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

PHYSICAL SCIENCE: PHYSICS (NYSP12SLS)

Wednesday, June 10, 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: Physics** 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: Physics***. 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, a centimeter ruler, a protractor, and a copy of the ***2025 Edition Reference Tables for Physical Science: Physics*** 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.

Base your answers to questions 1 through 5 on the information below and on your knowledge of Physical Science: Physics. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Physics***. 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.

Pendulum Motion

A group of students investigated pendulum motion to better understand this motion in amusement park attractions. The students began with a computer simulation that neglects friction.

Diagram 1 shows the release point and the lowest point of a pendulum in this simulation. The graphs in Diagram 2 show some information about the energy of the Earth-pendulum system at these two points.

Diagram 1: Pendulum Simulation Without Friction

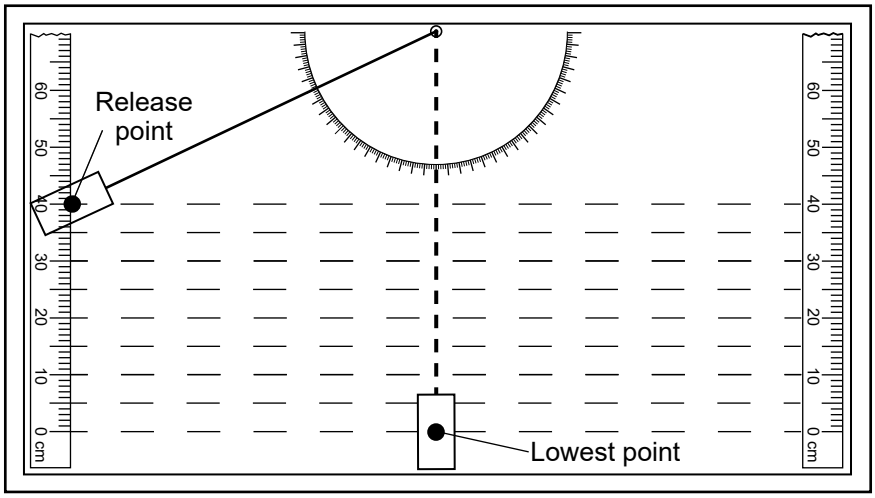
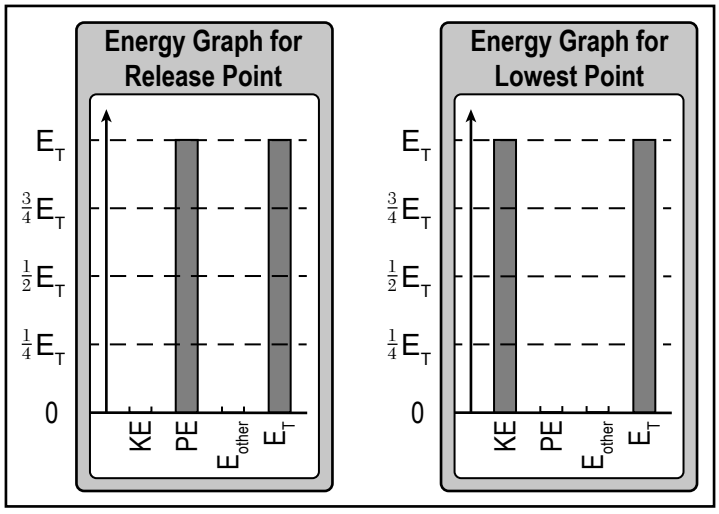


Diagram 2: Energy Bar Graphs for Diagram 1



1 Which statement describes the energy transformation modeled in Diagram 2?

(1) The kinetic energy was equal to the potential energy at both points and the total energy remained constant.

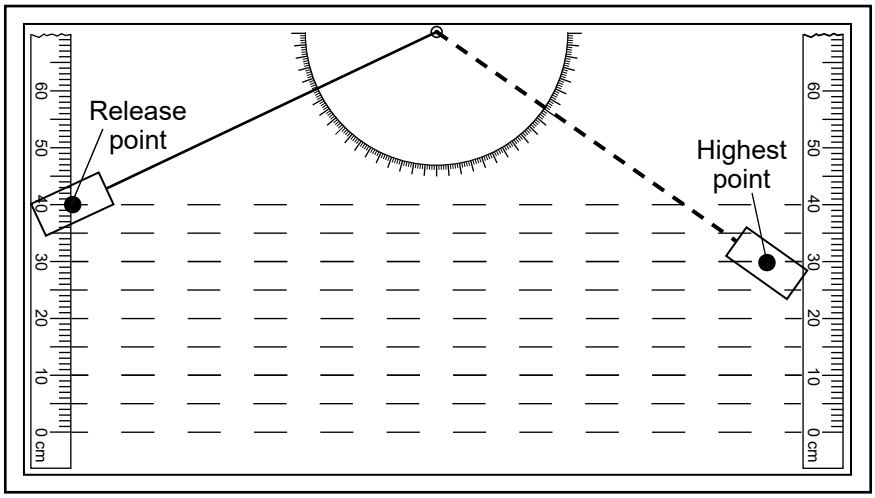
(2) The potential energy at the release point was equal to the kinetic energy at the lowest point and the total energy remained constant.

(3) The kinetic energy was equal to the potential energy at both points and the total energy increased.

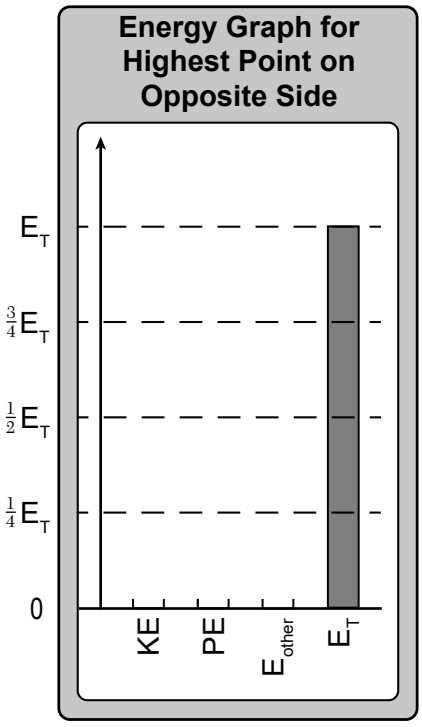
(4) The potential energy at the release point was equal to the kinetic energy at the lowest point and the total energy increased.

The students modified the simulation to include friction. Diagram 3 shows the release point of the pendulum and the highest point of the pendulum on the opposite side of the pendulum's swing.

Diagram 3: Pendulum Simulation With Friction

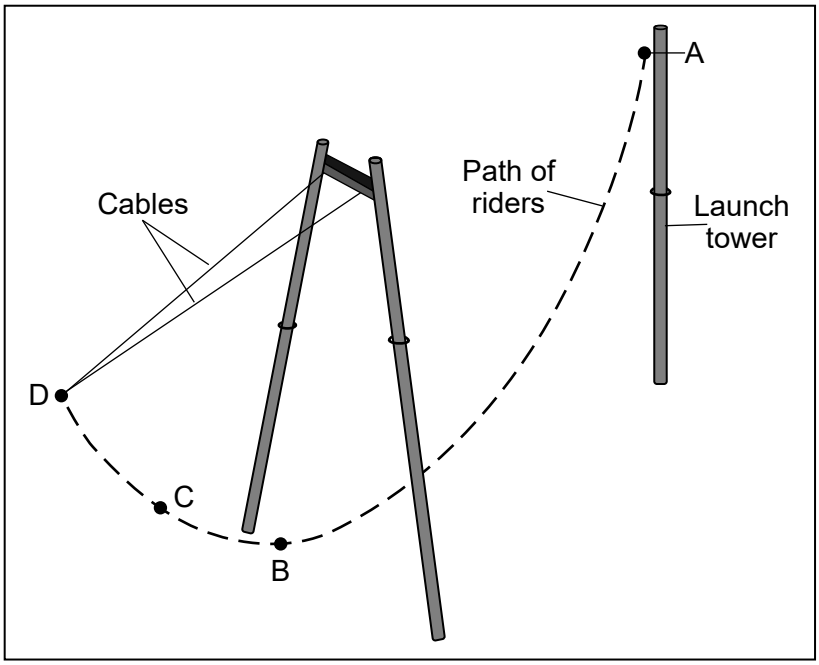


2 On the axes below, construct a bar graph that precisely represents the type(s) and fractional amount(s) of energy the Earth-pendulum system had at the highest point on the opposite side of the pendulum's swing. [1]



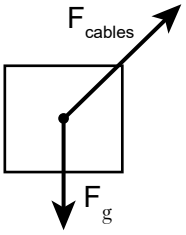
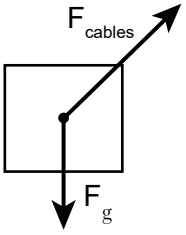
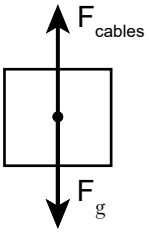
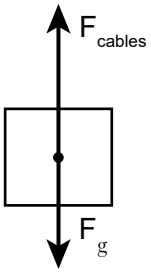
Students visited the Lagoon Skycoaster, an amusement park attraction that functions similarly to a pendulum. Riders are harnessed in specialized flight suits attached to cables and then raised to Point *A*, as shown in Diagram 4. At Point *A*, the riders pull a cord that releases them. They then swing in a circular path. The riders reach a maximum speed at Point *B*. They then pass through Point *C* and reach a maximum height at Point *D*.

