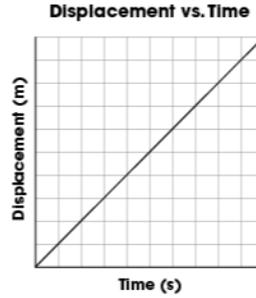


PHYSICAL SCIENCE OGT QUESTIONS (2008 & 2009)

QUESTION 1

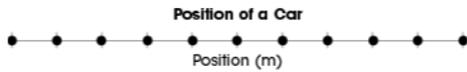
A student records the position of a car every second for a period of time and plots the following displacement and time graph.

Graphic1

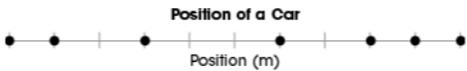


Illustrated below is the change in position of a car every second. Which observation of an object moving from left to right did the student record?

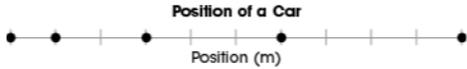
• A.



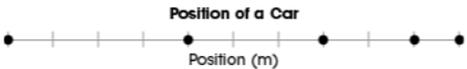
• B.



• C.



• D.

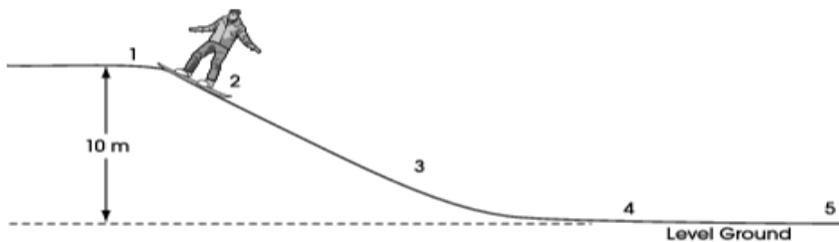


question 14 (2009)

Please respond

Question 2 (Physical Sciences)

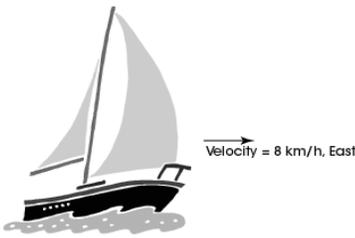
A snowboarder begins his run from rest (point 1) on top of a hill. He moves straight down the slope until he reaches the bottom of the hill (point 4) and the ground levels off. The snowboarder continues to move horizontally across the level ground and eventually comes to a stop (point 5).



Using the same board, the snowboarder decides to make another run down the hill to see if he can increase his speed. Describe one thing the snowboarder could do to increase his speed on the slope. Explain why this would cause his speed to increase. Respond in the space provided in your **Answer Document**. (2 points)

Question 3 (Physical Sciences)

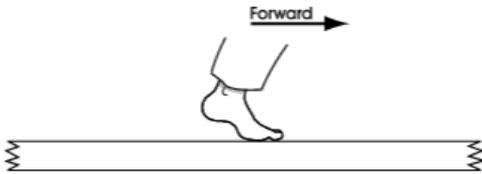
A sailboat is moving at a constant velocity of 8 km/h eastward as shown in the picture below.



Describe two opposing forces acting on the boat and explain how each force affects the boat. Respond in the space provided in your Answer Document. (2 points)

Question 4 (Physical Sciences)

Use the picture to answer question 13.



Which statement accurately describes the interaction between the foot and sidewalk as a person moves forward along the sidewalk in the direction of the arrow?

- A. The foot pushes forward on the sidewalk; the sidewalk does not push forward on the foot.
- B. The foot pushes forward on the sidewalk; the sidewalk pushes forward on the foot.
- C. The foot pushes backward on the sidewalk; the sidewalk pushes forward on the foot.
- D. The foot pushes backward on the sidewalk; the sidewalk pushes backward on the foot.

Question 5 (Physical Sciences)

Which energy transformation below describes the conversion involved when the carbon compounds in wood are burned?

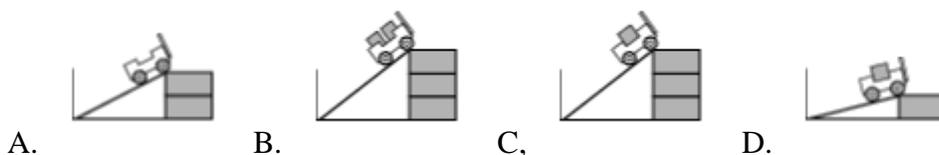
- A. Chemical energy is converted to thermal energy.
- B. Thermal energy is converted to chemical energy.
- C. Potential energy is converted into chemical energy.
- D. Chemical energy is converted into potential energy.

