The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SCIENCE: CHEMISTRY (NYSP12SLS)

Tuesday, June 9, 2026 — 1:15 to 4:15 p.m., only

Student Name _____

School Name _____

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Print your name and the name of your school on the lines above.

Use your knowledge of **Physical Science: Chemistry** to answer all questions in this examination. Before you begin this examination, you must be provided with the ***2025 Edition Reference Tables for Physical Science: Chemistry***. You may need to use these reference tables to answer some of the questions.

You are to answer all questions in this examination. You may use scrap paper to work out the answers to the questions, but be sure to record your answers on your answer sheet and in your test booklet. A separate answer sheet for multiple-choice questions has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet. Record your answers for the constructed-response questions in your test booklet.

All answers in your test booklet should be written in pen, except for graphs and drawings, which should be done in pencil.

When you have completed the examination, you must sign the declaration printed on your separate answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet and test booklet cannot be accepted if you fail to sign this declaration.

NOTICE …

A scientific calculator or graphing calculator and a copy of the ***2025 Edition Reference Tables for Physical Science: Chemistry*** must be available for you to use while taking this examination.

Note that diagrams are not drawn to scale unless otherwise noted.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

PHYSICAL SCIENCE: CHEMISTRY (NYSP12SLS)

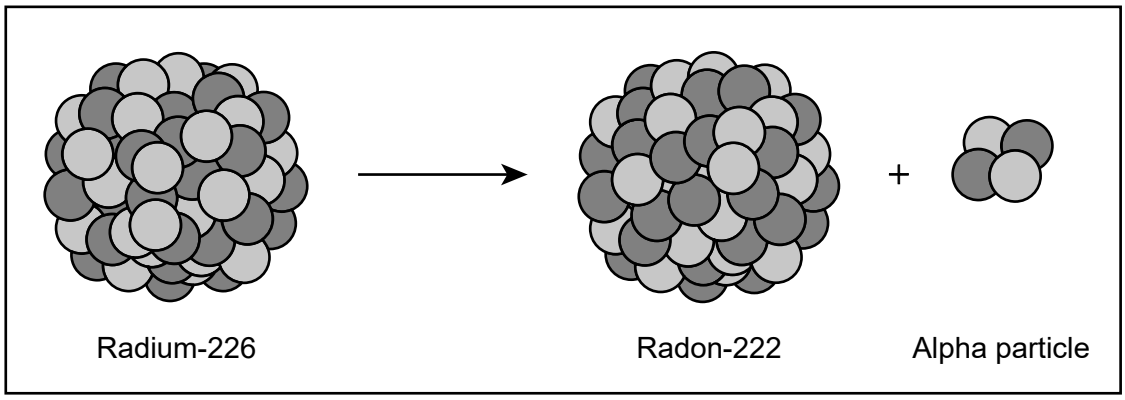
Base your answers to questions 1 through 5 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***. Be sure to record your answers for the multiple-choice questions on the separate answer sheet provided. Record your answers for the constructed-response questions in your test booklet.

How Glow Became Gloom

Radium is an element that has the ability to cause certain materials to phosphoresce (glow). When radium decays, it produces particles that excite electrons in some substances. Figure 1 shows the particle production from radium.

In the early 1900s, thousands of young women were employed to hand paint the numbers on watches. A mixture containing radium was used so that the numbers would glow in the dark. The women dipped their brushes in a powder base containing radium and made the tip of the brush smaller by placing it in their mouths. Over time, many of these women experienced tooth loss and jaw deterioration as calcium in teeth and bone was displaced by radium.

Figure 1: Model of the Alpha Decay of a Radium-226 Nucleus



(Not drawn to scale)

1 Complete the table below to predict the changes in the composition of the nucleus as the radium atom decays. [1]

Isotope	Number of Protons	Number of Neutrons
Ra-226	88	138
Rn-222		

2 Use the patterns of outermost electrons to describe how radium could substitute for the element found in teeth and bone. [1]

The Radium Chemical Company, one of the divisions of Standard Chemical Company, marketed a variety of radium products. Figures 2 and 3 show these products. These products have been replaced with less harmful chemical compounds because radium has dangerous health effects.

Figure 2: Advertisement for Radium Preparations (May 1915)

THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION HAS ACCEPTED FOR INCLUSION WITH NEW AND NON-OFFICIAL REMEDIES THE FOLLOWING PRODUCTS OF THE STANDARD CHEMICAL COMPANY OF PITTSBURGH, PENNSYLVANIA:

Radium Bromide
Radium Chloride
Radium Sulfate
Radium Carbonate

"Standard" Radium Solution for Drinking
"Standard" Radium Solution for Bathing
"Standard" Radium Compress
"Standard" Radium Earth

For Literature Address

RADIUM CHEMICAL COMPANY

Forbes and Meyran Avenues, Pittsburgh, Pa.

You are cordially invited to visit our exhibit at the annual meeting of the Illinois State Medical Society, Springfield, Illinois, May 18th, 19th and 20th, 1915, Masonic Temple. Booth Number 18.

Figure 3: Formulas of Radium Compounds

Compound	Formula
Radium bromide	$RaBr_2$
Radium chloride	$RaCl_2$
Radium sulfate	$RaSO_4$
Radium carbonate	$RaCO_3$

3 Which statement identifies the formation of ions in the radium compounds displayed in the advertisement?

(1) Radium loses 1 electron and forms Ra^+; chlorine gains 1 electron and forms Cl^-.

(2) Radium gains 1 electron and forms Ra^-; chlorine loses 1 electron and forms Cl^+.

(3) Radium loses 2 electrons and forms Ra^{2+}; bromine gains 1 electron and forms Br^-.

(4) Radium gains 2 electrons and forms Ra^{2-}; bromine loses 1 electron and forms Br^+.

Other methods for lighting the watch dial were developed beginning in the 1960s. Figure 4 compares some glow-in-the-dark alternatives. Different energy sources, including electromagnetic radiation, are used to energize electrons in watches.

Figure 4: Analysis of Some Glow-in-the-Dark Watch Alternatives to Radium

Glow in the Dark Alternatives	Nuclear Particles Produced	Energy Source for Glow	Glow Time
Super-LumiNova	None	Light source, such as sunlight	Up to 15 hours per charge
Phosphor	None	Light source, such as sunlight	Between 3–5 hours per charge
Promethium-147	Beta	Nucleus of the atom	Continuously, dims gradually over time
Tritium	Beta	Nucleus of the atom	Continuously, dims gradually over time

4 Which statement supports the claim that a watch made with phosphor glows in the dark when the electromagnetic energy source is removed?

(1) Radiation that was absorbed is released in the form of light as electrons return to a lower energy state.

(2) Radiation that was absorbed is released in the form of light as electrons jump to the excited state.

(3) Radiation that is released from the nucleus is released in the form of light as electrons return to their ground state.

(4) Radiation that is released from the nucleus is released in the form of light as electrons jump to the excited state.

5 A manufacturing company wants to design a watch with the following criteria:

Criterion 1: Ability to see the face of the watch in the dark for maximum time

Criterion 2: Minimize health impacts

Select the glow-in-the-dark alternative that best meets these criteria by evaluating the information in Figure 4, and justify the selection by citing evidence. [1]

Glow-in-the-Dark Alternative: _____

Justification for Criterion 1: _____

_____

Justification for Criterion 2: _____

_____

Base your answers to questions 6 through 10 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

Chemistry of Beverages

Soda is a carbonated beverage made by a process in which carbon dioxide (molar mass 44.01 g/mol) is pumped into the drink under high pressure to a concentration of approximately 8.0 g CO_2 per liter of soda. The beverage container is then sealed to keep the solution carbonated. When the bottle or can is opened, the gas escapes and the beverage goes "flat" over time. Equation 1 represents this process. Consumers perceive soda as "flat" at concentrations less than 6.2 g CO_2 per liter.

Equation 1: $CO_2(aq) + \text{energy} \rightarrow CO_2(g)$

One liter of the carbonated beverage was put into a bottle and stored in a refrigerator at 5°C. An identical bottle of the carbonated beverage was stored on a shelf at 25°C. Each bottle is opened and immediately returned to its original location.

6 How many molecules of CO_2 are still dissolved in a 1.0-liter bottle of soda when first considered to be "flat"?

(1) 1.1×10^{23}

(2) 1.9×10^{23}

(3) 2.5×10^{22}

(4) 8.5×10^{22}

7 Identify evidence from Equation 1 that supports the claim that the $CO_2(aq)$ concentration in the bottle of opened soda on the shelf would drop below 6.2 g/L before the bottle in the refrigerator. [1]

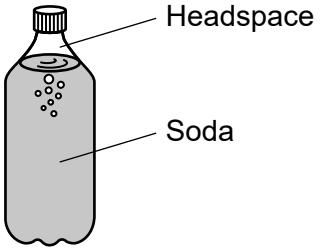
Evidence: _____

_____

_____

Figure 1 shows that carbon dioxide gas exists in the headspace above the soda in the sealed container, as well as in the liquid. When a brand of carbonated beverage is bottled at 281 K and 191 kPa, 35 mL of CO_2 occupies the headspace of a 355-mL bottle.

Figure 1: Carbonated Soda



8 A student makes a claim that a 355-mL unopened bottle stored on the shelf has less CO_2 gas in the headspace than an unopened bottle stored in the refrigerator. Place a check mark (✓) in either the Support or Refute box below to indicate whether you support or refute the student's claim. Provide a justification using the properties of solutions to explain your decision. [1]

☐ Support ☐ Refute

Some beverages stored in aluminum cans require a plastic lining to prevent acidic drinks from corroding the metal. Figure 2 lists the pH of some common beverages. Figure 3 lists some acid-base indicators.