Diagram 4: Lagoon Skycoaster



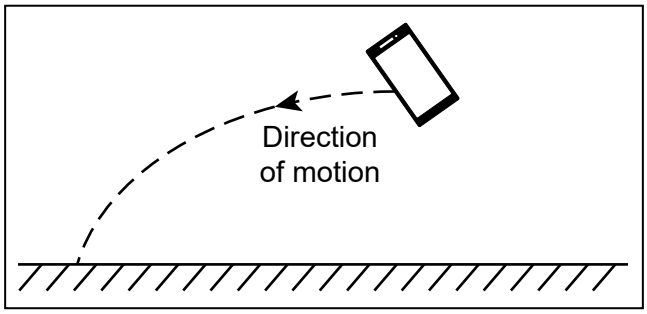
(Not drawn to scale)

3 Four students created force diagrams to analyze the forces and predict the motion of riders at Point *C* in *Diagram 4*. They described these forces and the motion of the riders. Which student's diagram and description are correct? [Neglect air resistance.]

Student	Force Diagram	Description of Forces and Motion
(1)		Forces are unbalanced and riders are accelerating.
(2)		Forces are balanced and riders are not accelerating.
(3)		Forces are balanced and riders are not accelerating.
(4)		Forces are unbalanced and riders are accelerating.

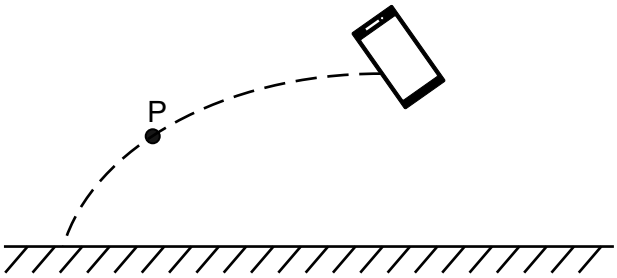
A student observed that a 0.15-kilogram cell phone was dropped from a rider at Point *B*, the lowest point of the Lagoon Skycoaster's path. Diagram 5 shows the path of the phone as it fell to the ground, neglecting air resistance.

Diagram 5: Cell Phone Path



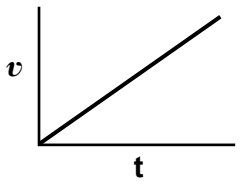
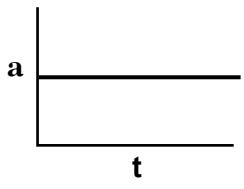
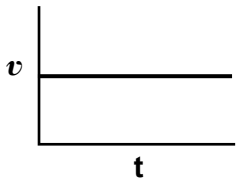
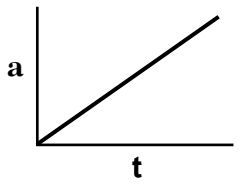
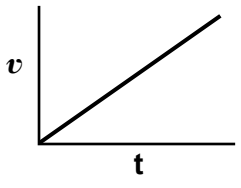
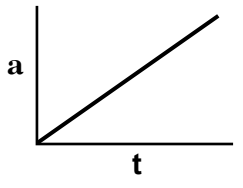
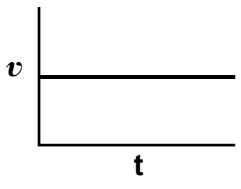
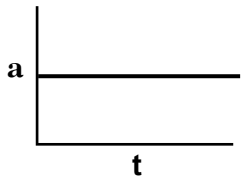
(Not drawn to scale)

4 On the diagram below, draw an arrow at Point *P* to represent the direction of the net force acting on the cell phone at that point in the cell phone's path. Also, in the space provided, determine the magnitude of this net force. [Neglect air resistance.] [1]



$F_{net} =$ _____ **N**

5 Which row in the table below correctly predicts the vertical motion caused by the net force acting on the cell phone in *Diagram 5*?

Row	Magnitude of Vertical Velocity vs. Time	Magnitude of Vertical Acceleration vs. Time
(1)		
(2)		
(3)		
(4)		

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

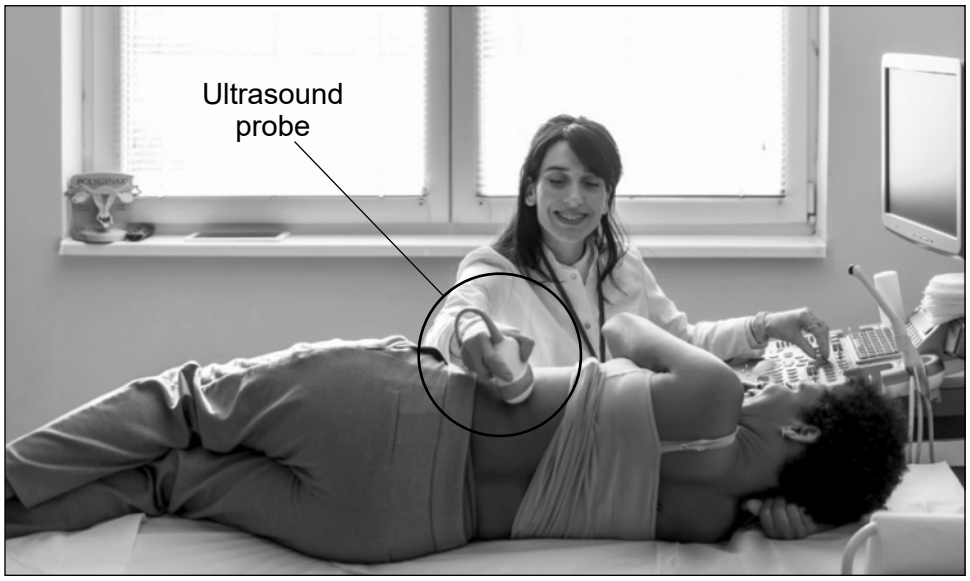
Kidney Stone Detection and Removal

Sound waves and electromagnetic radiation are commonly used in medical devices to diagnose and treat kidney stones. Kidney stones are hard deposits of minerals and salts that can form in the kidneys and can cause a variety of medical concerns that may affect kidney function.

An ultrasound probe, as shown in Diagram 1, sends a pulse of sound energy into the human body. The reflected pulse is received by the probe. Information received can be used to determine the shape and location of a kidney stone by measuring the time it takes for a pulse to return to the probe.

Ultrasound machines can also be used to determine the speed at which urine, blood, and various other fluids flow through the body. This is done by measuring the frequency of the reflected pulse and comparing it to the frequency of the original pulse.

Diagram 1: Operation of an Ultrasound Machine



6 Which wave phenomenon does ultrasound apply to determine the speed of moving fluids in the body?

(1) diffraction

(2) Doppler effect

(3) interference

(4) refraction

Ultrasound machines that provide detailed images of kidney stone structure use sound waves with frequencies in the range of 5.0×10^6 hertz to 7.5×10^6 hertz.

Sometimes the machines produce distorted images at the boundary between two different types of tissue. This is called an edge artifact, which is a result of sound pulses bending as they travel through different tissue within the body. The typical speed of sound in human tissue can vary, as shown in Table 1.

Table 1: Speed of Sound in Some Human Tissue

Tissue	**Speed of Sound** (m/s)
Blood	1570
Bone	4080
Kidney	1560
Liver	1550
Muscle	1580

7 Substitute numerical values into a mathematical representation that can be used to predict the wavelength of sound waves traveling through a kidney. [1]

8 The appearance of edge artifacts is caused by a change in which characteristic of a sound pulse?

(1) frequency

(2) phase

(3) speed

(4) period

Depending on the size and location of kidney stones, lasers can be used to break them apart. The letters in the word laser stand for:

L: light
A: amplification by
S: stimulated
E: emission of
R: radiation

The photon emitted from a laser is a phenomenon that results from an excited electron falling to a lower energy level. The amplification of light released from a laser is a phenomenon that results from constructive interference within the laser prior to being released.

The frequencies of light released by three types of lasers used to break kidney stones into smaller pieces are shown in Table 2.

Table 2: Frequencies of Lasers

Laser Type	**Frequency** (Hz)
Holmium	1.43×10^{14}
Neodymium	2.83×10^{14}
Pulsed Dye	5.13×10^{14}

9 Which row in the table below provides evidence that correctly matches the model of light to each phenomenon in the operation of a laser?

Row	**Emission**	**Amplification**
(1)	Wave model	Particle model
(2)	Particle model	Wave model
(3)	Wave model	Wave model
(4)	Particle model	Particle model

10 Using one or more mathematical relationships, support the claim that a kidney stone will absorb ***less*** energy from a holmium laser photon than from a pulsed dye laser photon. [1]

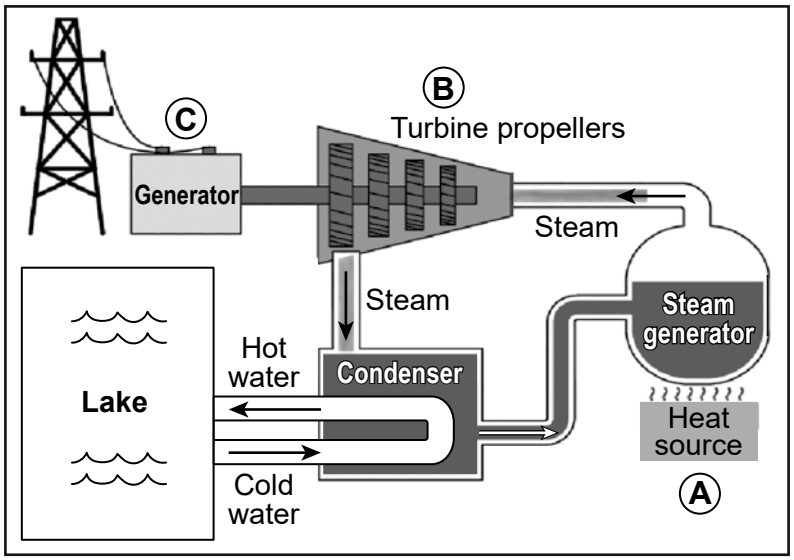
Base your answers to questions 11 through 14 on the information below and on your knowledge of Physical Science: Physics. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Physics***.