Question 6 (Physical Sciences)

All carts shown below are identical 0.5 kilogram metal carts.

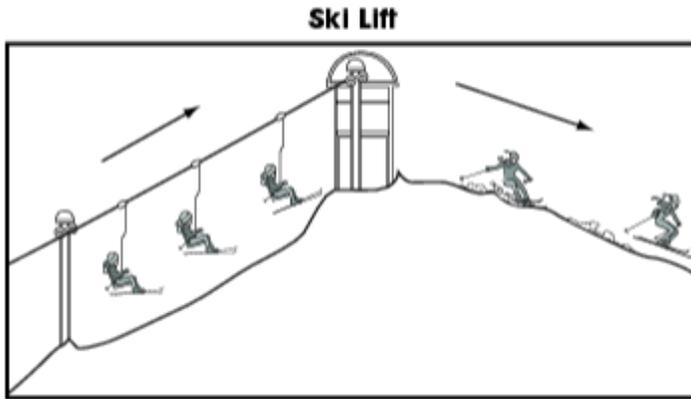
Blocks placed in the carts have a mass of 1 kilogram each.

Which cart arrangement has the greatest amount of gravitational potential energy with the cart sitting at the top of the ramp as shown in each diagram?



Question 7 (Physical Sciences)

The picture below shows the different positions of a skier as she is lifted to the top of a slope and then skis down the other side.



Which statement best explains the change in the skier's potential energy?

- A. The skier loses potential energy as she is lifted up the slope and loses potential energy as she skis down the slope.
- B. The skier gains potential energy as she is lifted up the slope and maintains the same potential energy as she skis down the slope.
- C. The skier gains potential energy as she is lifted up the slope and loses potential energy as she skis down the slope.
- D. The skier loses potential energy as she is lifted up the slope and gains potential energy as she skis down the slope.

QUESTION 8

A student walks from inside an air-conditioned building to stand outside on a sunny, sandy beach. The student says that her face and the bottoms of her feet feel warm.

Which statement best describes the thermal energy transfer taking place?

- A.

Thermal energy is transferred to her face by radiation, and thermal energy is transferred to the bottoms of her feet by radiation.

- B.

Thermal energy is transferred to her face by convection, and thermal energy is transferred to the bottoms of her feet by radiation.

- C.

Thermal energy is transferred to her face by radiation, and thermal energy is transferred to the bottoms of her feet by conduction.

- D.

Thermal energy is transferred to her face by conduction, and thermal energy is transferred to the bottoms of her feet by conduction.

Question 9 (Physical Sciences)

QUESTION 9

Jackie used a portable electric drill to remove screws from a broken wooden table. He noticed that the screws holding the table together were warm to the touch after being removed from the wood.

What explains this phenomenon?

- A.

Mechanical energy from the drill was converted into thermal energy due to friction.

- B.

Electrical energy from the drill was converted into chemical energy due to resistance.

- C.

Thermal energy from the drill was converted into mechanical energy due to inertia.

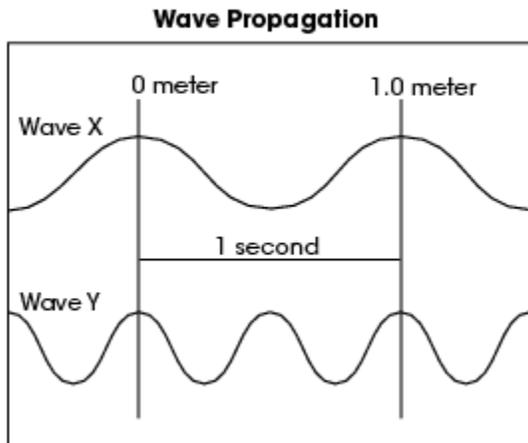
- D.

The process of removing the screw concentrated the thermal energy that was already present in the wood.