Figure 2: pH of Some Common Beverages

Beverage	pH
Cola	2.3–2.9
Fortified water	9.0–9.5
Seltzer	4.5
Sport drink 1	3.0–3.5
Sport drink 2	8.8
White grape juice	3.4

Figure 3: Acid-Base Indicators

Indicator	Approximate pH Range for Color Change	Color Change
Bromocresol green	4.0–5.6	yellow to blue
Indigo carmine	11.4–13.0	blue to yellow
Phenol red	6.8–8.0	yellow to red
Thymol blue	1.2–2.8	red to yellow

9 How many of the beverages listed in Figure 2 would require the can to have a plastic coating?

(1) 6

(2) 2

(3) 3

(4) 4

10 Which two indicators could be used to distinguish the two sport drinks from one another?

(1) thymol blue, phenol red

(2) thymol blue, indigo carmine

(3) bromocresol green, phenol red

(4) bromocresol green, indigo carmine

Base your answers to questions 11 through 14 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

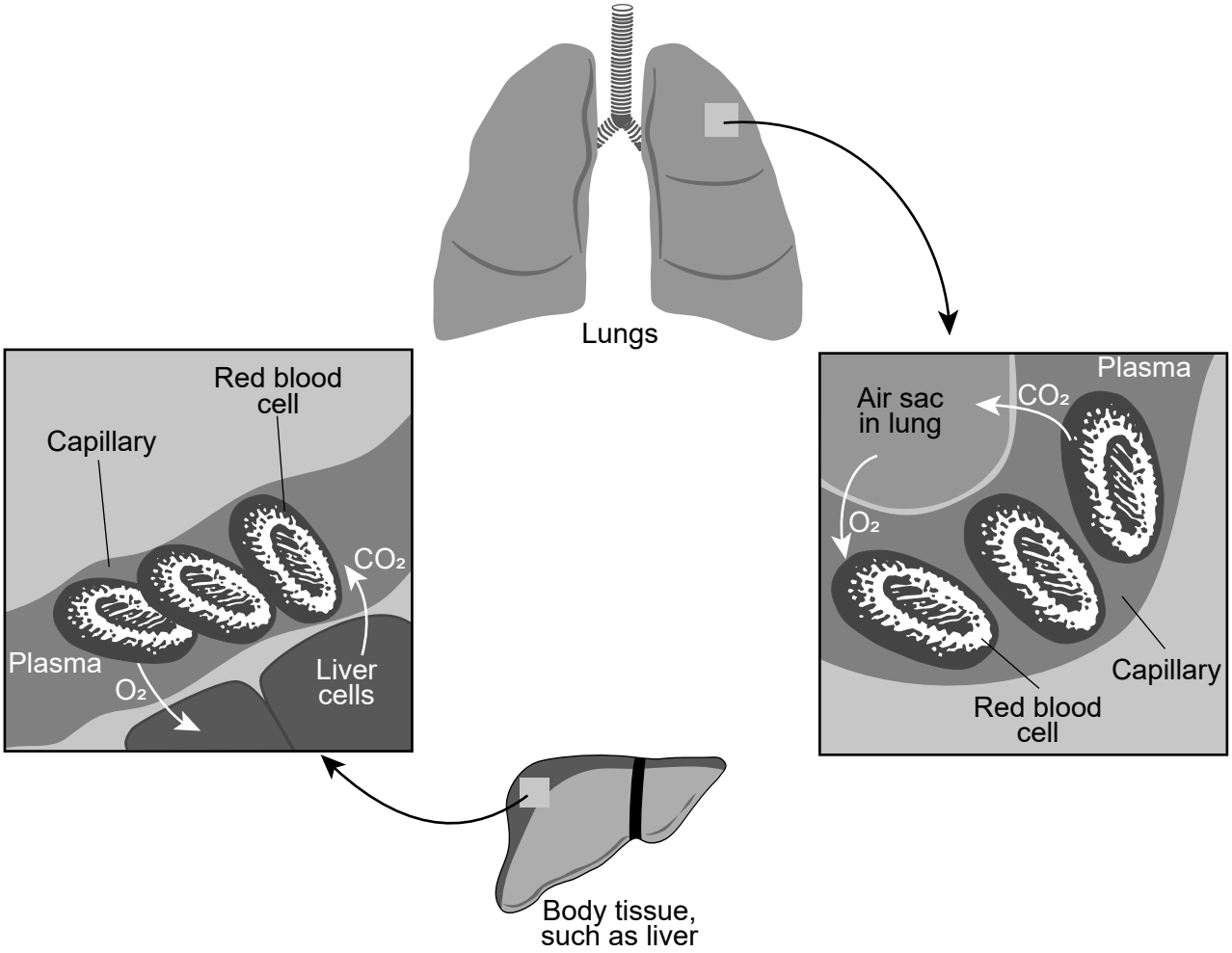
Equilibria in the Blood

Red blood cells contain hemoglobin, which transports most of the oxygen from the lungs to the cells of the body. Hemoglobin is often represented by the notation Hb. Equation 1 represents oxygen in the capillaries of the lungs binding with Hb to form oxyhemoglobin, $Hb(O_2)_4$.

Equation 1: $Hb(aq) + 4O_2(g) \rightleftharpoons Hb(O_2)_4 + \text{energy}$

Figure 1 shows the process of gas exchange between the lungs and the body cells through the blood. Dissolved carbon dioxide is transported from the cells of body tissue to the lungs by red blood cells and in the fluid plasma of the blood.

Figure 1: Gas Exchange Between the Lungs, Blood, and Body Cells



(Not drawn to scale)

11 Using collision theory, predict and explain the change to the rate of oxyhemoglobin production when the concentration of oxygen in the lungs is increased. [1]

Prediction: _____

_____

Explanation: _____

_____

_____

12 Draw an electron-dot diagram to model the gas released from the liver cells into the plasma. [1]

Carbon dioxide, formed in the cells of the body tissues, reacts with water to form carbonic acid, $H_2CO_3(aq)$. Carbonic acid then dissociates to form $H^+(aq)$ and $HCO_3^-(aq)$ to establish an equilibrium. In the human body, this process is catalyzed by an enzyme, carbonic anhydrase, which allows the body to maintain a healthy pH. Equation 2 represents the overall equilibrium.

Equation 2: $CO_2(g) + H_2O(\ell) \rightleftharpoons H^+(aq) + HCO_3^-(aq)$

Students performed a laboratory investigation in a closed system to model the process in Equation 2. During this laboratory activity, appropriate safety equipment was used and safety procedures were followed.

13 Which statement predicts the change in the reaction rates of Equation 2 if students added carbonic anhydrase during the investigation?

(1) The rate of HCO_3^- production would increase; the rate of CO_2 production would increase.

(2) The rate of HCO_3^- production would increase; the rate of CO_2 production would decrease.

(3) The rate of HCO_3^- production would decrease; the rate of CO_2 production would decrease.

(4) The rate of HCO_3^- production would decrease; the rate of CO_2 production would increase.

14 Apply LeChatelier's principle to identify **one** change in the laboratory investigation, other than changing the amount of water, that would increase the concentration of $H^+(aq)$ and describe how the change would affect the equilibrium system. [1]

Change: _____

Description: _____

_____

_____

Base your answers to questions 15 through 18 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

The Accidental Development of Breathable, Waterproof Fabric

Outdoor enthusiasts and athletes prefer clothing that is breathable and water resistant. A company's quest to make a refrigerant from tetrafluoroethylene, TFE, led to the accidental discovery of a breathable, water-resistant fabric.

The commercial preparation of TFE began with the production of hydrofluoric acid, HF(aq), from calcium fluoride, CaF_2, and sulfuric acid, H_2SO_4(aq). The HF(aq) was reacted at a high temperature with chloroform, $CHCl_3$, to produce gaseous TFE. When the TFE was stored overnight under high pressure and low temperature, the bottles unexpectedly became coated with a slippery, nonreactive, powdery substance called polytetrafluoroethylene, PTFE.

15 Complete the equation representing the production of HF(aq) to demonstrate conservation of matter. [1]

$$CaF_2 + \_\_\_\_\_ \rightarrow \_\_\_\_\_ + 2HF$$

16 Which changes would occur as the TFE produced is changed to a liquid?

(1) The distance between the molecules increases and the attractive forces increase.

(2) The distance between the molecules increases and the attractive forces decrease.

