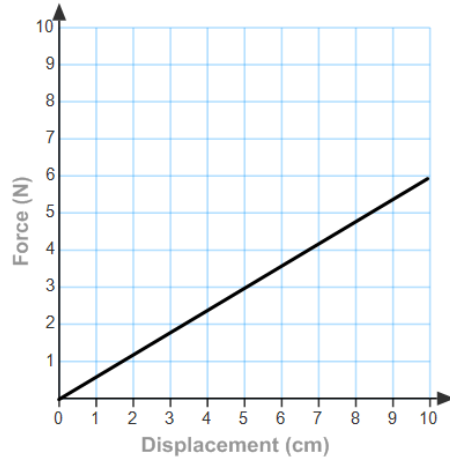
20. A heavy block is suspended from a vertical spring. The elastic potential energy is stored in the spring is 2 J. What is the spring constant if the elongation of the spring is 10 cm?

A. 400 N/m    B. 300 N/m    C. 200 N/m    D. 100 N/m    E. 50 N/m



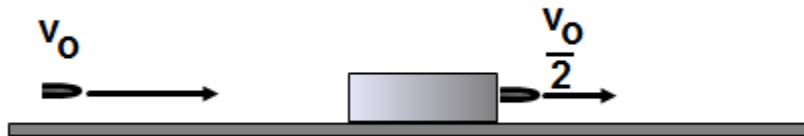
21. A heavy block is suspended from a vertical spring. The elastic potential energy is stored in the spring is 0.8 J. What is the elongation of the spring if the spring constant is 100 N/m?

A. 2 cm    B. 4 cm    C. 8 cm    D. 10 cm    E. 13 cm



22. The elastic force as a function of displacement presented by the graph. How much elastic potential energy is stored in the spring when it is stretched by 10 cm?

A. 0.1 J    B. 0.2 J    C. 0.3 J    D. 0.4 J    E. 0.5 J



23. A bullet penetrates a wooden block and loses its velocity by a half. What is the ratio between the initial kinetic energy of the bullet and kinetic energy when the bullet leaves the block?

A.  $\frac{KE_i}{KE_f} = \frac{1}{2}$     B.  $\frac{KE_i}{KE_f} = \frac{1}{4}$     C.  $\frac{KE_i}{KE_f} = \frac{2}{1}$     D.  $\frac{KE_i}{KE_f} = \frac{4}{1}$     E.  $\frac{KE_i}{KE_f} = \frac{16}{1}$

24. A truck driver slams on the brakes of a moving truck with a constant velocity  $v$ , as a result of his action the truck stops after traveling a distance  $d$ . If the driver had been traveling with twice the velocity, what would be the stopping distance compared to the distance in the first trial?

A. Two times greater  
 B. Four times greater  
 C. The same  
 D. Half as much  
 E. One-quarter as much

25. What happens to the total energy of a moving object if all the applied forces are conserved?

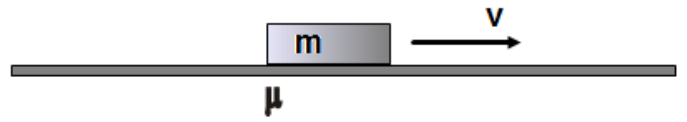
A. It increases  
 B. It decreases  
 C. It remains constant  
 D. The velocity is required to answer this question  
 E. The altitude is required to answer this question

26. A machine does 2500 J of work in 1 min. What is the power developed by the machine?

A. 21 W    B. 42 W    C. 150 W    D. 2500 W    E. 150000 W

27. A car travels with a constant speed of 15 m/s. The car's engine produces a 4000 N pushing force in order to keep the speed constant. How much power is developed by the engine?

A. 60 W    B. 600 W    C. 6000 W    D. 60000 W    E. 600000 W



28. A block with a mass of  $m$  crosses a rough horizontal surface at a constant speed of  $v$ . The coefficient of kinetic friction between the block and the surface is  $\mu$ . How much power must be produced in order to overcome the friction force?
- A.  $mg$       B.  $\mu mg$       C. zero      D.  $\mu g$       E.  $\mu mgv$
29. A motorbike engine can develop a power of  $90000\text{ W}$  in order to keep a constant velocity of  $30\text{ m/s}$ . What is the pushing force?
- A.  $3000\text{ N}$       B.  $30000\text{ N}$       C.  $300000\text{ N}$       D.  $300\text{ N}$       E.  $30\text{ N}$

Answers

1. C
2. B
3. E
4. E
5. E
6. E
7. B
8. A
9. C
10. C
11. A
12. B
13. D
14. E
15. A
16. A
17. E
18. C
19. A
20. A
21. E
22. C
23. D
24. B
25. C
26. B
27. D
28. E
29. A