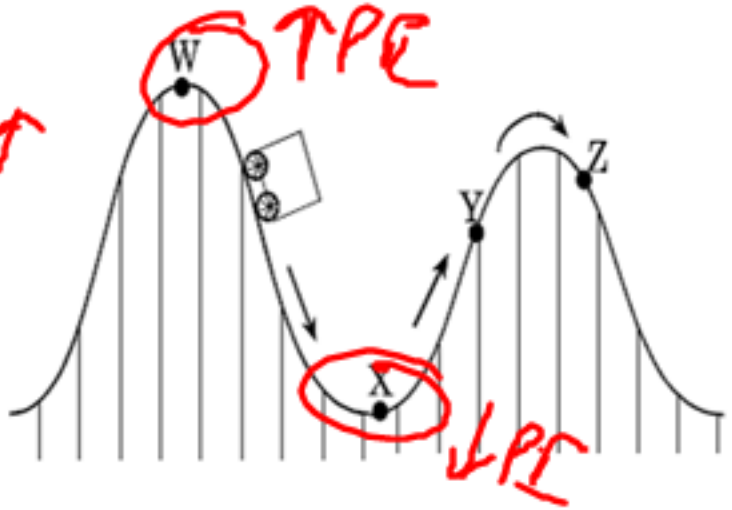
1. A roller coaster car moves on a roller coaster track through positions W, X, Y, and Z.

PE ↓ = KE ↑



mass ↑

At what position will the roller coaster car ***most likely*** have the greatest kinetic energy?

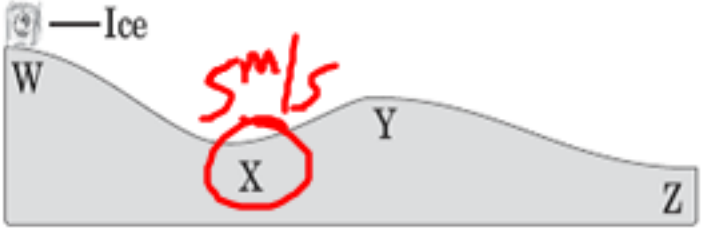
A W

B X

C Y

D Z

2. A 1-kg block of ice is set into motion on a frictionless surface. It attains a speed of 5 m/s at point X.



What is the kinetic energy of the ice at point X?

A 2.5 J

B 5 J

C 12.5 J

D 25 J

$$KE = \frac{1}{2}mv^2$$
$$= \frac{1}{2}(1)(5)^2$$
$$=$$

3. What is the potential energy acquired by an object with a mass of 5.00 kilograms when it is raised 5.00 meters?

A 25.0 J

B 49.0 J

C 245 J

D 480. J

$m = 5kg$

$h = 5m$

$PE = ?$

$PE = mgh$

$= 5(9.8)(5)$

$kg \rightarrow m$

$N \rightarrow F_g$

4. A metal rod and a brick are both in the sun. Assuming that both are the same mass, which property of matter will make one hotter to the touch than the other?

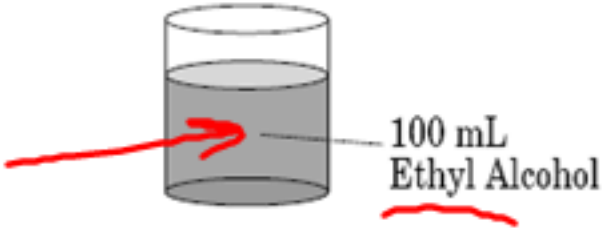
A density

B specific heat

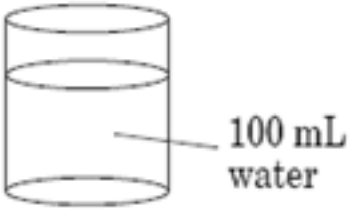
C melting point

D boiling point

5. The liquids in two beakers have an initial temperature of 50°C and are left to cool.



Specific Heat = 2,400 J/kg°C



Specific Heat = 4,186 J/kg°C

What will happen to the liquids?

A The ethyl alcohol will cool first.

B The water will cool first.

C Both liquids will cool at the same rate.

D Both liquids will remain at 50°C.