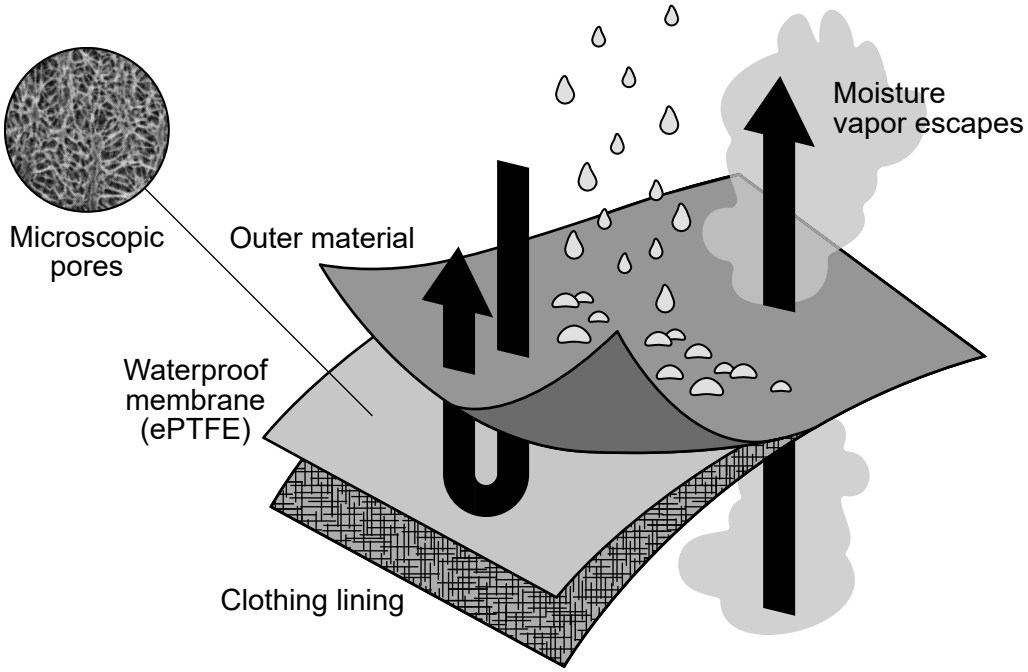
(3) The distance between the molecules decreases and the attractive forces increase.

(4) The distance between the molecules decreases and the attractive forces decrease.

In 1969, Robert Gore was working with heated rods of PTFE, attempting to gently stretch the material. Out of frustration, after a series of failed experiments, he gave the rod of PTFE a sudden, hard pull. This led to a rearrangement of the molecules, resulting in expanded PTFE (ePTFE), a new material with many useful physical properties.

Clothing that contains ePTFE is composed of at least two layers. The outer rain-resistant layer is generally nylon or polyester, which prevents most of the water from penetrating into the inner fabric layers. Spraying the outer layer with durable water repellent makes it more waterproof. Water vapor from sweat moves through the pores of the layer of ePTFE away from the body, allowing cooling to occur. These microscopic pores are less than one micrometer in diameter. Figure 1, on the next page, shows the layers of waterproof fabric.

Figure 1: Waterproof Clothing Layers



(Not drawn to scale)

17 Which row ranks the size of a pore in ePTFE, a water droplet, and a water molecule from smallest to largest?

Row	Smallest Size	Medium Size	Largest Size
(1)	Water droplet	Pore in ePTFE	Water molecule
(2)	Water droplet	Water molecule	Pore in ePTFE
(3)	Pore in ePTFE	Water molecule	Water droplet
(4)	Water molecule	Pore in ePTFE	Water droplet

18 What type of molecules in nylon or polyester would optimize the function of the outer material layer?

(1) nonpolar molecules because they have weak attractions to water

(2) nonpolar molecules because they have strong attractions to water

(3) polar molecules because they have weak attractions to water

(4) polar molecules because they have strong attractions to water

Base your answers to questions 19 through 22 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

Urban Heat Islands

The urban heat island effect is found in areas with high population densities. This occurs when temperatures in urban areas are significantly warmer than the surrounding regions. The temperature is increased because each material absorbs heat in its own way, causing some to warm more quickly than others. The urban heat island effect makes the impact of global climate change more severe, leading to higher temperatures and more frequent and intense heat waves in cities compared to rural areas. Figure 1 lists the specific heat capacities of natural and man-made materials found in urban environments.

An urban school has two soccer fields: a practice soccer field covered with natural grass and a game field covered with artificial turf. On a hot day, both fields absorb the same amount of energy. A brick sidewalk connects the two soccer fields at the urban school. A single brick in the sidewalk has a mass of 1.95 kg.

Figure 1: Specific Heat Capacities of Various Materials

Material	**Specific Heat** (J/g°C)
Asphalt (blacktop)	0.920
Brick	0.840
Grass	3.000
Soil (dry)	0.800
Soil (wet)	1.480
Artificial turf	1.920
Wood	1.300–2.400

19 Make a claim stating which soccer field will experience a greater temperature increase after absorbing the same amount of heat. Cite evidence to support your claim. [1]

Claim: _____

_____

Evidence: _____

_____

20 What amount of energy is absorbed when the temperature of a single brick increases from 20.°C to 35°C?

(1) 2.5×10^1 J

(2) 2.5×10^4 J

(3) 3.3×10^4 J

(4) 5.7×10^5 J

Another factor in urban heat islands is the amount of solar radiation that a material reflects. As reflectivity increases, less heat is absorbed by the material. Figure 2 shows the approximate reflectivity of several materials.

The Sun emits ultraviolet, visible, and near-infrared radiation. Our atmosphere absorbs most of the ultraviolet radiation before this radiation reaches Earth's surface, but visible light and near-infrared radiation do reach the ground.

Plants reflect most of the near-infrared radiation and absorb visible light, but the absorbed radiation is not converted to heat within the plant.

Figure 2: Approximate Reflectivity of Materials

Surface	**Reflectivity** (%)
Asphalt (blacktop)	10
Brick	10–15
Concrete	20–30
Grass	25
Paint (black)	5
Paint (white)	75–85

21 Which range of wavelengths approximately corresponds to the radiation absorbed by plants?

(1) 200 nm to 300 nm

(2) 400 nm to 700 nm

(3) 750 nm to 1000 nm

(4) 1500 nm to 2000 nm

22 Which strategies are effective ways to minimize the heat island effect in an urban community?

1. Use light-colored paints on the building
2. Increase the number of grassy areas
3. Replace concrete sidewalks with brick
4. Increase the use of wood in place of brick in construction

(1) 1, 2, and 3

(2) 2, 3, and 4

(3) 1, 2, and 4

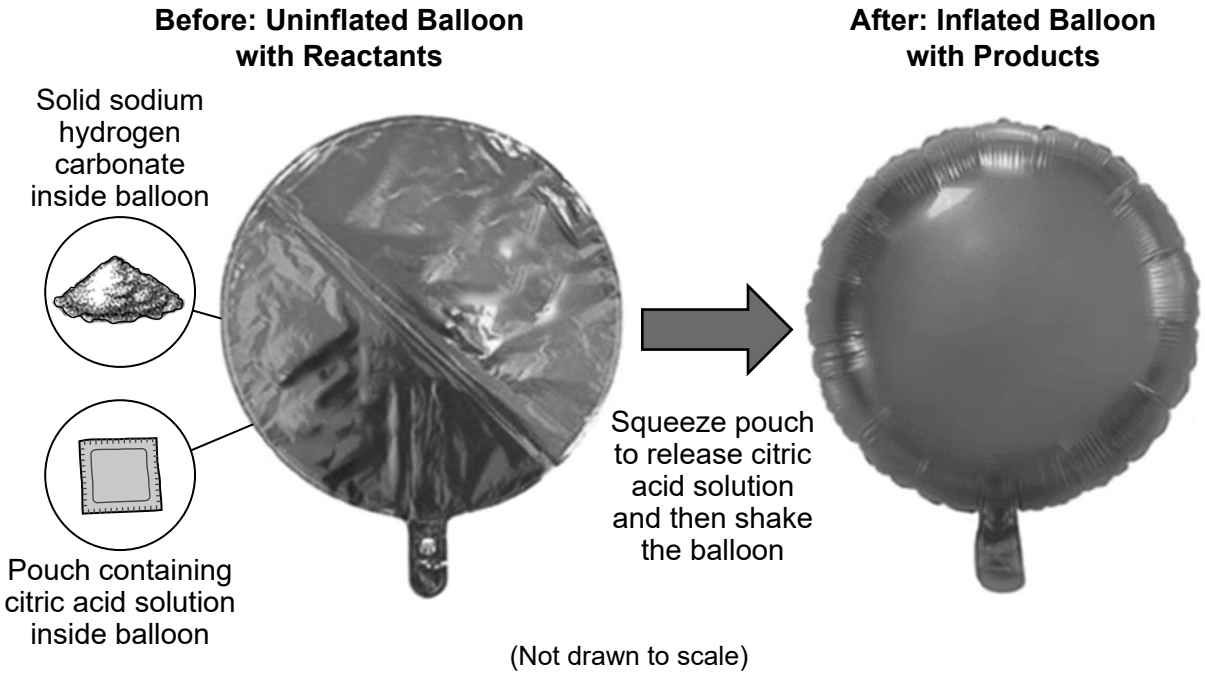
(4) 1, 3, and 4

Base your answers to questions 23 through 27 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

Balloon Arches

Two groups of students are on the decorating committee for an evening winter dance at their high school in upstate New York. One group decided to make a balloon arch in the interior hallway to welcome the students. The other group decided to make a balloon arch outside on the sidewalk leading to the school door. Figure 1 shows the self-inflating balloons the students chose to use, made from mylar.

Figure 1: Interior and Exterior of Mylar Balloon



(Not drawn to scale)

One mylar balloon contained 1.439 g solid sodium hydrogen carbonate ($NaHCO_3$) and a pouch containing a solution of citric acid, $C_6H_8O_7(aq)$. When mixed, these react to inflate the balloon. Equation 1 represents this reaction. Figure 2 provides molar masses for the substances in Equation 1.