Heat Exchange

A power plant is an industrial facility that generates electrical energy from another form of energy. In thermoelectric power plants, heat is used to make steam which is sent to a turbine. This heat may come from the burning of fossil fuels, biomass, or waste. Other heat sources include the fissioning of enriched uranium in nuclear power plants, the Sun in solar power plants, or heat from the Earth's core in geothermal power plants.

Model 1 shows the basic components of a thermoelectric power plant. Three of these components are labeled *A*, *B*, and *C*. The steam causes the propellers within a turbine to rotate, resulting in the production of electrical energy in the electrical generator. The majority of these power plants use water drawn from a lake, river, or reservoir to condense the steam back into water.

Model 1: Thermoelectric Power Plant



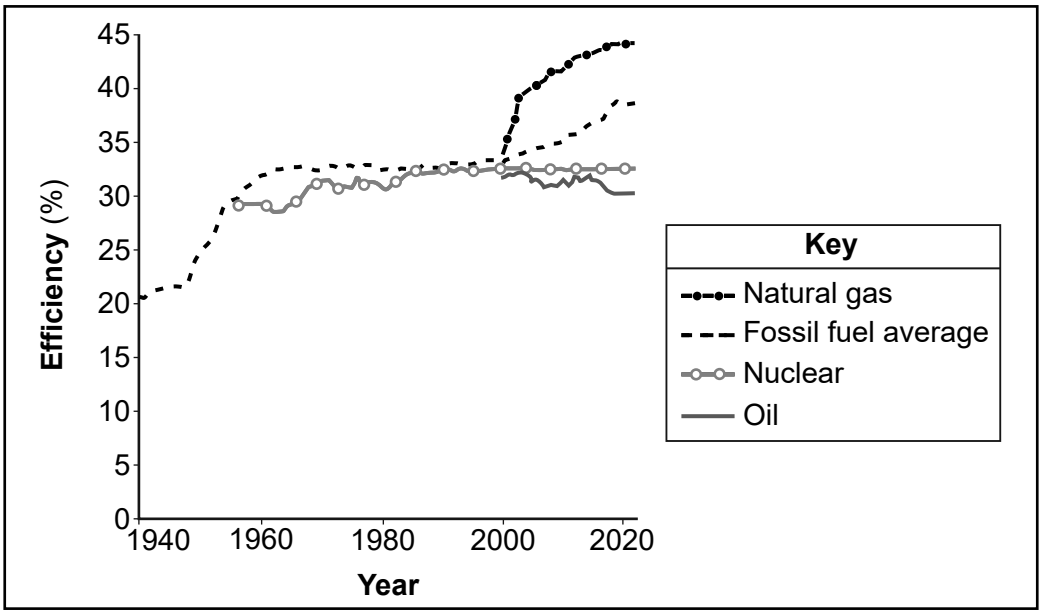
11 The flowchart below represents energy transformations that occur in the thermoelectric power plant. Identify the type of energy in each labeled component. [1]

_____ → _____ → _____

Component A Component B Component C

Graph 1 shows some information about the efficiency of various forms of thermoelectric power plants.

Graph 1: Thermoelectric Power Plant Efficiency in the United States



12 Which statement correctly evaluates how the relationship between the energy input and the energy output of a thermoelectric power plant has changed in the United States?

(1) The energy input and the energy output have increased proportionally for power plants powered by fossil fuels since 1940.

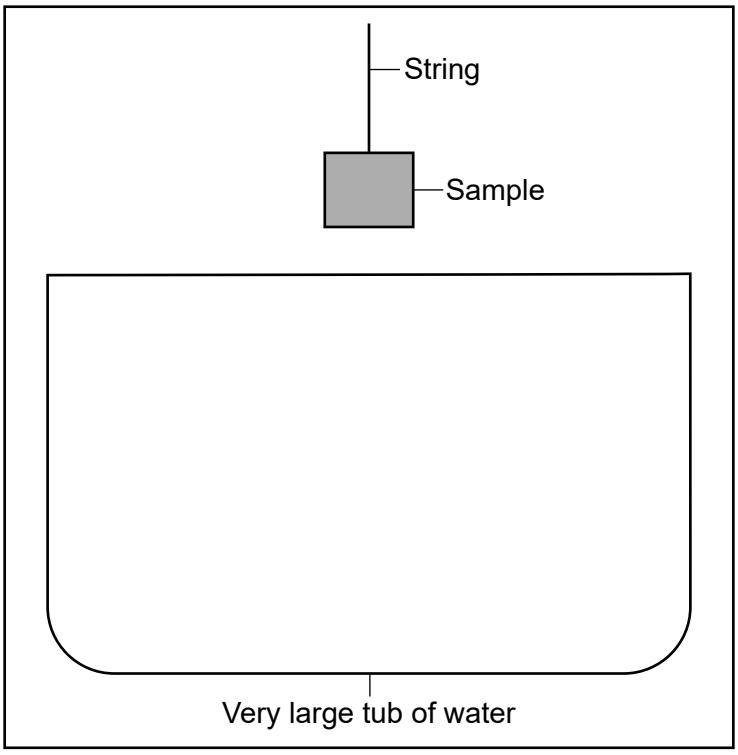
(2) The ratio of energy output to energy input has increased since 2000 for power plants powered by natural gas.

(3) The energy input is less than the energy output for power plants powered by oil for all years between 2000 and 2020.

(4) The energy output has increased at a greater rate than the energy input for a power plant powered by nuclear energy since 2000.

After learning about the operation of a local power plant, students wanted to determine which factors affect the amount of thermal energy transferred between a variety of materials and a very large tub of water. As shown in Model 2, the students selected one type of material to test and lowered the sample by a string into the tub of water. The physical state of the sample remains unchanged. During the investigation, appropriate safety equipment was used and safety procedures were followed.

Model 2: Investigation Setup



(Not drawn to scale)

13 Place a check mark (✓) in **three** boxes below to indicate the quantities that must be known about the sample in this investigation in order to determine how much thermal energy is transferred. [1]

- ☐ Boiling point
- ☐ Mass
- ☐ Temperature change
- ☐ Melting point
- ☐ Specific heat capacity
- ☐ Color

In a second investigation, students wanted to see if a different fluid might be better than water for cooling the power plant. The specific heat capacity of water is 4.2 $\frac{J}{g \bullet °C}$. Ethylene glycol is used in the cooling systems of automobile engines.

In this investigation, students decided to determine the specific heat capacity of the ethylene glycol. They had access to a temperature probe and a metal heating coil that operates at 12 volts and 1.5 amperes. The student placed the heating coil into 490 grams of the ethylene glycol at 20.°C in an insulated container. After 1300 seconds, the temperature rose to 40.°C.

14 Using the data from the investigation, the specific heat capacity of ethylene glycol is

(1) 1.2 $\frac{J}{g \bullet °C}$

(2) 2.4 $\frac{J}{g \bullet °C}$

(3) 3.6 $\frac{J}{g \bullet °C}$

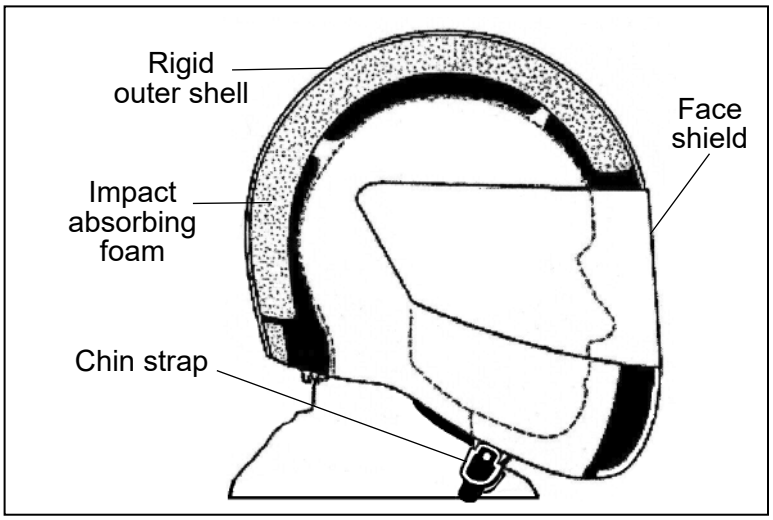
(4) 4.8 $\frac{J}{g \bullet °C}$

Base your answers to questions 15 through 20 on the information below and on your knowledge of Physical Science: Physics. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Physics***.