$Q = mC_p\Delta T$

6. A 3.00-kg object rests on the roof's edge of a 10.0-m high building. What is the object's potential energy?

A 22.8 J

B 33.0 J

C 294 J

D 300. J

$m = 3\,kg$

$h = 10\,m$

$PE = mgh = F_g h$

$= 3(9.8)(10)$

7. How much power is used to lift a box that weighs 50 newtons 10 meters in 10 seconds?

$W = Fd$

A 5 watts

B 50 watts

C 500 watts

D 5,000 watts

$P = ?$

$F_g = 50N$

$h = 10m$

$t = 10s$

$P = \frac{W}{t}$

$= \frac{Fd}{t}$

$= \frac{50(10)}{10}$

8. A total of 750 J of work was done when a force of 125 N was exerted on a box to move it. How far was the box moved?

A	6.00 m
B	600. m
C	850. m
D	906 m

$$\frac{W}{F \mid d}$$

$W = 750\,J$

$F = 125\,N$

$d = ?$

$$\frac{W}{F} = \frac{Fd}{F}$$

$$d = \frac{W}{F}$$

$$= \frac{750}{125}$$

9. A student exerts a force of 500 N pushing a box 10 m across the floor in 4 s. How much work does the student perform?

A 50 J

B 1,250 J

C 2,000 J

D 5,000 J

$F = 500N$

$d = 10m$

$t = 4s$

$W = ?$

$W = Fd$

$= 500(10)$

10. In which example would the amount of work done equal zero?

A holding a 1,000-N rock overhead

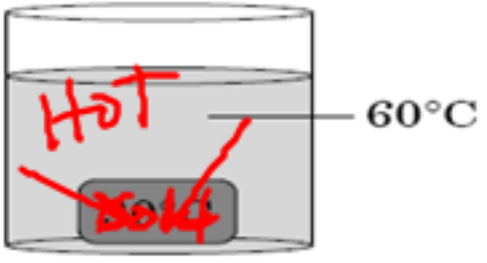
B filing papers in a file cabinet

C carrying a bag of groceries upstairs

D writing a book report

(Not moving)

11. A solid object at 30°C is placed inside a container of liquid at 60°C.



What ***most likely*** will be observed?

A The temperature of the liquid will remain the same.

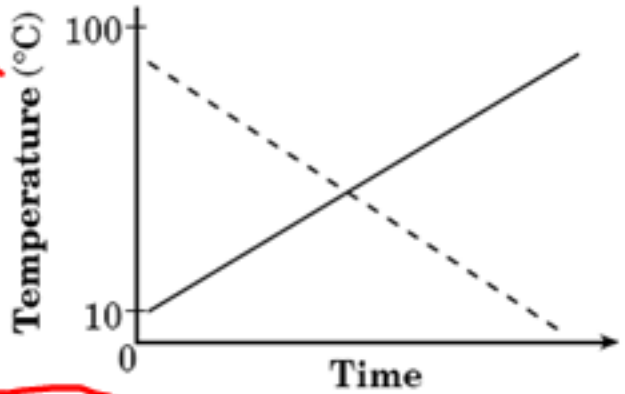
B The temperature of the solid object will decrease.

C The temperature of the liquid will increase.

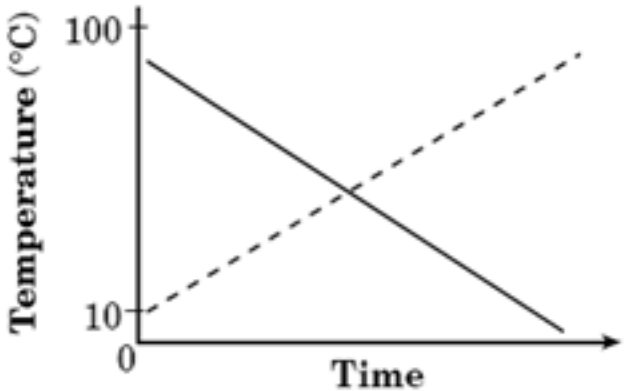
D The temperature of the solid object will increase.

12. A small piece of aluminum at a temperature of 10°C is placed in an insulated container filled with water at 95°C. The temperatures of the aluminum and the water are recorded for several hours until equilibrium is reached. The dashed line represents the temperature of the aluminum, and the solid line represents the temperature of the water. Which graph ***best*** represents the temperature of each substance over time?