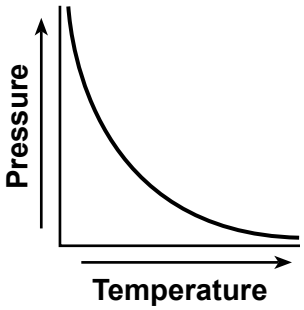
Equation 1: $C_6H_8O_7(aq) + 3NaHCO_3(s) \rightarrow 3CO_2(g) + 3H_2O(\ell) + Na_3C_6H_5O_7(aq)$

Figure 2: Molar Masses for Equation 1

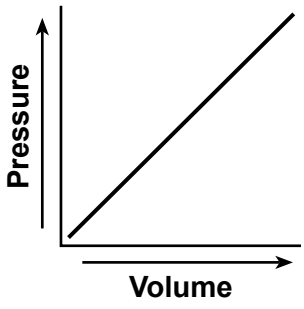
Substance	$C_6H_8O_7$	$NaHCO_3$	CO_2	H_2O	$Na_3C_6H_5O_7$
Molar Mass (g/mol)	192.14	84.01	44.01	18.02	258.09

The two groups of students noticed that the balloons attached to the outdoor archway were smaller than the balloons attached to the indoor archway when the balloons were inflated.

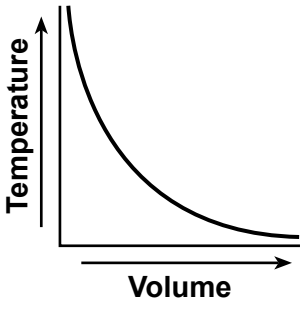
23 Which graph represents the factors that cause the difference in the size of the balloons on the indoor and outdoor arches?



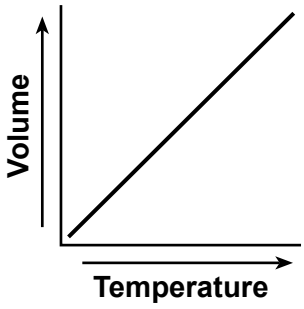
(1)



(3)



(2)



(4)

24 Calculate the number of grams of $CO_2(g)$ that would be produced when the balloon is completely inflated. [1]

_____ **g $CO_2(g)$**

One student was inflating the balloons for the interior hallway. As the components in the reaction were mixed, the student noticed that the balloons felt cold.

The student read the label on a small, self-inflating balloon. The package states that when the balloon is inflated at 25°C and 1.0 atm, the volume will be 135 mL. The student measures the volume of a balloon attached to the outdoor archway as 123 mL.

25 Which statement describes the change in energy and the placement of the energy term in *Equation 1*?

(1) The reaction is endothermic and the term is on the left.

(2) The reaction is exothermic and the term is on the left.

(3) The reaction is endothermic and the term is on the right.

(4) The reaction is exothermic and the term is on the right.

26 Construct a mathematical representation using appropriate calculations that could be used to determine the temperature of the mylar balloon outside at a pressure of 1.0 atm. Show all work. [1]

Mathematical Representation:

Balloons can be made from latex or mylar. The students were concerned about which substance would be less harmful to the environment when using balloons in future events. Figure 2 lists some of the characteristics of both latex and mylar balloons.

Figure 2: Characteristics of Latex and Mylar Balloons

Latex Balloons	Mylar Balloons
Made from the sap of rubber trees, processed with other chemicals	Made from synthetic materials coated with a metallic layer
Elastic and flexible	Strong and durable
Biodegradable	Non-biodegradable
Contributes to microplastic pollution	Lasts indefinitely
Less likely to cause electrical outages if released to the environment	More likely to cause electrical outages if released to the environment due to the metallic coating
More cost-effective	More expensive

27 Which material would be a better choice, based on trade-offs for short-term benefits and long-term negative environmental impacts?

(1) latex because it is less cost-effective but it is better for the environment

(2) latex because it is less likely to cause electrical outages but may contribute to microplastic pollution

(3) mylar because it is more cost-effective but lasts indefinitely

(4) mylar because it is more likely to cause electrical outages but is strong and durable

Base your answers to questions 28 through 32 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

Clock Reaction

In clock reactions, the completion of the reaction can be timed due to an observable change, usually a color change. A student performs one type of clock reaction to determine the effect of temperature on reaction time using Mixture *A* and Mixture *B*, which contains starch. The reaction time is measured from the initial combination of Mixtures *A* and *B* to the point of an instantaneous dark blue color change. Figure 1 shows the materials and this color change. Table 1 lists student data and calculated reaction rates at four temperatures. During this laboratory activity, appropriate safety equipment was used and safety procedures were followed.

Figure 1: Materials and Color Changes for Experiments 1–4

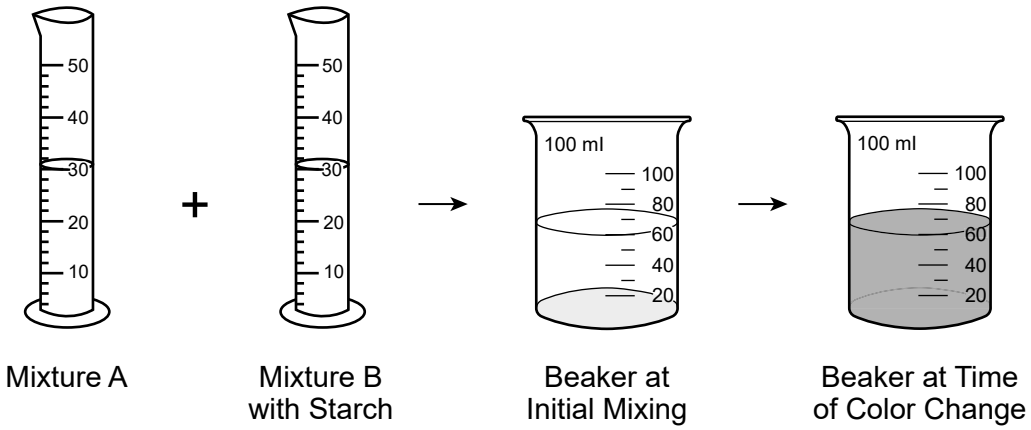


Table 1: Experiments 1–4

Experiment Number	**Temperature** (K)	**Reaction Time** (s)	**Reaction Rate** (M/s)
1	283	459.0	1.37×10^{-6}
2	294	159.5	3.95×10^{-6}
3	303	107.8	5.84×10^{-6}
4	313	52.0	1.21×10^{-5}

28 A student completes Experiments 1–4 and claims that as temperature increases, the reaction time increases. Place a check mark (✓) in either the Support or Refute box below to indicate if the given information supports or refutes the student's claim. Provide numerical evidence to support or refute the claim. [1]

☐ Support ☐ Refute

Evidence: _____

_____

_____

29 The student performed a fifth experiment using the conditions of Experiment 2 in Table 1. In this experiment, $Cu^{2+}(aq)$ was added to determine if the ion acts as a catalyst. Which reaction rate would indicate that $Cu^{2+}(aq)$ acts as a catalyst?

(1) 1.37×10^{-6} M/s

(2) 1.37×10^{-7} M/s

(3) 3.15×10^{-5} M/s

(4) 3.15×10^{-6} M/s

A different clock reaction uses 0.100 M potassium iodate, KIO_3, (molar mass = 214.00 g/mol) as Mixture *C*. Starch and 0.250 M sodium bisulfite, $NaHSO_3$, (molar mass = 104.06 g/mol) are used for Mixture *D*. The "alarm" in this clock reaction is the color change that occurs when the formation of molecular iodine reacts with starch. Molecular iodine is formed after a sequence of reactions involving Mixtures *C* and *D*. Equation 1 represents the first step in the sequence, and Equation 2 represents the simplified conversion of iodide ions to iodine molecules.

Equation 1: $IO_3^-(aq) + 3HSO_3^-(aq) \rightarrow I^-(aq) + 3H^+(aq) + 3SO_4^{2-}(aq)$

Equation 2: $2I^-(aq) \rightarrow I_2(aq)$

30 Which phrase identifies an acid and its property in Equation 1?

(1) $HSO_3^-(aq)$ because it is a hydrogen ion donor

(2) $HSO_3^-(aq)$ because it is a hydrogen ion acceptor

(3) $IO_3^-(aq)$ because it is a hydrogen ion donor

(4) $IO_3^-(aq)$ because it is a hydrogen ion acceptor

31 A student makes a claim that the conversion of iodide ions to iodine molecules is oxidation. Based on evidence from Equation 2, which statement demonstrates the validity of the claim?

(1) The oxidation number changes from –1 to 0 because I_2 loses electrons.

(2) The oxidation number changes from –1 to 0 because I^- loses electrons.

(3) The oxidation number changes from –1 to +2 because I_2 loses electrons.

(4) The oxidation number changes from –1 to +2 because I^- loses electrons.

32 The teacher prepares 250. mL of Mixture *C*. How many grams of solute are required to make the solution used in this clock reaction?

(1) 0.117 g

(2) 0.856 g

(3) 5.35 g

(4) 13.4 g

Base your answers to questions 33 through 37 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

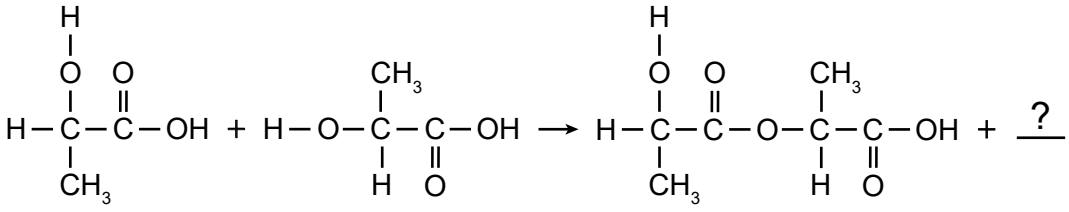
Chip Bag: PFAS vs PLA Plastics

Companies that produce snack chips consider several criteria when choosing packing materials, including cost, environmental impact, function, and appearance. Prior to 2010, most chip bags were made with PFAS (polyfluorinated alkyl substances), which were made from petroleum, a non-renewable resource.

