

Question 35
Benchmark A
Spring 2005

Use the partial periodic table to answer question 35.

6	— Atomic number
C	— Symbol
Carbon	— Name
12.0107	— Average Atomic Mass

Partial Periodic Table of the Elements

IA 1	IIA 2	IIIA 13	IVA 14	VA 15	VIA 16	VIIA 17	VIII 18
1 H Hydrogen 1.00794	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
2 3 Li Lithium 6.941	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
3 11 Na Sodium 22.9898	20 Ca Calcium 40.078	[Grid]					
4 19 K Potassium 39.0983		[Grid]					

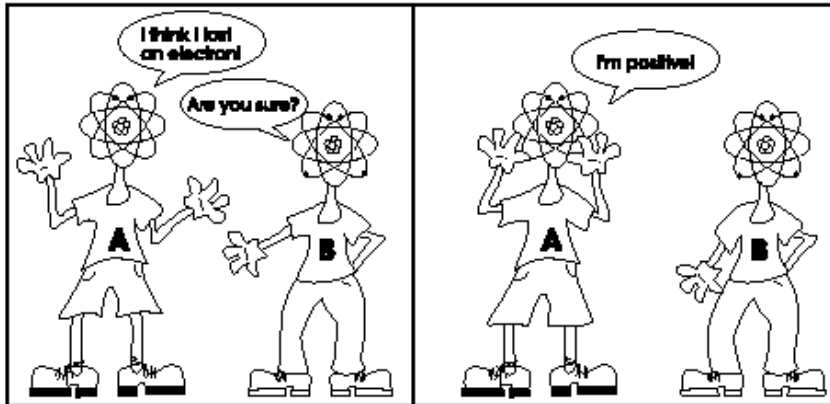
Suppose scientists discovered four new elements (W, X, Y, Z) while studying rock and soil samples brought back from a Mars mission. Which Lewis dot structure represents an element that should be placed in column VIIA (17) of the periodic table?

- A. $\cdot\ddot{W}\cdot$
- B. $\cdot\ddot{X}\cdot$
- C. $\cdot\ddot{Y}\cdot$
- D. $\cdot\ddot{Z}\cdot$

10th Grade Science Ohio Graduation Test
Physical Sciences

Question 12
Benchmark A
9th Practice Test

Use the cartoon to answer question 12.



12. Explain the response of atom A in terms of protons and electrons. Describe how protons and electrons affect charge. Respond in the space provided in your **Answer Document**. (2 points)

Question 23
Benchmark A
9th Practice Test

Data Table

Substance	Number of Protons	Number of Electrons
lithium	3	2
fluorine	9	10
potassium	19	19
sulfur	16	18

23. Which substance is electrically neutral?
- A. lithium
 - B. fluorine
 - C. potassium
 - D. sulfur

Question 27
Benchmark B
Spring 2005

When methane (CH_4) is burned in the presence of oxygen (O_2), the two chemicals react together in a process called combustion.

Which of these compounds could be a possible product of this combustion reaction?

- A. NH_3
- B. SO_2
- C. H_2O
- D. CS_2

10th Grade Science Ohio Graduation Test
Physical Sciences

Question 26
Benchmark B
9th Practice Test

Use the partial periodic table to answer question 26.

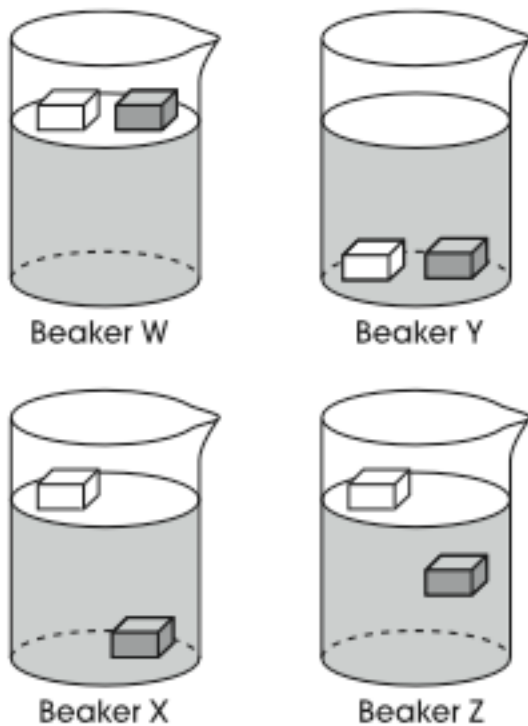
		6 C Carbon 12.0107	— Atomic number — Symbol — Name — Average Atomic Mass		
--	--	------------------------------------	--	--	--

IA 1		IIA 2		IIIA 13		IVA 14		VA 15		VIA 16		VIIA 17		VIIIA 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 35.453	18 Ar Argon 39.948						
4	19 K Potassium 39.0983	20 Ca Calcium 40.078													

26. The noble gas neon is used for filling neon signs. Like other noble elements, it has a full octet (complete outer energy level) of electrons, which makes the gas
- freeze at room temperature.
 - react with other gases in the air.
 - unlikely to combine with other elements.
 - solidify at standard pressure and temperature.