Please respond

Question 10 (Physical Sciences)

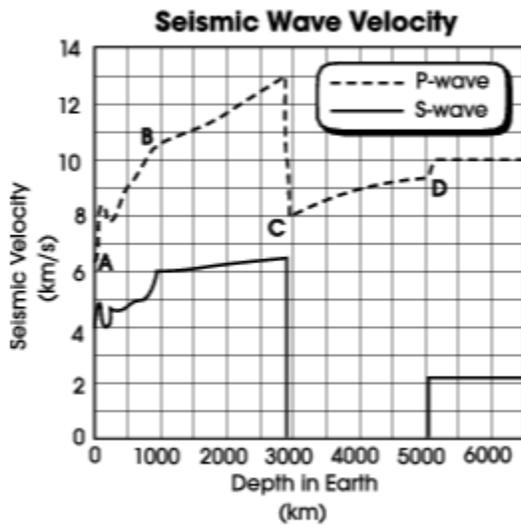
In the diagram below, similar types of waves with the same amplitude travel in the same medium. Compared to wave X, which statement is correct?



- A. Wave Y has greater speed.
- B. Wave Y has less energy.
- C. Wave Y has a lower frequency.
- D. Wave Y has a shorter wavelength.

Question 11 (Physical Sciences)

The graph below shows the seismic wave velocities at various depths within Earth.



Based on the graph, which point marks the beginning of Earth's liquid outer core?

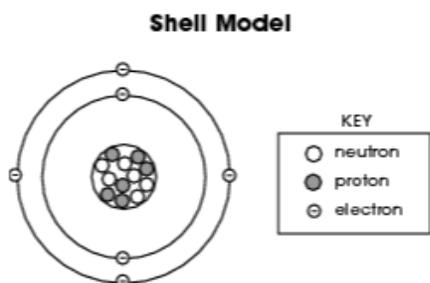
- A.
- B.
- C.
- D.

CHEMICAL SCIENCE OGT QUESTIONS (2008 & 2009)

Question 1 (Physical Sciences)

Use the graphic to answer question #31.

Which element does the shell model represent?



A.

6
C
Carbon
12.0107

C.

12
Mg
Magnesium
24.3050

B.

9
F
Fluorine
18.9984

D.

11
Na
Sodium
22.9898

Question 2 (Physical Sciences)

W reacts with X in the equation below.

According to the law of conservation of mass, how many grams of W must react completely with 225 grams of X to result in 375 grams of product?

- A. 150 grams
- B. 225 grams
- C. 375 grams
- D. 600 grams

Question 3 (Physical Sciences)

A metal that can be hammered out or rolled into thin sheets is best described as

- A. brittle.
- B. ductile.
- C. reactive.
- D. malleable.

Question 4 (Physical Sciences)

Use the partial periodic table to answer question #16.

Would you normally expect neon (Ne) to form compounds?

		<table border="1" style="border-collapse: collapse; text-align: left;"> <tr><td>6</td></tr> <tr><td>C</td></tr> <tr><td>Carbon</td></tr> <tr><td>12.0107</td></tr> </table>	6	C	Carbon	12.0107			<ul style="list-style-type: none"> — Atomic Number — Symbol — Name — Average Atomic Mass 	
6										
C										
Carbon										
12.0107										
Partial Periodic Table of the Elements										
	IA 1		IIIA 13	IVA 14	VA 15	VIA 16	VIIA 17	VIII 18		
1	1 H Hydrogen 1.00794							2 He Helium 4.0026		
2	3 Li Lithium 6.941	4 Be Beryllium 9.0122	5 B Boron 10.811	6 C Carbon 12.0107	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.1797		
3	11 Na Sodium 22.9898	12 Mg Magnesium 24.3050	13 Al Aluminum 26.98154	14 Si Silicon 28.0855	15 P Phosphorus 30.9738	16 S Sulfur 32.065	17 Cl Chlorine 35.4527	18 Ar Argon 39.948		
4	19 K Potassium 39.0983	20 Ca Calcium 40.078								

A. Yes, but neon is a rare gas and difficult to obtain.

B. No, neon needs six electrons to fill its outermost level.

C. Yes, neon needs six electrons to fill its outermost level.

D. No, neon has eight electrons in its outermost level and is stable.

Question 5

Solid copper wire is a good conductor because

- A. Copper contains no protons
- B. Electrons move easily within the wire
- C. Protons and electrons tend to cluster at opposite ends of it.
- D. Copper contains the same number of protons and neutrons.

Question 6 (Physical Sciences)

A student is testing the conductivity of two solid substances. Substance A has high conductivity and substance B has low conductivity.

Based on this information, what must be true regarding these two substances?

- A. Electrons in substance A are able to move more easily than electrons in substance B.
- B. There is more energy stored in chemical bonds in substance A than there is in substance B.
- C. The atomic nuclei in substance A have more mass than the atomic nuclei in substance B.
- D. Substance A contains a higher percentage of radioactive atoms than does substance B.