PFAS molecules are very stable due to the presence of multiple C–F bonds. Because of this, PFAS are sometimes called "forever chemicals" because they do not break down in the environment.

In 2010, a new chip bag made from PLA (polylactic acid) was introduced. PLA is a bioplastic made from lactic acid, which is produced from renewable resources such as sugar or corn. During the production of PLA, many lactic acid monomers join together to form a long chain by removing a small molecule. Figure 1 represents one step of this process.

Figure 1: Simplified Process to Produce PLA



33 Identify the missing product in the simplified process to produce PLA to demonstrate the conservation of atoms. [1]

_____

34 Explain how the attraction for electrons between the elements that supports the function of PFAS as a "forever chemical" is more stable than the C–H bond in a PLA molecule. [1]

_____

_____

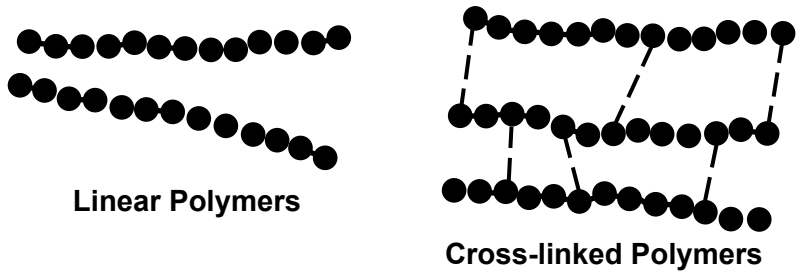
_____

Polymers such as PLA can be modified to improve their properties. In 2025, scientists found that the rate of decomposition of PLA can be increased by replacing some of the oxygen atoms in lactic acid with a different element to provide sites of weaker bonding.

Polymers can also be modified to affect physical properties. Cross-linking establishes electrical forces between different polymer strands, which improves the durability while compromising flexibility.

Figure 2 shows the configuration of linear and cross-linked polymers. The illustrated circles represent individual monomer units.

Figure 2: PLA Polymer



35 Which row compares the properties of the listed element to the oxygen replaced in lactic acid to increase the rate of decomposition?

Row	Element	Number of Outermost Electrons	Atomic Radius	Ionization Energy
(1)	N	Same	Larger	Lower
(2)	N	Different	Smaller	Higher
(3)	S	Same	Larger	Lower
(4)	S	Different	Smaller	Higher

36 Which row describes how the electrical forces in a cross-linked polymer affect the durability and flexibility in PLA?

Row	Electrical Forces	Durability	Flexibility
(1)	Attractive	Increases	Decreases
(2)	Attractive	Decreases	Increases
(3)	Repulsive	Decreases	Increases
(4)	Repulsive	Increases	Decreases

Drinking water may contain PFAS. There are two types of PFAS: PFOA (perfluorooctanoic acid) and PFOS (perfluorooctanesulfonic acid). In 2024, the Environmental Protection Agency (EPA) set a limit on the maximum contaminant level in drinking water for each of these chemicals as 4.0 nanograms/liter (ng/L). Figure 3 shows a portion of the Annual Drinking Water Quality report for 2021.

Figure 3: Water Quality Report for a City in Western New York

Contaminant	**Date of Sample**	**Average Level Detected** (ng/L)
PFOA	1/27/21–10/13/21	0.44
PFOS	1/27/21–10/13/21	0.95

37 Make a claim as to whether the drinking water in the samples in Figure 3 are safe with respect to PFOA and PFOS. Cite numerical evidence to support this claim. [1]

Claim: _____

Evidence: _____

_____

_____

Base your answers to questions 38 through 41 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

Photosynthetic Pathways

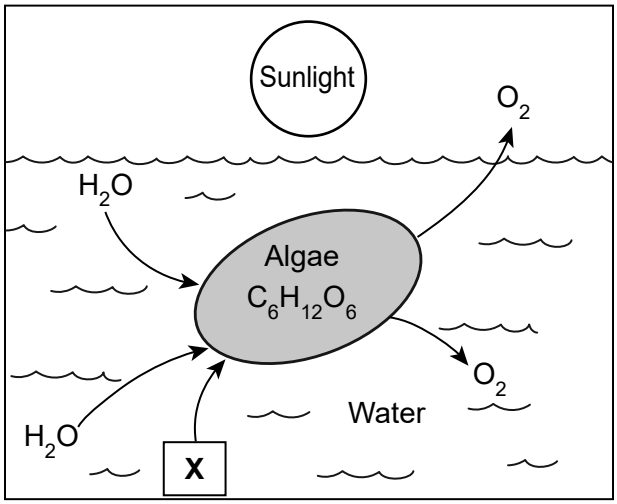
In 1957, an experiment was performed to determine the source of the oxygen atoms in the glucose molecules produced during photosynthesis. Oxygen-18 (O-18), a stable isotope of oxygen, was used to produce enriched water containing 100 times more of this isotope than normal. This allowed the O-18 to be traced in the photosynthesis process.

Algae were allowed to photosynthesize for 20 minutes in the enriched water. Next, the algae were transferred to non-enriched water where they continued to photosynthesize. Since O-18 cannot be directly detected, the following sequence of steps was used to detect the presence of O-18:

- The O-18 underwent a nuclear transformation to become unstable F-18.
- The unstable F-18 emitted a particle and decayed to O-18.
- The particle emitted by F-18 was detected and used to confirm the presence of O-18.

The results of the experiment demonstrated that none of the O-18 from the enriched water was found to be in the algae. Figure 1 represents photosynthesis occurring in algae in enriched water.

Figure 1: Photosynthesis in Algae in Enriched Water



(Not drawn to scale)

38 Identify the missing component labeled **X** *and* write the coefficient to balance the equation. [1]

$$6H_2O + \_\_\_\_\_ \quad \_\_\_\_\_ \rightarrow C_6H_{12}O_6 + 6O_2$$

39 Identify the particle that allows scientists to confirm the presence of O-18. [1]

_____

Magnesium ions are essential for plants to perform photosynthesis. Aqueous magnesium ions are absorbed from the soil through the roots.

Soil pH also affects magnesium absorption. Magnesium absorption is reduced by half in soils with a pH of 4.5 compared to soils with a pH of 6.5. The pH of soil is essential for field crop production and affects plant health. Raspberries grown in New York State benefit from a soil pH of 5.5–6.5 for optimal growth. The soil in the northern Finger Lakes region of New York State has a pH above 7. Elemental sulfur, aluminum sulfate, and manure can be used to lower the pH of the soil. Limestone and dolomite can be added to acidic soils to increase the pH of the soil.

40 Which claim identifies how the hydronium ion concentration in soil with a pH of 6.5 compares to soil in which the magnesium-absorption levels are reduced by half?

(1) The hydronium ion concentration is one hundred times more compared to the soil with reduced magnesium levels.

(2) The hydronium ion concentration is one hundred times less compared to the soil with reduced magnesium levels.

(3) The hydronium ion concentration is two times more compared to the soil with reduced magnesium levels.

(4) The hydronium ion concentration is two times less compared to the soil with reduced magnesium levels.

41 A farmer in the northern Finger Lakes region of New York State wants to grow raspberries. How would a commercial manufacturer of a soil additive make a product to maximize its short-term and long-term effects on raspberry growth?

(1) Manufacture a dolomite product with small-size crystals.

(2) Manufacture a dolomite product with different-size crystals.

(3) Manufacture an aluminum sulfate product with small-size crystals.

(4) Manufacture an aluminum sulfate product with different-size crystals.

Base your answers to questions 42 through 45 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

All About Aluminum

The United States uses over 80 billion aluminum cans per year. The aluminum is extracted from bauxite, an ore that contains various aluminum compounds. Figure 1 shows abundance of some elements in Earth's crust.

Figure 1: Percent Abundance by Mass in Earth's Crust

Element	**Percent** (%)
O	46.10
Si	28.20
Al	8.23

The properties of aluminum, such as its malleability, ductility, low density, thermal and electrical conductivity, and resistance to corrosion are desirable for many consumer products. Figure 2 provides some examples of uses of aluminum.

Figure 2: Aluminum Products

Uses of Aluminum	**Examples of Uses**
Building and construction	Window frames, siding, doors, railings, awnings
Transport	Parts for cars, airplanes, buses, ships, trains
Appliances	Washing machines, lawn mowers, refrigerators
Packaging	Kitchen foil, cans, packaging foil, food containers
Electrical and communications	Power transmission lines and towers, superconductors, telephone cables, capacitors
Outdoor play equipment	Slides, jungle gyms, swings, bats, bicycles, tennis rackets
Other	Cutlery, pots, pans

42 Which statement describes how the structure of aluminum metal supports its function?

(1) Aluminum has tightly packed atoms that allow for high density in airplane parts.

(2) Aluminum has loosely packed atoms that allow for high density in bicycle parts.

(3) Aluminum has mobile electrons that allow for poor conductivity in pots and pans.