Question 28
Benchmark C
Spring 2005

Gertrude cut two bars of different types of soap into four pieces each. She put one piece from each bar into each of four beakers, labeled Beaker W, Beaker X, Beaker Y and Beaker Z. Each beaker contained a different unknown liquid.



According to the results shown above, which beaker contained the liquid that was densest?

- A. Beaker W
- B. Beaker X
- C. Beaker Y
- D. Beaker Z

Question 37
Benchmark C
9th Practice Test

Which of these elements would most likely be a shiny, gray-colored solid at room temperature, conduct electricity, and dent when hit with a hammer?

- A. aluminum
- B. argon
- C. chlorine
- D. sulfur

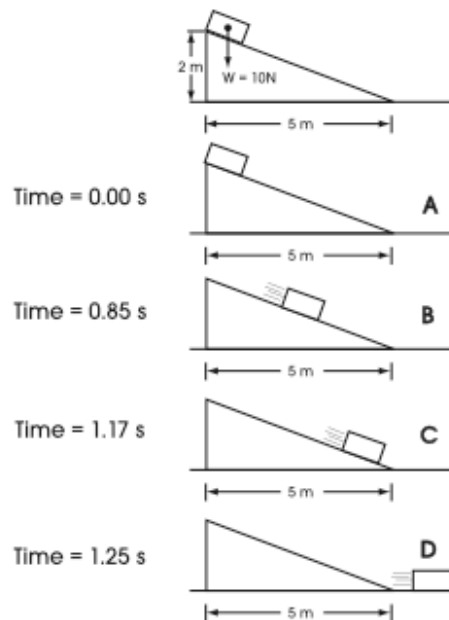
Question 28
Benchmark D
9th Practice Test

28. When you are driving a car, why is braking less effective on a wet road than on a dry road?
- A. The water reduces friction.
 - B. Kinetic energy is increased by water.
 - C. Friction increases when the brakes are wet.
 - D. Reaction time is reduced during a rainstorm.

Question 5
Benchmark D
Spring 2005

Inclined Plane Experiment

In doing the following inclined plane experiment in "ideal conditions," students assume that friction from the air, incline or floor is negligible. A stationary box at the top of a frictionless incline is released and is allowed to slide to the bottom. The figure below illustrates the box in four positions labeled A through D as it is sliding from the incline onto the level floor. As the box moves from the bottom of the incline to the floor, students assume that the box experiences no change in speed, only a change in direction.



The weight of the box used in the experiment is 10 Newtons (N) as illustrated in the figure.

The weight of the box is a measure of the

- A. velocity of the box while sliding.
- B. friction between the air and the box.
- C. kinetic energy at the top of the incline.
- D. force acting on the box due to gravity.

Question 6
Benchmark D
Spring 2005

Assume that the experiment will be repeated in less "ideal" conditions where the effects of friction on the motion of the box cannot be ignored. Predict the effect that significant friction would have on the acceleration of the box as it slides down the incline. Explain the cause of the predicted effect. Respond in the space provided in your **Answer Document**. (2 points)

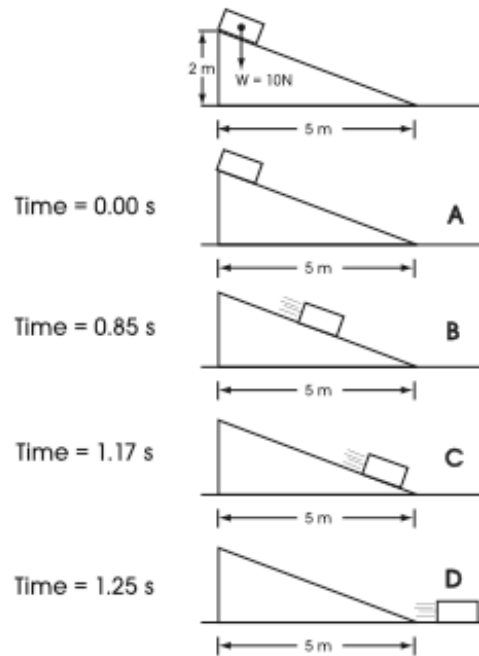
Question 21
Benchmark D
Spring 2005

21. When dropped from the same height, why does a flat sheet of paper fall more slowly than the same sheet when it is tightly crumpled into a ball?
- A. The sheet of paper has less mass when it is flat than it does when it is crumpled.
 - B. The sheet of paper weighs less when it is flat than it does when it is crumpled.
 - C. The force of gravity has a greater effect on the crumpled paper than it does on the flat paper.
 - D. The flat sheet of paper has greater surface area and encounters more air resistance than when it is crumpled.