Motorcycle Helmets

A motorcycle helmet is an important piece of safety equipment worn by riders for head protection. It can reduce the risk of brain injury by up to 69% when compared with accidents involving riders without a helmet. This is partially due to incorporating various materials, such as foam, under the rigid outer shell. Most severe motorcycle accidents involve an impact-force injury to the rider's head. Diagram 1 represents several components of a typical motorcycle helmet.

Diagram 1: Motorcycle Helmet Components



(Not drawn to scale)

15 Which engineering design solution would address the problem of large impact-force injuries to a rider's head during a motorcycle accident?

(1) Increase foam thickness to increase the time interval over which an impact force is applied.

(2) Decrease foam thickness to decrease the time interval over which an impact force is applied.

(3) Decrease foam thickness to increase the change in speed during the time interval in which an impact force is applied.

(4) Increase foam thickness to decrease the change in speed during the time interval in which an impact force is applied.

16 Which statement describes the kinetic energy transfer into a helmet component during impact?

(1) The kinetic energy is converted into gravitational potential energy of the chin strap.

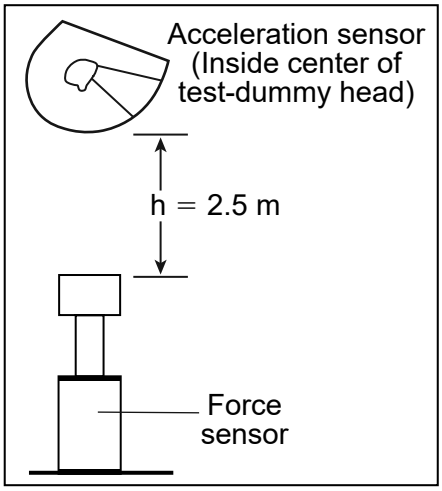
(2) The kinetic energy is converted to thermal energy in the rigid outer shell.

(3) The kinetic energy is converted to work that is done on the absorbing foam in the helmet.

(4) The kinetic energy is converted into mechanical energy of the face shield.

Improving the design of helmets has the potential to increase protection to riders. In order to evaluate the design of a helmet, the helmet is tested using the head of a test dummy. In one such study, a 4.90-kilogram head of a test dummy was strapped into a 1.50-kilogram helmet. The test-dummy head was outfitted with a sensor to measure the magnitude of the maximum acceleration during impact. The test-dummy head was dropped from a height of 2.5 meters onto a second sensor. This sensor measured the magnitude of the average force during impact. Diagram 2 represents the setup used to test the helmet. Table 1 shows the average impact data for several trials, each trial with an identical new helmet.

Diagram 2: Helmet Evaluation Test Setup



(Not drawn to scale)

Table 1: Average Impact Data

Speed at Impact (m/s)	**Maximum Acceleration of Head** (m/s^2)	**Average Force Measured by Force Sensor** (N)
7.00	2.16×10^3	1.30×10^4

17 Which mathematical representation can be used to determine the average time interval during which the impact occurs as the head-helmet system comes to rest?

(1) $\frac{(4.90\ \text{kg} + 1.50\ \text{kg})(7.00\ \text{m/s})}{1.30 \times 10^4\ \text{N}}$

(2) $\frac{2.5\ \text{m}}{7.00\ \text{m/s}}$

(3) $\sqrt{\frac{(2)(2.5\ \text{m})}{9.8\ \text{m/s}^2}}$

(4) $\frac{2.16 \times 10^3\ \text{m/s}^2}{7.00\ \text{m/s}}$

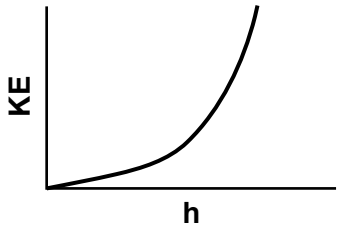
18 Determine the magnitude of the ***maximum*** net force on the test-dummy head during the impact with the force sensor, and place **one** check mark (✓) in **one** box to indicate the direction of this net force. [1]

_____ **N**

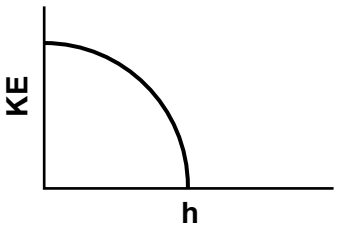
☐ Left ☐ Right

☐ Up ☐ Down

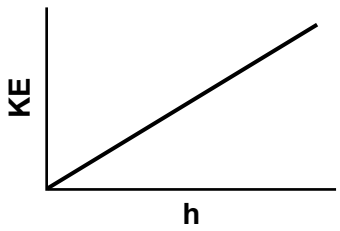
19 Which graph best represents the relationship between the kinetic energy of the test-dummy head and the height above the force sensor as the head falls? [Neglect air resistence.]



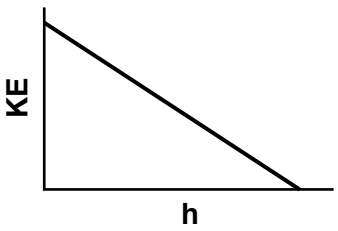
(1)



(3)



(2)



(4)

The effectiveness of a motorcycle helmet to prevent serious injury is largely based on the type of foam used to absorb the impact. Table 2 shows four helmets with identical mass that were modified with different types of impact-absorbing foam. The modified helmets were then tested using the same setup, shown in Diagram 2, to determine their effectiveness in protecting the rider.

Table 2: Impact Data for Modified Helmets

Helmet	**Type of Impact-Absorbing Foam**	**Speed at Impact** (m/s)	**Maximum Acceleration of Head** (m/s^2)
1	Polystyrene	7.00	1.20×10^3
2	Polystyrene and Polyfoam	7.00	1.00×10^3
3	Double Polystyrene	7.00	0.76×10^3
4	Dense Polystyrene	7.00	1.10×10^3

20 Place a check mark (✓) in **one** box to indicate which helmet is most effective at ***minimizing*** the force that impacts the rider's head during impact, and explain how the information in Table 2 supports your response. Include a mathematical relationship as part of your explanation. [1]

☐ Helmet 1 ☐ Helmet 2 ☐ Helmet 3 ☐ Helmet 4

Explanation: _____

_____

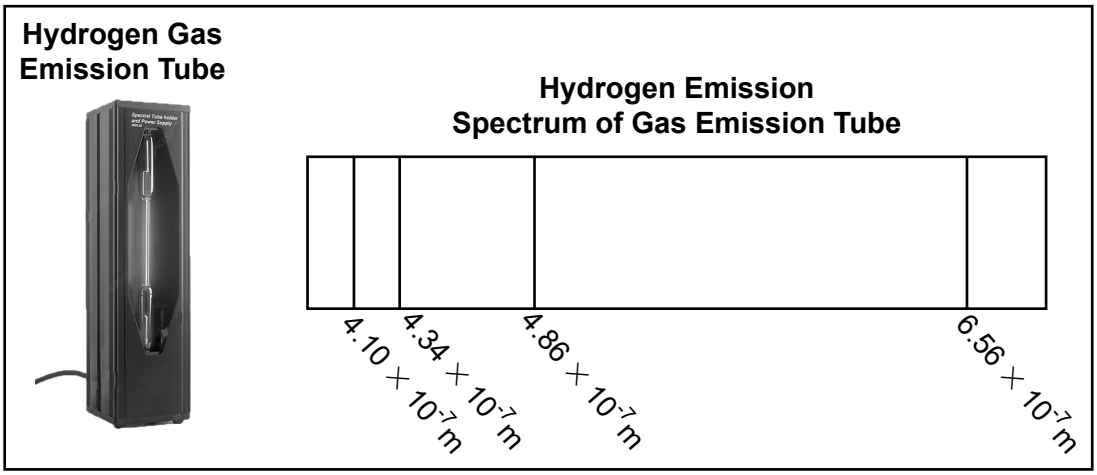
Base your answers to questions 21 through 24 on the information below and on your knowledge of Physical Science: Physics. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Physics***.

Emission Spectra and Nuclear Fusion

The Big Bang theory is the leading explanation for how the universe began. The universe started in an intensely hot and dense state that expanded over the next 13.8 billion years to form the universe that exists today.

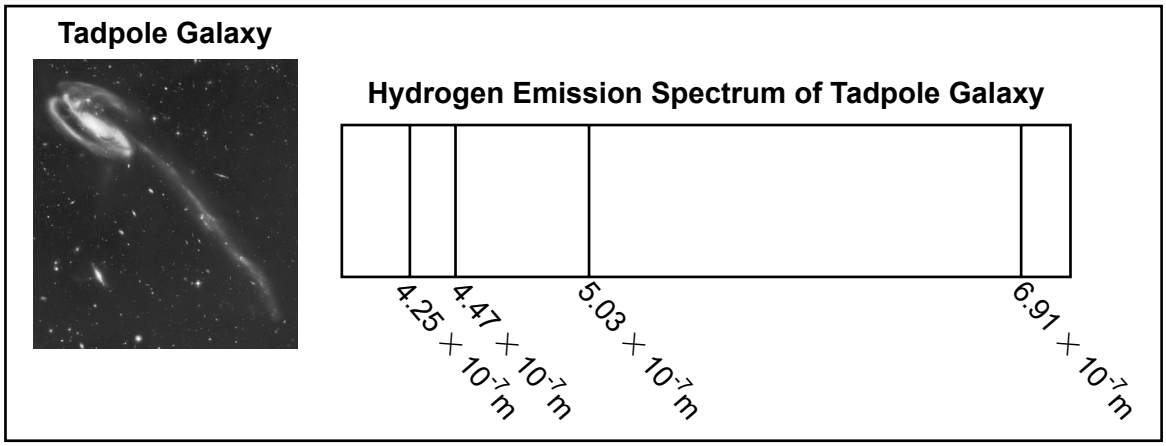
The rate of change in the size of the universe can be studied using light emission spectra of elements present in distant stars. Diagram 1 represents the visible emission spectrum of hydrogen produced with a gas emission tube. Diagram 2 represents the visible emission spectrum of hydrogen emitted from the Tadpole Galaxy, located approximately 420 million light-years from Earth. The wavelengths of the spectral lines are indicated on each diagram.