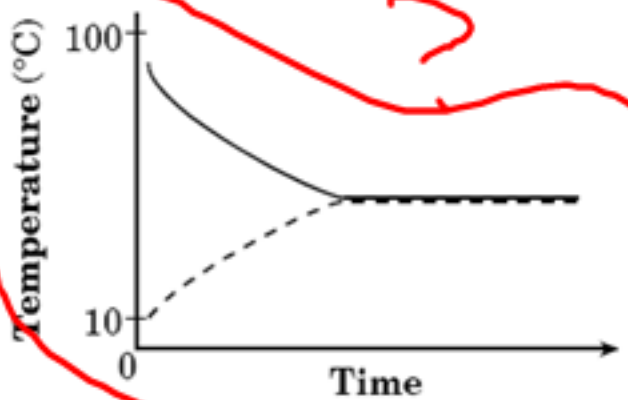
A



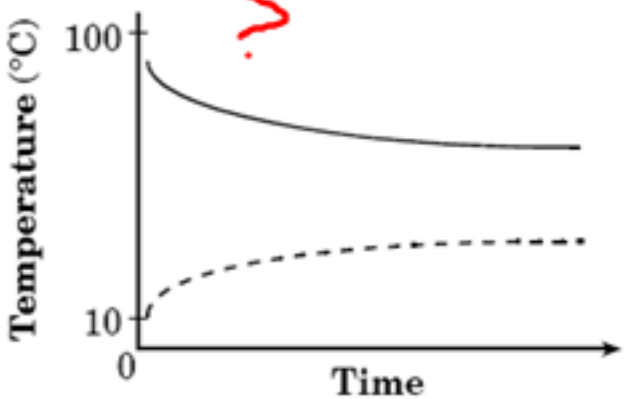
B



C



D



13. How does ice cool a warm drink?

A Cold flows from the ice to the drink.

B Heat flows from the ice to the drink.

C Cold flows from the drink to the ice.

D Heat flows from the drink to the ice.

14. Why is lightning seen before thunder is heard?

A Light travels slower than sound.

B Light travels faster than sound.

C Lightning has more energy than thunder.

D Lightning has less energy than thunder.

15. A student opens the top window and the bottom window in a hot room. Warmer air goes out the top window, while cooler air comes in the bottom window. Which ***best*** explains why the room becomes cooler?

A conduction

B radiation

C heat reaction

D convection

16. When comparing the types of electromagnetic waves, which has the ***greatest*** energy?

A ultraviolet

B X-rays

C gamma rays

D visible

longer WL ← → shorter WAVEL

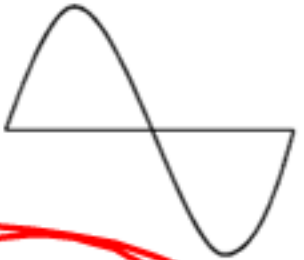
↓E ↑E

↓f ↑f

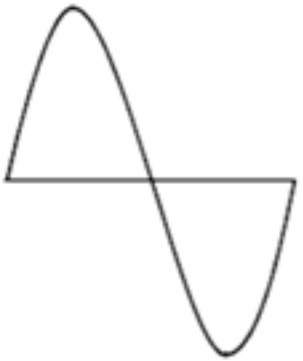
17. Which diagram represents a wave with the ***most*** energy?

A

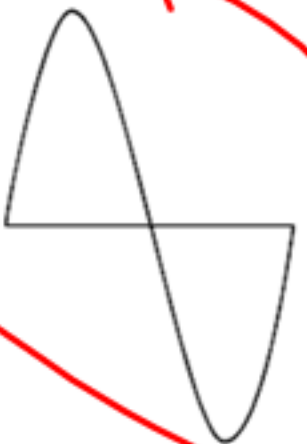
B



C

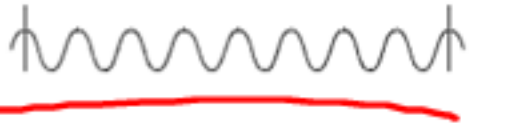


D



18. Which figure represents the wave with highest frequency and lowest energy?

A



B

C

D

19. A student is listening to the radio and realizes that the volume is too low. When she turns up the volume, which part of the sound waves is she changing?

A wavelength

B frequency

C period

D amplitude

20. What is the speed of a wave with a wavelength of 0.5 m and a frequency of 20 Hz?

A 5 m/s

B 10 m/s

C 20 m/s

D 30 m/s

$V = ?$

$\lambda = .5\,m$

$f = 20$

$V_w = f\lambda$