Question 2
Benchmark E
Spring 2005

Inclined Plane Experiment

In doing the following inclined plane experiment in "ideal conditions," students assume that friction from the air, incline or floor is negligible. A stationary box at the top of a frictionless incline is released and is allowed to slide to the bottom. The figure below illustrates the box in four positions labeled A through D as it is sliding from the incline onto the level floor. As the box moves from the bottom of the incline to the floor, students assume that the box experiences no change in speed, only a change in direction.



2. At what time does the box have the greatest kinetic energy?
- A. 0.00 s
 - B. 0.85 s
 - C. 1.17 s
 - D. 1.25 s

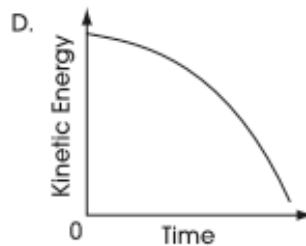
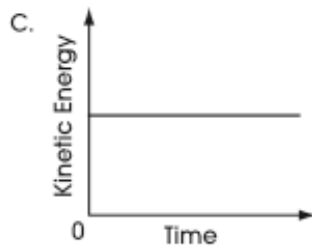
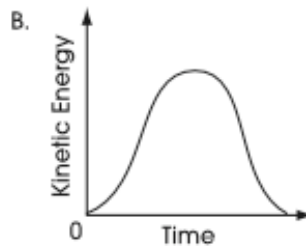
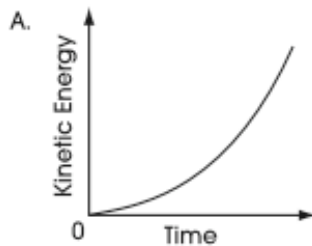
Question 4
Benchmark E
Spring 2005

4. Where is the potential energy of the box greatest?
- A. The potential energy is constant throughout the motion.
 - B. The potential energy is greatest at the top of the incline.
 - C. The potential energy is greatest midway along the incline.
 - D. The potential energy is greatest at the bottom of the incline.

Question 25
Benchmark E
Spring 2005

25. When a space shuttle is launched, it continues to accelerate for several minutes.

Which graph shows the kinetic energy of the space shuttle during the first few minutes of flight? (Launch time = 0)



10th Grade Science Ohio Graduation Test
Physical Sciences

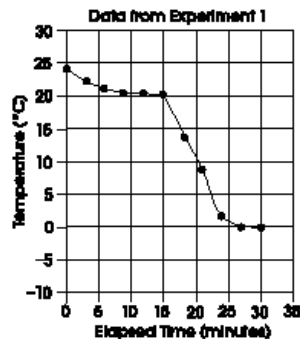
Question 4
Benchmark F
9th Practice Test

Temperature Experiment

Students pour 250.0 g of water into an open insulated container. The initial temperature of the water inside the container is recorded. The temperature of the contents of the container is recorded every 3.0 minutes. When 73.0 g of ice (at melting point) is added to the container, the students continue to collect temperature data and the mixture is gently stirred. The data from Experiment 1 are listed in the chart below. The data are also plotted on the following graph.

Chart for Experiment 1

Elapsed Time (minutes)	Temperature of System (°C)	Observations
0	24.3	water added
3	22.1	
6	21.0	
9	20.5	
12	20.3	
15	20.2	ice added
18	13.7	
21	8.2	
24	2.2	
27	0.0	
30	0.0	ice still present



If the experiment is repeated and the only difference is that twice as much ice (146.0 g) is added to the container of water, the students will observe what difference from Experiment 1?

- A. Any remaining ice will sink to the bottom of the container.
- B. The water in the container will be colder at the end of the experiment.
- C. The temperature will fall faster during the last 15 minutes of the experiment.
- D. A significantly larger amount of ice will melt in the last 15 minutes of the experiment.

Question 5
Benchmark F
9th Practice Test

When the ice was added to the water in the container, several energy transfers occurred. Considering only the contents of the container, what would be a likely sequence (order) of energy transfers?

- A. Water transferred energy to the ice as the ice melted.
- B. Water transferred energy to the air as the ice increased in temperature.
- C. Ice transferred energy to the air which then lowered the temperature of the water.
- D. Ice transferred energy to the water which lowered the temperature of the water.