Diagram 1: Gas Emission Tube



(Not drawn to scale)

Diagram 2: Tadpole Galaxy



(Not drawn to scale)

21 Identify the data that provides evidence for the relative motion between the Tadpole Galaxy and Earth, and describe this relative motion between the Tadpole Galaxy and Earth. [1]

Evidence of relative motion: _____

_____

Description of relative motion: _____

_____

22 Based on the information in *Diagram 1*, which wavelength corresponds to the greatest visible photon energy emitted by hydrogen gas?

(1) 4.10×10^{-7} m

(2) 4.34×10^{-7} m

(3) 4.86×10^{-7} m

(4) 6.56×10^{-7} m

Approximately 380,000 years after the Big Bang, the universe cooled enough to allow for the formation of atoms, most of which were different forms of hydrogen and helium. These gases collected in various regions and collapsed together to form stars. The Sun releases its energy by nuclear fusion.

Model 1 represents the fusion of two deuterium nuclei. Deuterium is a form of hydrogen.

Model 1: Nuclear Fusion of Two Deuterium Nuclei

$$^{2}_{1}H + {}^{2}_{1}H \rightarrow {}^{4}_{2}He + 3.66 \times 10^{-12}\ J$$

23 Which row in the table below correctly completes the statement by placing the correct phrase in the blanks to support the claim that mass is converted to energy in Model 1?

The _____**A**_____ a helium nucleus and _____**B**_____ is converted into energy.

Row	A	B
(1)	total mass of	two deuterium nuclei
(2)	total mass of	one deuterium nucleus
(3)	difference in mass between	one deuterium nucleus
(4)	difference in mass between	two deuterium nuclei

Energy is also released in some chemical reactions. Model 2 shows the combustion reaction of two octane (C_8H_{18}) molecules in gasoline.

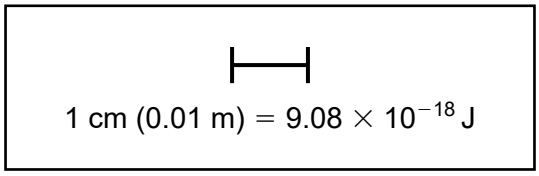
Model 2: Combustion of Two Octane Molecules

$$2\,C_8H_{18} + 25\,O_2 \rightarrow 18\,H_2O + 16\,CO_2 + \text{energy}$$

As a result, 9.08×10^{-18} joules of energy is released for each octane molecule that is combusted.

The length of a 1.0-centimeter line segment in Model 3 represents the amount of energy released during the combustion of one molecule of octane with oxygen.

Model 3: Energy Release Scale



24 Using the scale of the line segment in Model 3, which measurement best represents the total amount of energy released during the fusion of two deuterium nuclei, as shown in *Model 1*?

(1) the average length of a car (approximately 4 meters)

(2) the height of the Empire State Building (approximately 400 meters)

(3) the height of Mount Rainier, WA (approximately 4000 meters)

(4) the distance between Buffalo, NY, and Albany, NY (approximately 400,000 meters)

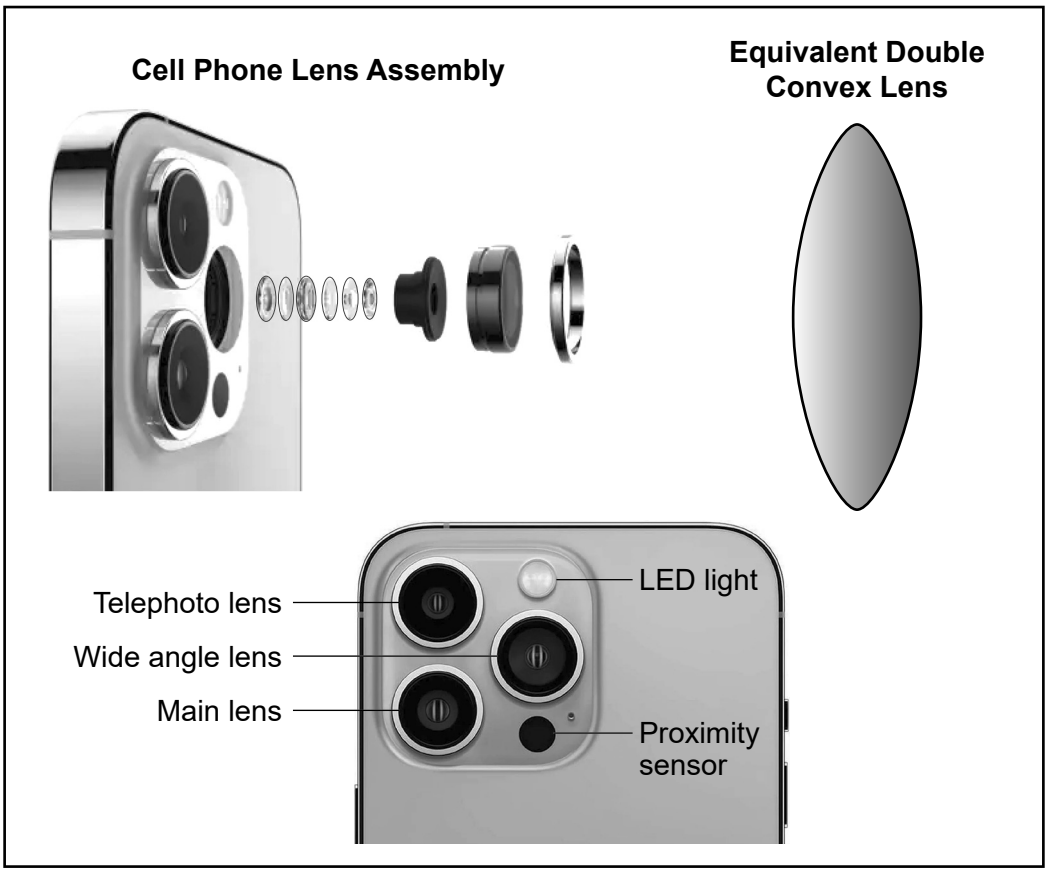
Base your answers to questions 25 through 29 on the information below and on your knowledge of Physical Science: Physics. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Physics***.

The Cell Phone

One type of cell phone camera assembly consists of three separate sets of lenses, a proximity sensor, and an LED light. Each lens set consists of six individual lenses that function equivalently to a double convex lens. Diagram 1 below shows the camera assembly of a cell phone.

When the camera assembly of a cell phone is used, one set of lenses functions as the main lens, another set functions as the wide-angle lens, and the third set functions as the telephoto lens. A small motor moves each lens to enable the camera to focus the image on a light sensor inside the cell phone. The image formed on the sensor is converted to digital data stored in the cell phone's memory.

Diagram 1: Camera Assembly of a Cell Phone

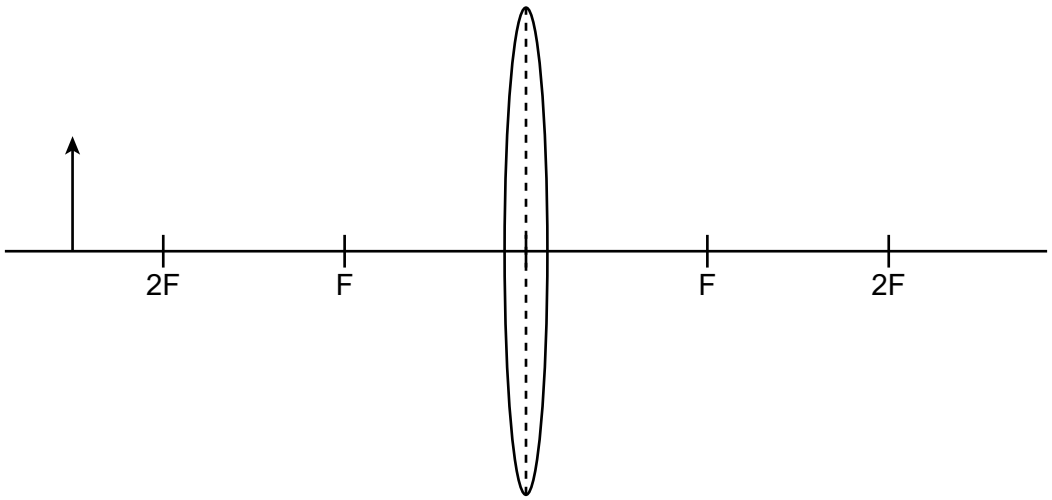


(Not drawn to scale)

In one cell phone, the main lens has an equivalent focal length of 2.4 centimeters. A student used the main lens to take a photograph of her 1.5-centimeter fingernail at a distance of 3.8 centimeters in front of the lens, as shown in Diagram 2. The student then moves her fingernail to a distance of 6.0 centimeters in front of the lens.