(4) Aluminum has mobile electrons that allow for good conductivity in power transmission cables.

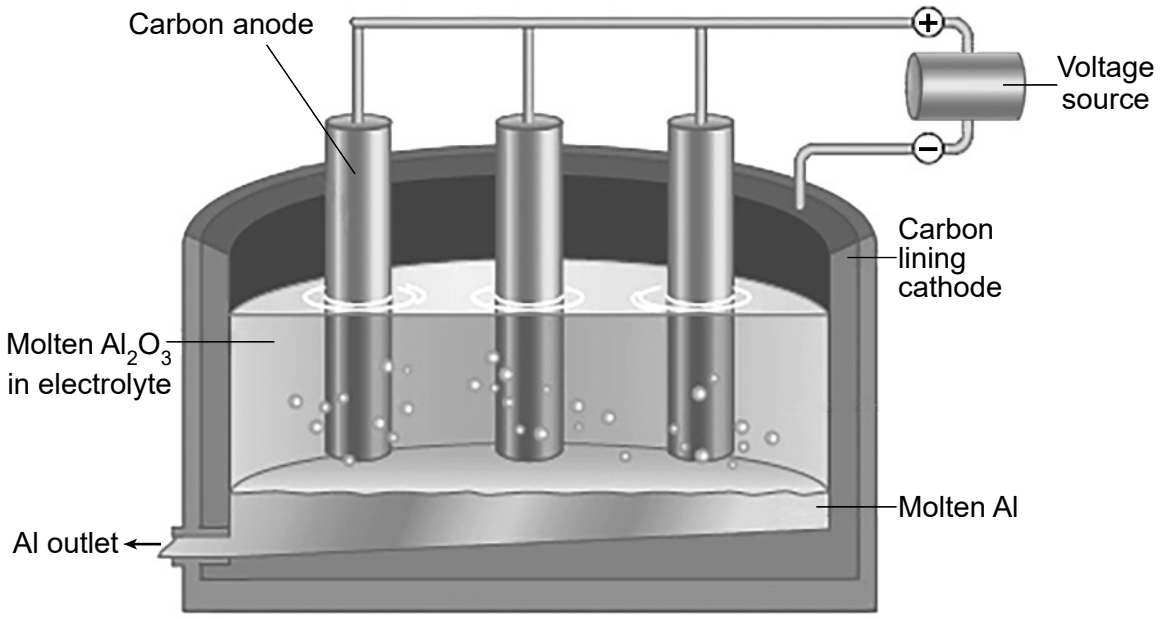
43 Predict the outcome of a reaction between aluminum and the second most abundant element in Earth's crust by writing the chemical formula. [1]

_____

In the mid-1800s, the small, available quantities of purified aluminum were more costly than gold. The isolation of elemental aluminum required large amounts of energy and time at a substantial cost.

Around 1888, the first low-cost, large-scale electrolysis method for extracting pure aluminum from aluminum oxide (Al_2O_3) was developed. This method is known as the Hall-Heroult process. Figure 3 shows the electrolytic cell of the Hall-Heroult process.

Figure 3: Electrolysis of Aluminum Oxide Using the Hall-Heroult Process



Equation 1 represents the half-reaction that takes place at the carbon anode.

Equation 1: $C + 2O^{2-} \rightarrow CO_2 + 4e^-$

44 Which row identifies the products that are formed at each electrode during electrolysis?

Row	Formed at Anode	Formed at Cathode
(1)	O^{2-}	Al
(2)	CO_2	Al
(3)	O^{2-}	Al^{3+}
(4)	CO_2	Al^{3+}

45 Which row provides evidence to support the claim that the Hall-Heroult process involves a transfer of electrons as an energy conversion occurs within the system?

Row	Aluminum Half-Reaction	Source of Electrons	Energy Conversion
(1)	$Al \rightarrow Al^{3+} + 3e^-$	O^{2-}	chemical to electrical
(2)	$Al + 3e^- \rightarrow Al^{3+}$	C	chemical to electrical
(3)	$Al^{3+} + 3e^- \rightarrow Al$	C	electrical to chemical
(4)	$Al^{3+} + 3e^- \rightarrow Al$	O^{2-}	electrical to chemical

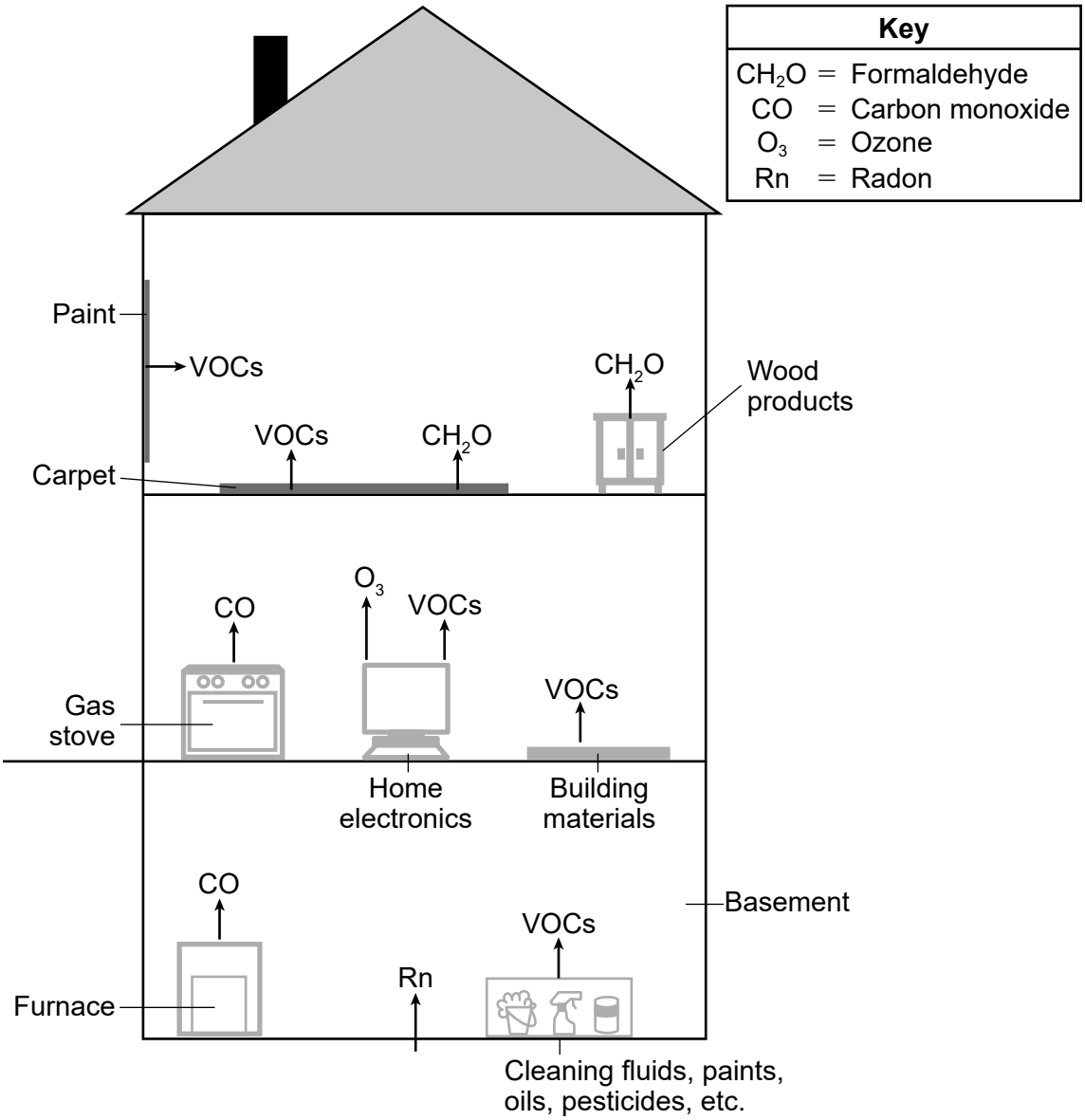
Base your answers to questions 46 through 50 on the information below and on your knowledge of chemistry. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Chemistry***.

Indoor Air Pollution

Many odors in the home are due to volatile organic compounds (VOCs). Volatility is how easily a solid or liquid becomes a gas through sublimation or evaporation and increases with increasing temperature. VOCs come from a wide variety of sources in the home. The gases released from the VOCs are inhaled and can be the source of both short-term and long-term health issues.

Other indoor pollution comes from odorless gases such as radon-222 and carbon monoxide. Radon-222 is a dense, radioactive gas that is able to enter homes through the basement foundation. Alpha particles and a very small amount of energy are released as radon-222 decays. If radon-222 enters the human body by inhalation, it may cause damage to cells and can ultimately cause cancer. Figure 1 shows some sources of indoor air pollution in a house.

Figure 1: Sources of Indoor Air Pollution



46 Which statement identifies a method to reduce the impact of a source of indoor air pollution as indicated by Figure 1?

(1) Store cleaning supplies in a well-ventilated area.

(2) Place carbon monoxide detectors in each room of the house.

(3) Replace hardwood floors with carpeting.

(4) Raise the temperature in the home.

47 Write an equation to model the nuclear decay process to illustrate the changes in the composition of Rn-222 as it decays. [1]

_____

Figure 2 contains data on physical properties of VOCs.