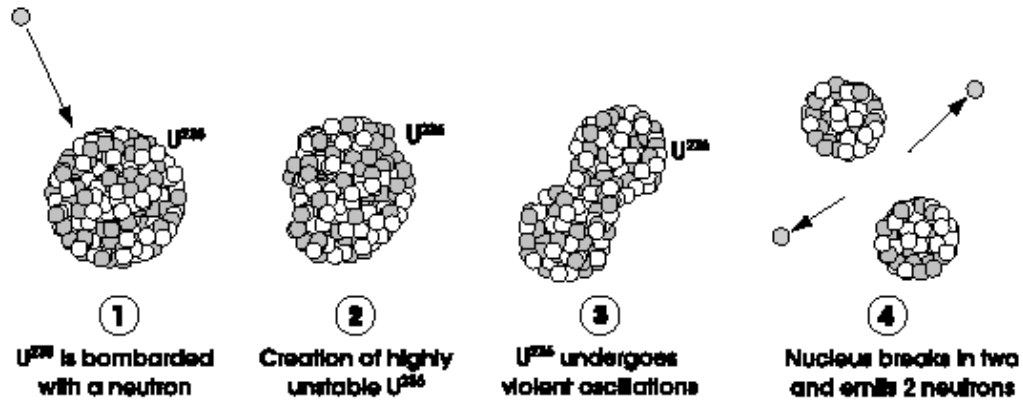
Question 7
Benchmark F
9th Practice Test

During the first 15 minutes of Experiment 1, the water molecules in the container

- A. decreased in average speed.
- B. changed the type of bonds present in the water.
- C. changed shape because the temperature changed.
- D. increased in oxygen content compared to the hydrogen content.

Question 16
Benchmark F
9th Practice Test

Use the sequence of pictures to answer question 16.



16. At what step in the fission process is a massive amount of energy released?

- A. 1
- B. 2
- C. 3
- D. 4

Question 35
Benchmark F
9th Practice Test

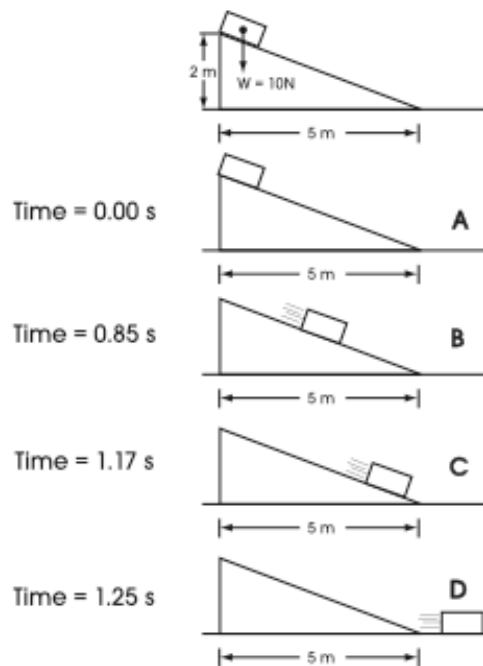
The primary reason an ice cube feels cold to the touch is that

- A. conduction causes coldness to leave the ice.
- B. radiation from the hand enters the ice.
- C. conduction causes heat to leave the hand.
- D. convection currents leave the hand.

Question 3
Benchmark F
Spring 2005

Inclined Plane Experiment

In doing the following inclined plane experiment in "ideal conditions," students assume that friction from the air, incline or floor is negligible. A stationary box at the top of a frictionless incline is released and is allowed to slide to the bottom. The figure below illustrates the box in four positions labeled A through D as it is sliding from the incline onto the level floor. As the box moves from the bottom of the incline to the floor, students assume that the box experiences no change in speed, only a change in direction.



3. The total energy of the box is
- A. always the same.
 - B. negative at point D.
 - C. increasing with time.
 - D. zero before the box is released.

Question 7
Benchmark G
Spring 2005

Use the table to answer question 7.

Speed of Sound in Solids

Solids	Density (g/cm³)	Speed (m/s)
cork	0.25	500
brick	1.80	3650
glass	2.24	4540
stainless steel	7.90	5000

7. For the solids listed in the data table, which seems to be true about the relationship between the speed of sound and density?
- A. The speed of sound decreases as density increases.
 - B. The speed of sound increases as density increases.
 - C. The speed of sound increases as density decreases.
 - D. There is no apparent relationship between density and the speed of sound.

Question 21
Benchmark G
9th Practice Test

21. One could conclude that sound is transmitted fastest in
- A. solids.
 - B. liquids.
 - C. gases.
 - D. a vacuum.