Diagram 2: Fingernail Photograph

25 On the model below, using **two** principal rays, construct a ray diagram that could be used to determine the location and size of the image formed by the main camera lens. Include an arrow to represent the image. The location of the arrow shown on the model represents the fingernail's location relative to the location of the camera's focal point. [1]



The student learns that the wide-angle lens was made from a material with a greater index of refraction than the main lens. The student then claims that light travels faster through the wide-angle lens than through the main lens.

26 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. Justify your response using a mathematical relationship to show how the index of refraction of a material affects the speed of light through that material. [1]

☐ Support ☐ Refute

Justification:

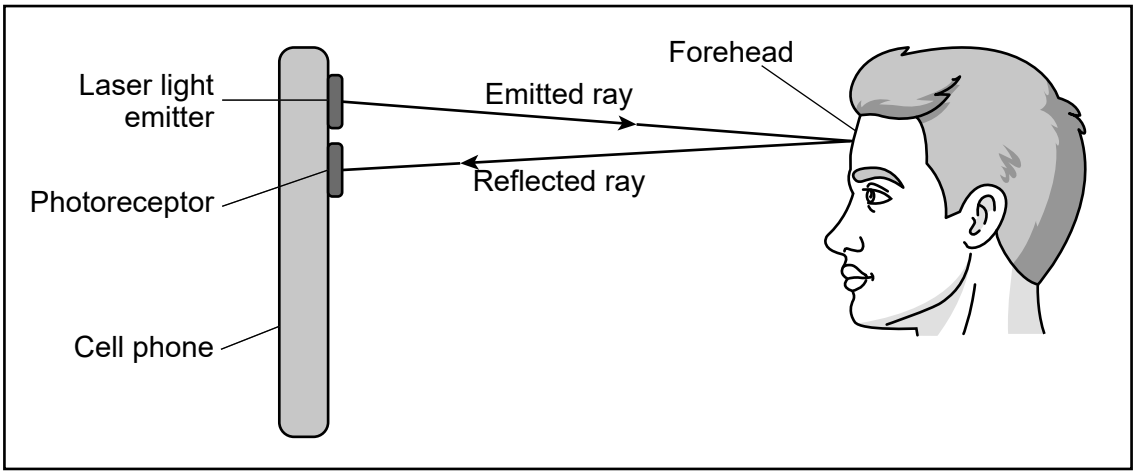
Some cell phones have a protective setting that prevents the phone from being used until it has been unlocked. Facial recognition technology allows a phone to unlock when the phone recognizes the correct user's face. Above the screen of the cell phone is a laser that projects thousands of dots onto a user's face. Diagram 3 shows these dots made visible using an infrared camera.

A photoreceptor on the cell phone analyzes the reflected infrared light from the user's face. This photoreceptor then calculates the distance from the photoreceptor to each dot and compares it to the image made when facial recognition was set up. If they match, the phone unlocks.

Diagram 3: Infrared Photograph of Projected Dots

Diagram 4 shows the interaction between one of the sensor's emitted infrared light rays and a person's face involved with facial recognition technology.

Diagram 4: Path of Infrared Light Ray



(Not drawn to scale)

27 Which table identifies some of the energy transformations in Diagram 4?

Location	Energy Transformation
Laser light emitter	electromagnetic to sound
Forehead	sound to thermal
Photoreceptor	sound to electromagnetic

(1)

Location	Energy Transformation
Laser light emitter	electromagnetic to electrical
Forehead	electrical to electromagnetic
Photoreceptor	electromagnetic to chemical

(3)

Location	Energy Transformation
Laser light emitter	electrical to electromagnetic
Forehead	electromagnetic to chemical
Photoreceptor	electromagnetic to thermal

(2)

Location	Energy Transformation
Laser light emitter	electrical to electromagnetic
Forehead	electromagnetic to thermal
Photoreceptor	electromagnetic to electrical

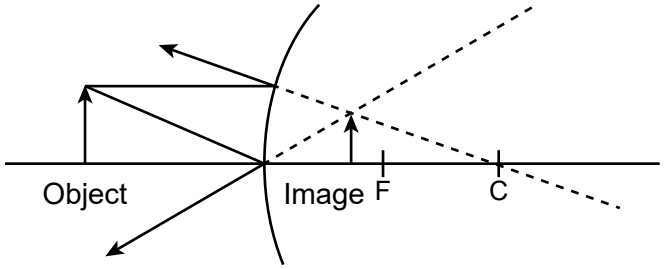
(4)

The front of the cell phone also has a camera which can create a mirror image. When the user takes a "selfie," the image of the user is displayed on the screen as upright and smaller, as shown in Diagram 5.

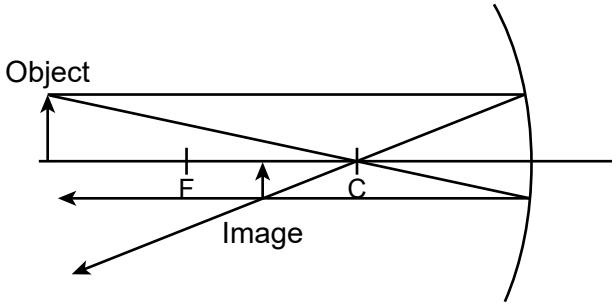
Diagram 5: "Selfie" Image

The image displayed by the cell phone while taking a "selfie" can also be produced using a mirror.

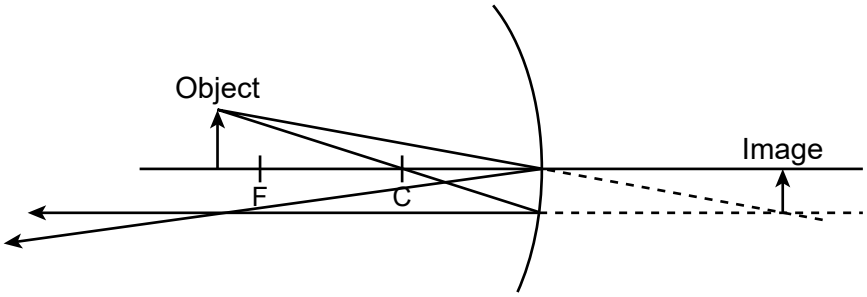
28 Which ray diagram correctly represents a series of light rays used to produce the same upright and smaller image as in the cell phone?



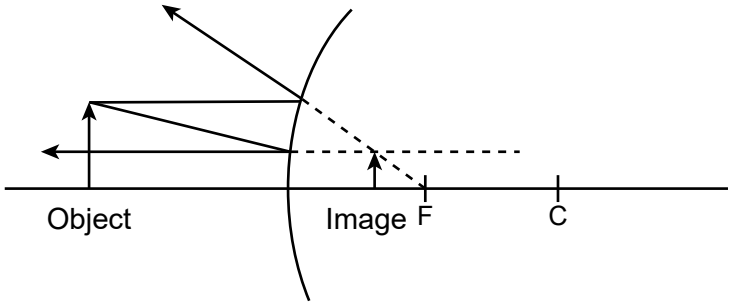
(1)



(2)



(3)



(4)

The frequent use of cell phones has increased the awareness of possible health concerns and risks. The following information was published by the National Cancer Institute in 2014 (adapted).

Is the radiation from cell phones harmful?

Cell phones emit radiation in the radio/microwave frequency region of the electromagnetic spectrum. Second-, third-, and fourth-generation cell phones (2G, 3G, 4G) emit radio/microwave frequency in the frequency range of 0.70–2.7 GHz. Fifth generation (5G) cell phones are anticipated to use the frequency spectrum up to 80. GHz.

Energy from ionizing radiation can damage DNA. DNA damage can cause changes to genes that may increase the risk of cancer.

The human body does absorb energy from devices that emit radio/microwave radiation. The only consistently recognized biological effect of radio/microwave radiation absorption in humans that the general public might encounter is heating to the area of the body where a cell phone is held (e.g. the ear and head). However, that heating is not sufficient to measurably increase core body temperature. There are no other clearly established dangerous health effects on the human body from radio/microwave radiation.

The energy of a photon determines the photon's ability to ionize an atom. Each element has an ionization energy, which is the minimum amount of energy required to eject an electron and ionize an atom of that element. Table 1 shows some information for common elements found in the human body.

Table 1: Energy Needed to Ionize an Atom

Element	**Ionization Energy** (J)
Oxygen	2.2×10^{-18}
Carbon	1.8×10^{-19}
Hydrogen	2.2×10^{-18}
Nitrogen	2.3×10^{-18}
Calcium	9.8×10^{-19}

A student determines the maximum photon energy associated with the 4G and 5G networks, as shown in Table 2.

Table 2: Cellular Network Photon Energy

Network Type	**Max. Photon Energy** (J)
4G	1.8×10^{-24}
5G	5.3×10^{-23}

29 The student makes the following claim:

Claim: The highest frequency of the radiation used by cell phones in both 4G and 5G networks causes ionization of commonly found elements in the human body that may increase the risk of cancer.

Place a check mark (✓) in either the Support or Refute box below to indicate if the given information supports or refutes the claim. Justify your response with scientific reasoning. [1]

☐ Support ☐ Refute

Justification: _____

_____

Base your answers to questions 30 through 35 on the information below and on your knowledge of Physical Science: Physics. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Physics***.