Figure 2: Physical Data of Selected VOCs at 1.0 atm

Common VOCs	**Product**	**Vapor Pressure at 20°C** (mmHg)	**Boiling Point** (°C)
Benzene	Furniture wax, detergents	75	80.1
Ethylene glycol	Paints, plastics	0.12	197.5
Formaldehyde	Pressed wood, cosmetics	3284	–19.1
Methanol	Perfume, antifreeze	128	64.7
Toluene	Stain remover, nail polish	28.5	110.6

48 In which list are VOCs placed in order from strongest to weakest electrical forces between particles in the substance?

(1) ethylene glycol, benzene, methanol, toluene

(2) ethylene glycol, toluene, benzene, methanol

(3) formaldehyde, methanol, benzene, toluene

(4) formaldehyde, benzene, methanol, toluene

Many common household, building, and medical products are prepared using an aqueous solution that is 37% formaldehyde (CH_2O) by mass.

49 What is the mass of formaldehyde necessary to prepare 1.5×10^3 g of the formaldehyde solution?

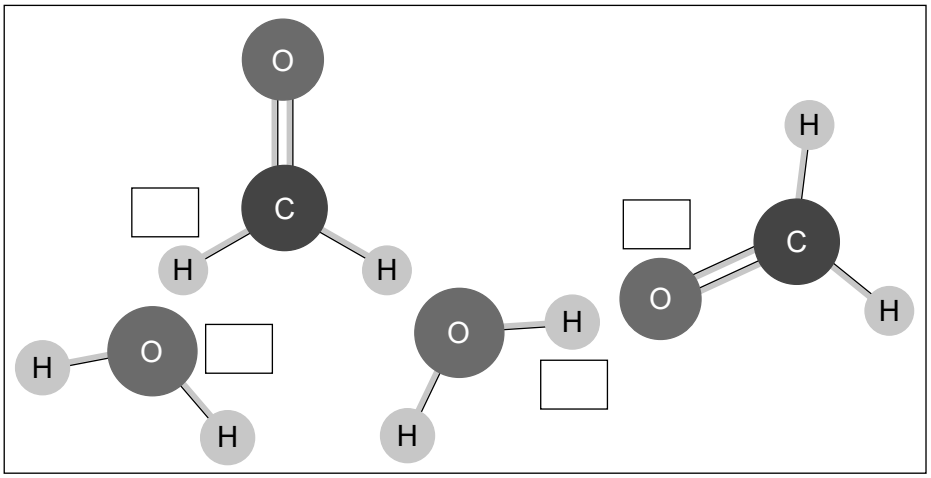
(1) 2.5×10^{-2} g

(2) 2.5×10^{1} g

(3) 5.6×10^{-1} g

(4) 5.6×10^{2} g

50 Label the partial charges (δ+, δ−) in the boxes provided below to illustrate the orientation of the solute and solvent molecules in the formaldehyde solution. [1]



PHYSICAL SCIENCE: CHEMISTRY (NYSP12SLS)

The State Education Department / The University of the State of New York

Regents Examination in Physical Science: Chemistry (NYSP12SLS) – June 2026

Scoring Key: Multiple-Choice Questions

Examination	Date	Question Number	Scoring Key	Question Type	Credit	Weight
PS: Chemistry (NYSP12SLS)	June '26	**3**	3	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**4**	1	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**6**	4	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**9**	4	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**10**	3	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**13**	1	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**16**	3	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**17**	4	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**18**	1	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**20**	2	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**21**	2	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**22**	3	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**23**	4	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**25**	1	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**27**	2	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**29**	3	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**30**	1	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**31**	2	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**32**	3	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**35**	3	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**36**	1	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**40**	2	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**41**	4	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**42**	4	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**44**	2	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**45**	3	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**46**	1	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**48**	2	MC	1	1
PS: Chemistry (NYSP12SLS)	June '26	**49**	4	MC	1	1

Regents Examination in Physical Science: Chemistry (NYSP12SLS) – June 2026

Scoring Key: Constructed-Response Questions

Examination	Date	Question Number	Scoring Key	Question Type	Credit	Weight
PS: Chemistry (NYSP12SLS)	June '26	**1**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**2**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**5**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**7**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**8**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**11**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**12**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**14**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**15**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**19**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**24**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**26**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**28**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**33**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**34**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**37**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**38**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**39**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**43**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**47**	–	CR	1	1
PS: Chemistry (NYSP12SLS)	June '26	**50**	–	CR	1	1

Key
MC = Multiple-choice question
CR = Constructed-response question

The chart for determining students' final examination scores for the **June 2026 Regents Examination in Physical Science: Chemistry (NYSP12SLS)** will be available on the Department's website at **https://www.nysedregents.org/ps-chemistry/** no later than June 26, 2026. Conversion charts provided for the previous administrations of the Physical Setting/Chemistry examination must NOT be used to determine students' final scores for this administration.

FOR TEACHERS ONLY

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

PHYSICAL SCIENCE: CHEMISTRY (NYSP12SLS)

Tuesday, June 9, 2026 — 1:15 to 4:15 p.m., only

RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 2 before rating student papers.

Updated information regarding the rating of this examination may be posted on the New York State Education Department's website during the rating period. Check this website at: https://www.nysed.gov/state-assessment/high-school-regents-examinations and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Regents Examination in Physical Science: Chemistry. Additional information about scoring is provided in the publication *Directions for Scoring Regents Examinations*.

Allow 1 credit for each correct response.

At least two science teachers must participate in the scoring of the open-ended questions on a student's paper. Each of these teachers should be responsible for scoring a selected number of the open-ended questions on each answer paper. No one teacher is to score more than approximately one-half of the open-ended questions on a student's answer paper. Teachers may not score their own students' answer papers.

Students' responses must be scored strictly according to the Rating Guide. For open-ended questions, credit may be allowed for responses other than those given in the Rating Guide if the response is a scientifically accurate answer to the question and demonstrates adequate knowledge as indicated by the examples in the Rating Guide. Do not attempt to correct the student's work by making insertions or changes of any kind. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

Fractional credit is *not* allowed. Only whole-number credit may be given for a response. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

For hand scoring, raters should enter the scores earned in the appropriate boxes printed on the separate answer sheet. Next, the rater should add these scores and enter the total in the space provided. Then the student's raw score on the test should be converted to a scale score by using the conversion chart that will be posted on the Department's website at: https://www.nysed.gov/state-assessment/high-school-regents-examinations no later than June 26, 2026. The student's scale score should be entered in the box labeled "Scale Score" on the student's answer sheet. The scale score is the student's final examination score.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score.

The test item map on page 11 identifies the Performance Expectation with which each test question is aligned. All NYSP-12SLS Performance Expectations are three-dimensional (https://www.nysed.gov/sites/default/files/programs/standards-instruction/p-12-science-learningstandards.pdf). The integration of these three dimensions provides students with a context for the content of science (DCI), the methods by which science knowledge is acquired and understood (SEP), and the ways in which the sciences are connected through concepts that have universal meaning across the disciplines (CCC).

1 [1] Allow 1 credit.

Isotope	Number of Protons	Number of Neutrons
Ra-226	88	138
Rn-222	86	136

2 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Radium and calcium have the same number of outermost electrons and similar chemical properties, so the radium could substitute for calcium in compounds for teeth.

— Radium and calcium both have 2 valence electrons or 2 outermost electrons.

— Radium and calcium are in the same group on the Periodic Table and have the same number of outermost electrons.

Note: Do *not* accept radium and calcium are in the same group without mention of outermost electrons.

3 [1] Allow 1 credit for 3.

4 [1] Allow 1 credit for 1.

5 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Glow-in-the-Dark Alternative: Super-LumiNova

Evidence for Criterion 1: — Super-LumiNova glows about 15 hours.

Evidence for Criterion 2: — Super-LumiNova does not release nuclear particles.

— Super-LumiNova uses sunlight as an energy source.

6 [1] Allow 1 credit for 4.

7 [1] Allow 1 credit for evidence. Acceptable responses include, but are not limited to:

— In Equation 1, the energy term is on the left side.

— In Equation 1, energy is a reactant.

8 [1] Allow 1 credit for Refute and a correct justification. Acceptable responses include, but are not limited to:

— Gases are less soluble at higher temperatures, so more carbon dioxide will be in the headspace.

— Gases are more soluble at lower temperatures.

Note: Allow credit if a symbol other than a ✓ is used.

9 [1] Allow 1 credit for 4.

10 [1] Allow 1 credit for 3.

11 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Prediction:

— The rate of the reaction producing oxyhemoglobin increases.

— The reaction will be faster.

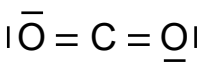
Explanation:

— The collisions between the oxygen and hemoglobin increase since there are more oxygen molecules to collide effectively.

— Increasing the number of molecules increases the likelihood of more collisions with the correct orientation.

12 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Example of 1-credit response:



Note: A Lewis electron-dot diagram showing the atoms in a nonlinear arrangement is acceptable.

13 [1] Allow 1 credit for 1.

14 [1] Allow 1 credit for a correct response that identifies one change *and* the corresponding description of that change. Acceptable responses include, but are not limited to:

Change	**Corresponding Description**
Increase the concentration of CO_2	— The equilibrium will shift to the right to undo the stress. — The forward reaction will occur at a faster rate than the reverse.
Decrease the concentration of HCO_3^-	— The equilibrium will shift to the right to undo the stress. — The forward reaction will occur at a faster rate than the reverse.
Increase the pressure *or* Decrease the volume of the reaction vessel	— There are no moles of gas on the product side, so an increase of pressure will shift the reaction to the right to undo the stress. — The equilibrium will shift to the right to undo the stress. — The forward reaction will occur at a faster rate than the reverse.