Flashlight Physics

Many small appliances use direct current, including flashlights like the one shown in Diagram 1. When the switch of a flashlight is pushed into the ON position, it makes contact between two metal strips, which creates an electric current. When charge flows through a tungsten filament, the lamp begins to glow, producing visible light. The electrical energy consumed by incandescent lamps with tungsten wire filaments is emitted in the form of electromagnetic radiation. Table 1 shows the relative amounts of energy emitted by the flashlight for various ranges of the electromagnetic spectrum.

Diagram 1: Flashlight

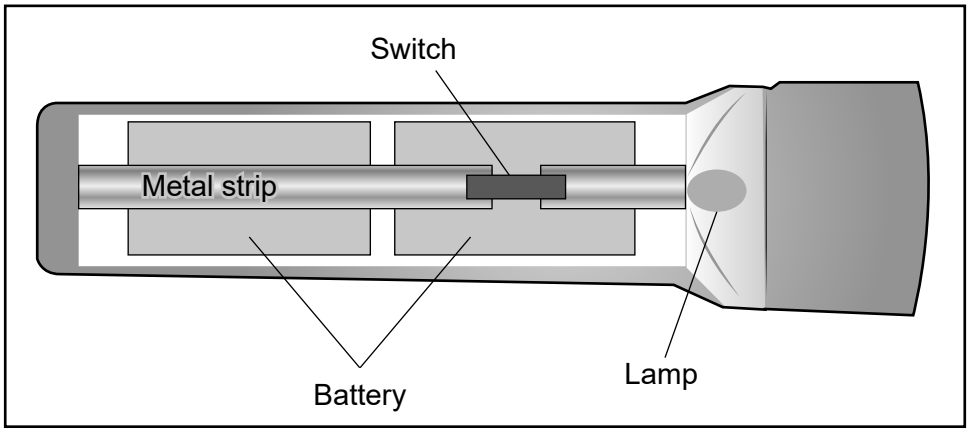
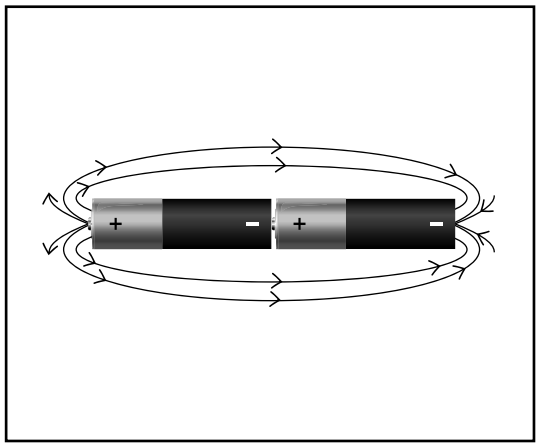


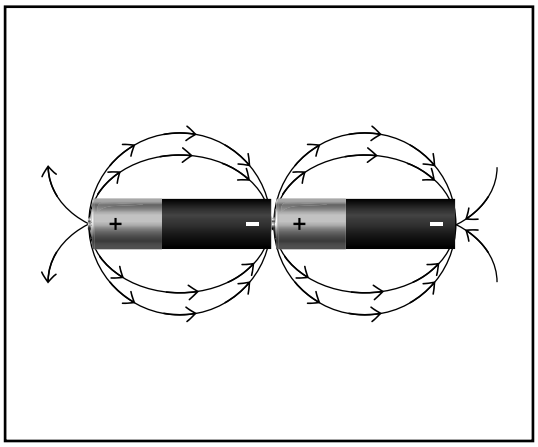
Table 1: Emitted Radiation for Incandescent Lamp

Range	Percent of Emitted Radiation
Infrared	80–85%
Visible light	15–20%
Ultraviolet	<1%

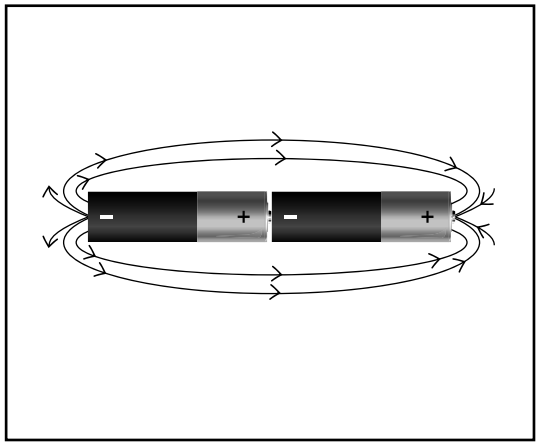
30 Which model shows the net electric field pattern around the batteries in the working flashlight?



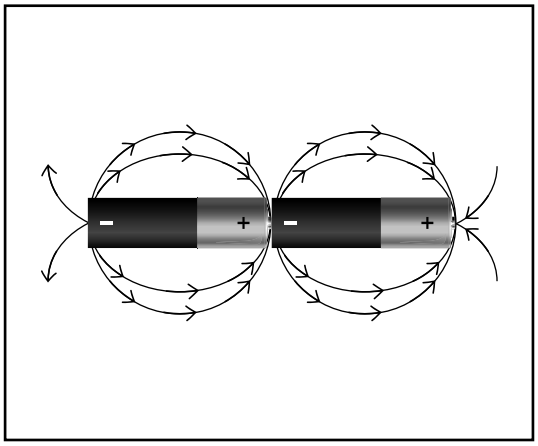
(1)



(3)



(2)



(4)

31 The largest percentage of electromagnetic radiation produced by the tungsten filament has a

(1) wavelength less than visible light

(2) wavelength greater than visible light

(3) speed faster than visible light

(4) speed slower than visible light

A student uses a computer simulation to build the circuits shown in Diagram 2 and Diagram 3. The student changes the potential difference of the battery and then records data for each circuit, as shown in Table 2 and Table 3.

Diagram 2: Circuit A

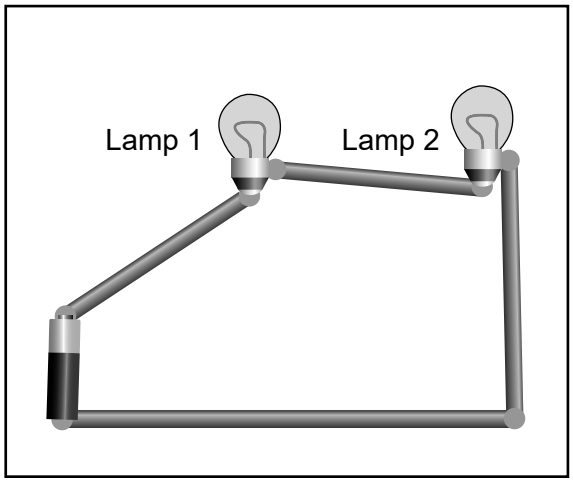


Diagram 3: Circuit B

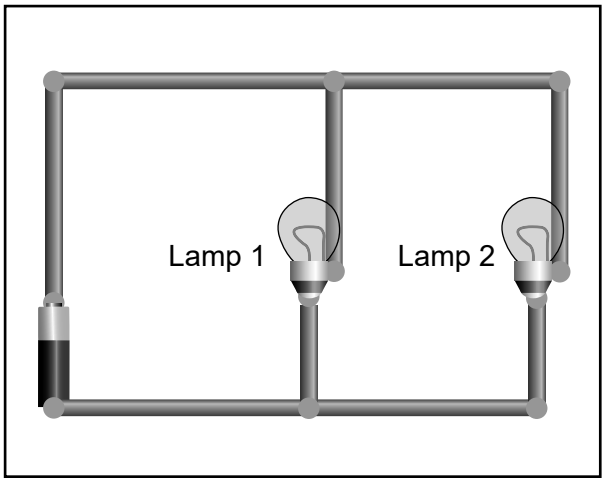


Table 2: Circuit A Data

Potential Difference (V)	**Total Current** (A)	**Equivalent Resistance** (Ω)
3.0	0.15	20.
6.0	0.30	20.
8.0	0.40	20.
12.0	0.60	20.

Table 3: Circuit B Data

Potential Difference (V)	**Total Current** (A)	**Equivalent Resistance** (Ω)
3.0	0.60	5.0
6.0	1.20	5.0
8.0	1.60	5.0
12.0	2.40	5.0

32 The student claims that the circuit in Diagram 2 obeys Ohm's law, while the circuit in Diagram 3 does not. 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. Justify your response using a mathematical representation *and* the data provided. [1]

☐ Support ☐ Refute

Justification:

33 The student changes the resistance of Lamp *1* in Diagram 3 to 15 ohms and the resistance of Lamp *2* in Diagram 3 to 5 ohms. Which row in the table describes what the student observes with correct scientific reasoning in the modified Circuit B?

Row	Observation	Reasoning
(1)	Lamp *1* and Lamp *2* glow with equal brightness.	Potential difference is the same across each lamp in the circuit.
(2)	Lamp *1* and Lamp *2* glow with equal brightness.	Current is constant throughout the circuit.
(3)	Lamp *2* glows brighter than Lamp *1*.	Lamp *2* has a greater potential difference across it than Lamp *1*.
(4)	Lamp *2* glows brighter than Lamp *1*.	Lamp *2* draws more current than Lamp *1*.

One of the most recent advancements in household lighting is the development and application of LED bulbs. LED bulbs contain a cluster of small diodes that emit light when a potential difference is applied. Historically, incandescent bulbs, as shown in Diagram 4, have been used for household lighting. These bulbs contain a visible filament that glows brightly when a potential difference is applied. Many LED bulbs include heavy metals, such as lead, and should be recycled. Conversely, incandescent light bulbs can be disposed of in the household trash. Diagram 5 shows that an 8-watt LED bulb can replace a 60-watt incandescent bulb with a similar light output.