Note: Do *not* allow credit for add a catalyst or add carbonic anhydrase.

15 [1] Allow 1 credit for:

$$CaF_2 + H_2SO_4 \rightleftharpoons CaSO_4 + 2HF$$

Note: Do *not* allow credit for H_2SO_4 and $CaSO_4$ with coefficients that make the equation unbalanced.

16 [1] Allow 1 credit for 3.

17 [1] Allow 1 credit for 4.

18 [1] Allow 1 credit for 1.

19 [1] Allow 1 credit for both an acceptable claim *and* acceptable evidence. Acceptable responses include, but are not limited to:

Claim:

— The artificial turf field will experience a greater temperature increase.

— The game field will experience a greater temperature increase.

Evidence:

— Turf has a specific heat of 1.920 J/g °C and grass has a specific heat of 3.000 J/g °C.

— Artificial turf has a lower specific heat capacity than grass.

Note: Evidence must have *at least* **two** numbers or comparative languages.

20 [1] Allow 1 credit for 2.

21 [1] Allow 1 credit for 2.

22 [1] Allow 1 credit for 3.

23 [1] Allow 1 credit for 4.

24 [1] Allow 1 credit for 0.7538.

Note: Significant figures do *not* need to be shown.

25 [1] Allow 1 credit for 1.

26 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

$$\frac{135\ \text{mL}}{298.15\ \text{K}} = \frac{123\ \text{mL}}{T_2}$$

$$\frac{(1)(135)}{298} = \frac{(123)(1)}{x}$$

$$T_2 = \frac{(0.123\ \text{L})(273 + 25\ \text{K})}{(0.135\ \text{L})}$$

27 [1] Allow 1 credit for 2.

28 [1] Allow 1 credit for Refute and correct numerical evidence. Acceptable responses include, but are not limited to:

— At 313 K, the highest temperature, the reaction time is 52.0 s, which is the shortest time.

— At 294 K, time = 159.5 s; at 303 K, t = 107.8 s

Note: Answer must contain **two** sets of data or comparative language, reaction time must be mentioned. Allow credit if a symbol other than a ✓ is used.

29 [1] Allow 1 credit for 3.

30 [1] Allow 1 credit for 1.

31 [1] Allow 1 credit for 2.

32 [1] Allow 1 credit for 3.

33 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Water

— H_2O

34 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— C-F bond has strong electrical forces of attraction because F has an almost complete valence shell, making it partially negative when bonded with partially positive (+) C.

— Fluorine's strong attraction for electrons makes bonds stable.

Note: Do *not* accept intermolecular forces.

35 [1] Allow 1 credit for 3.

36 [1] Allow 1 credit for 1.

37 [1] Allow 1 credit for both an acceptable claim *and* acceptable evidence. Acceptable responses include, but are not limited to:

Claim: The samples are safe.

Evidence:

— The concentrations of 0.44 ng/L and 0.95 ng/L are both well below the 4 ng/L limit established by the EPA.

— Both have a level below 4 ng/L.

Note: Answers must include quantitative data.

38 [1] Allow 1 credit for:

$6H_2O + \underline{6}\ \underline{CO_2} \rightarrow C_6H_{12}O_6 + 6O_2$

39 [1] Allow 1 credit for:

— Positron

— ${}^{0}_{+1}e$

— ${}^{0}_{+1}\beta$

40 [1] Allow 1 credit for 2.

41 [1] Allow 1 credit for 4.

42 [1] Allow 1 credit for 4.

43 [1] Allow 1 credit for Al_4Si_3.

44 [1] Allow 1 credit for 2.

45 [1] Allow 1 credit for 3.

46 [1] Allow 1 credit for 1.

47 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

$^{222}_{86}Rn \rightarrow {}^{218}_{84}Po + {}^{4}_{2}He$ + energy

$^{222}Rn \rightarrow {}^{218}Po + {}^{4}He$

Rn-222 $\rightarrow \alpha$ + Po-218 + energy

48 [1] Allow 1 credit for 2.

49 [1] Allow 1 credit for 4.

50 [1] Allow 1 credit for a response that indicates δ+ on *both* hydrogens and δ− on *both* oxygens.

Note: The δ does *not* need to be shown. However, indicating a number with a charge makes the answer invalid.

The *Chart for Determining the Final Examination Score for the June 2026 Regents Examination in Physical Science: Chemistry* will be posted on the Department's website at: https://www.nysed.gov/state-assessment/high-school-regents-examinations no later than June 26, 2026.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to https://www.nysed.gov/state-assessment/teacher-feedback-state-assessments.
2. Click Regents Examinations.
3. Complete the required demographic fields.
4. Select the test title from the Regents Examination dropdown list.
5. Complete each evaluation question and provide comments in the space provided.
6. Click the SUBMIT button at the bottom of the page to submit the completed form.

THE STATE EDUCATION DEPARTMENT

THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

June 2026 Physical Science: Chemistry Test Item Map to the Standards

Question	Type	Points	Performance Expectation
1	Constructed Response	1	HS-PS1-8
2	Constructed Response	1	HS-PS1-1
3	Multiple Choice	1	HS-PS1-2
4	Multiple Choice	1	HS-PS4-4
5	Constructed Response	1	HS-ETS1-3
6	Multiple Choice	1	HS-PS1-7
7	Constructed Response	1	HS-PS1-5
8	Constructed Response	1	HS-PS1-10
9	Multiple Choice	1	HS-PS1-11
10	Multiple Choice	1	HS-PS1-11
11	Constructed Response	1	HS-PS1-5
12	Constructed Response	1	HS-PS3-5
13	Multiple Choice	1	HS-PS1-5
14	Constructed Response	1	HS-PS1-6
15	Constructed Response	1	HS-PS1-7
16	Multiple Choice	1	HS-PS1-3
17	Multiple Choice	1	HS-PS2-6
18	Multiple Choice	1	HS-PS1-3
19	Constructed Response	1	HS-PS3-1
20	Multiple Choice	1	HS-PS3-1
21	Multiple Choice	1	HS-PS4-4
22	Multiple Choice	1	HS-ETS1-2
23	Multiple Choice	1	HS-PS1-9
24	Constructed Response	1	HS-PS1-7
25	Multiple Choice	1	HS-PS3-1
26	Constructed Response	1	HS-PS1-9
27	Multiple Choice	1	HS-ETS1-3
28	Constructed Response	1	HS-PS1-5
29	Multiple Choice	1	HS-PS1-5
30	Multiple Choice	1	HS-PS1-11
31	Multiple Choice	1	HS-PS1-12
32	Multiple Choice	1	HS-PS1-10
33	Constructed Response	1	HS-PS1-7
34	Constructed Response	1	HS-PS2-6
35	Multiple Choice	1	HS-PS1-1
36	Multiple Choice	1	HS-PS2-6
37	Constructed Response	1	HS-PS1-10
38	Constructed Response	1	HS-LS1-5
39	Constructed Response	1	HS-PS1-8
40	Multiple Choice	1	HS-PS1-11
41	Multiple Choice	1	HS-ETS1-3
42	Multiple Choice	1	HS-PS2-6
43	Constructed Response	1	HS-PS1-2
44	Multiple Choice	1	HS-PS1-12
45	Multiple Choice	1	HS-PS1-12
46	Multiple Choice	1	HS-ETS1-2
47	Constructed Response	1	HS-PS1-8
48	Multiple Choice	1	HS-PS1-3
49	Multiple Choice	1	HS-PS1-10
50	Constructed Response	1	HS-PS3-5

Regents Examination in Physical Science: Chemistry (NYSP12SLS) – JUNE 2026

Chart for Converting Total Test Raw Scores to Final Exam Scores (Scale Scores)

(Use for the June 2026 exam only.)

Raw Score	Scale Score	Performance Level
50	**100**	5
49	**99**	5
48	**98**	5
47	**96**	5
46	**95**	5
45	**94**	5
44	**92**	5
43	**91**	5
42	**90**	5
41	**89**	5
40	**87**	5
39	**86**	5
38	**85**	5
37	**84**	4
36	**83**	4
35	**81**	4
34	**80**	4

Raw Score	Scale Score	Performance Level
33	**79**	4
32	**78**	4
31	**77**	3
30	**76**	3
29	**75**	3
28	**74**	3
27	**72**	3
26	**71**	3
25	**70**	3
24	**69**	3
23	**68**	3
22	**66**	3
21	**65**	3
20	**64**	2
19	**62**	2
18	**60**	2
17	**59**	2

Raw Score	Scale Score	Performance Level
16	**57**	2
15	**55**	2
14	**53**	1
13	**51**	1
12	**48**	1
11	**46**	1
10	**43**	1
9	**40**	1
8	**37**	1
7	**33**	1
6	**29**	1
5	**25**	1
4	**21**	1
3	**16**	1
2	**11**	1
1	**6**	1
0	**0**	1

To determine the student's final examination score (scale score), find the student's total test raw score in the column labeled "Raw Score" and then locate the scale score that corresponds to that raw score. The scale score is the student's final examination score. Enter this score in the space labeled "Scale Score" on the student's answer sheet.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart change from one administration to another, it is crucial that for each administration the conversion chart provided for that administration be used to determine the student's final score. The chart above is usable only for this administration of the Regents Examination in Physical Science: Chemistry (NYSP12SLS).