Diagram 4: Incandescent Bulb

Diagram 5: LED Bulb

34 What is the difference in electrical energy used by the incandescent bulb in Diagram 4 and the LED bulb in Diagram 5 during one hour of operation?

(1) 0 J

(2) 5×10^1 J

(3) 2×10^5 J

(4) 3×10^5 J

35 Some energy groups advocate for switching to LED bulbs to reduce global energy usage. Describe **one** constraint of using LED bulbs instead of incandescent bulbs to reduce global environmental impact. [1]

Base your answers to questions 36 through 40 on the information below and on your knowledge of Physical Science: Physics. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Physics***.

From Astro Blaster to Supernova

A supernova occurs when a dying star collapses, then explodes. The Astro Blaster is a toy used to demonstrate the law of conservation of momentum. Multiple Astro Blasters can be used to model a supernova. When the Astro Blaster shown in Diagram 1 is dropped onto a hard surface, Ball *A* bounces upward to a height greater than the original drop height. Table 1 shows some information about the balls on the Astro Blaster.

Diagram 1: The Astro Blaster

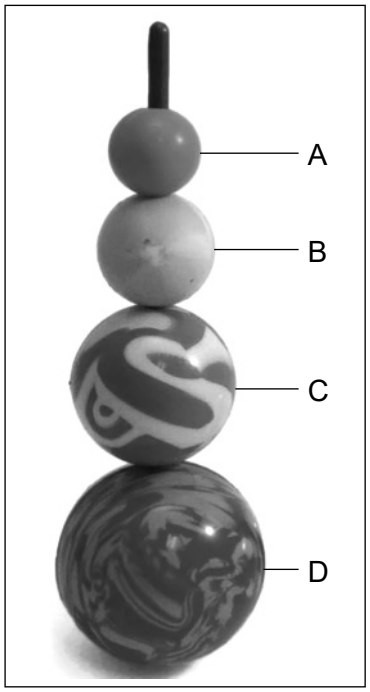
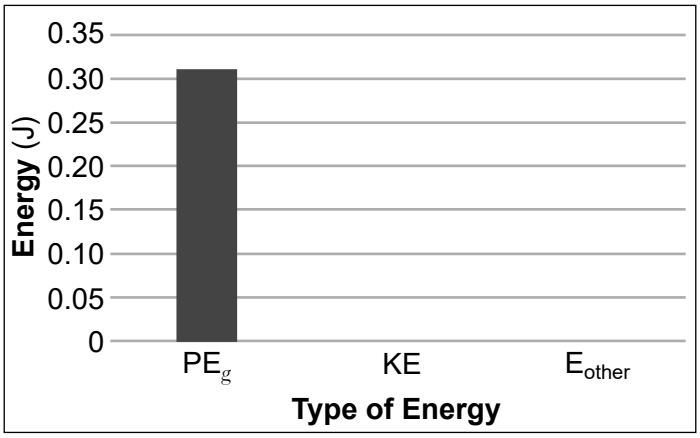


Table 1: Astro Blaster Data

Ball	**Mass** (kg)
A	0.0038
B	0.0109
C	0.0287
D	0.0627

In an attempt to understand how an Astro Blaster works, a student suggests dropping the largest ball, Ball *D*, alone. Ball *D* is dropped from a height of 0.50 meter and rebounds to a height of 0.34 meter. Graph 1 shows the energy of the Earth-ball system just before Ball *D* is dropped. During the investigation, appropriate safety equipment was used and safety precautions were followed.

Graph 1: Types of Energy



36 Which value results from applying a mathematical model to calculate the speed of Ball *D* the instant before the ball hits the ground? [Neglect friction.]

(1) 9.8 m/s

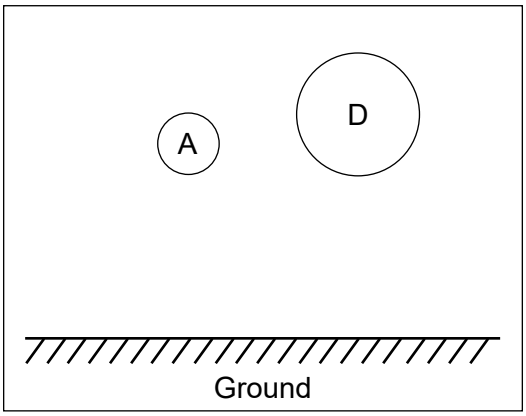
(2) 4.9 m/s

(3) 3.1 m/s

(4) 0.0 m/s

A student places Ball *A* and Ball *D* side by side at the same height above the ground, as shown in Diagram 2.

Diagram 2: Balls A and D Side by Side



(Not drawn to scale)

The student claims that if air resistance is neglected and both balls are dropped simultaneously, the balls will have different speeds at impact with the ground.

37 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. Justify your response. [1]

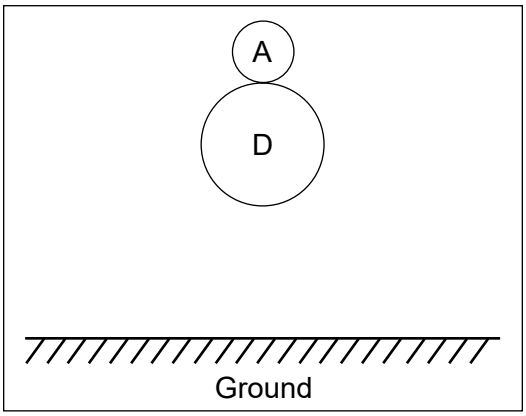
☐ Support ☐ Refute

Justification: _____

_____

The student drops Ball *A* and Ball *D* together, with Ball *A* directly on top of Ball *D*, as shown in Diagram 3.

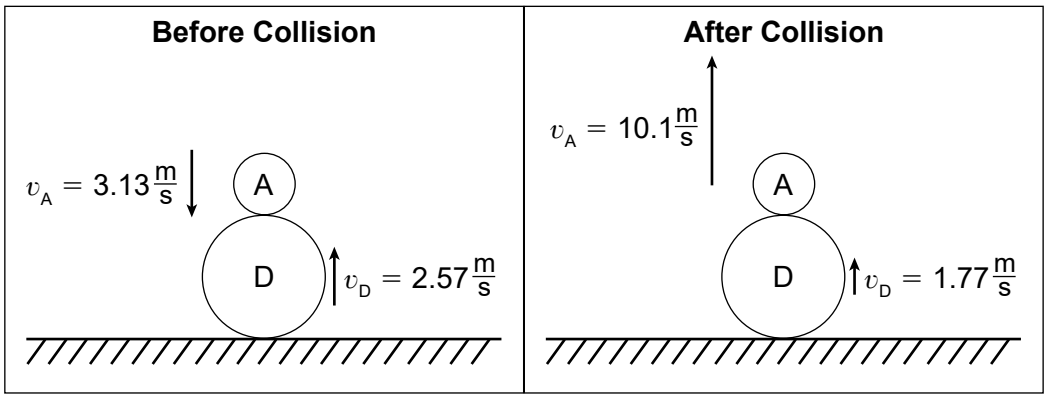
Diagram 3: Ball A on Top of Ball D



(Not drawn to scale)

The student models the collision that occurs between Balls *A* and *D* after Ball *D* hits the floor and rebounds, but Ball *A* is still moving downward. The student used a computer simulation to obtain the values shown in Diagram 4.

Diagram 4: Simulation Results



(Not drawn to scale)

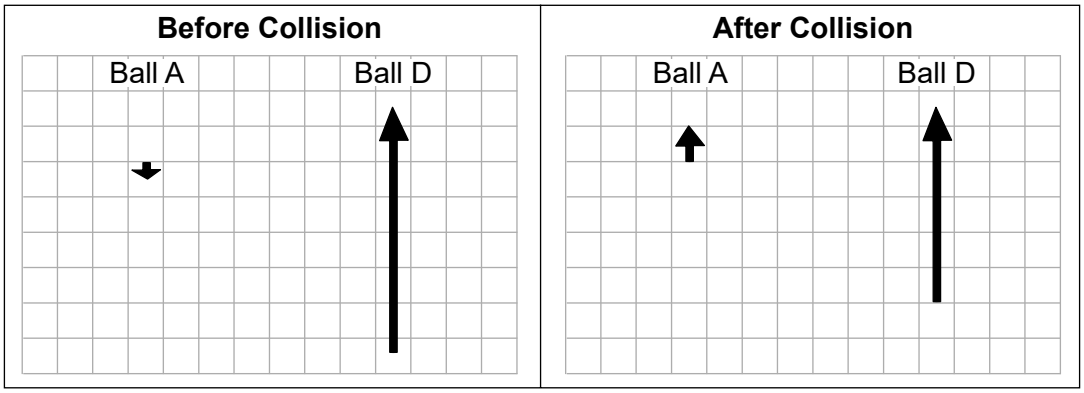
38 The manufacturer of the Astro Blaster claims that their toy can be used to illustrate the law of conservation of momentum. Based on *Table 1* and *Diagram 4*, use one or more mathematical representations to determine if the data from the simulation supports the manufacturer's claim. Place a check mark (✓) in the box below to indicate if your analysis of the data provided supports or refutes the manufacturer's claim. [1]

Mathematical Representation(s):

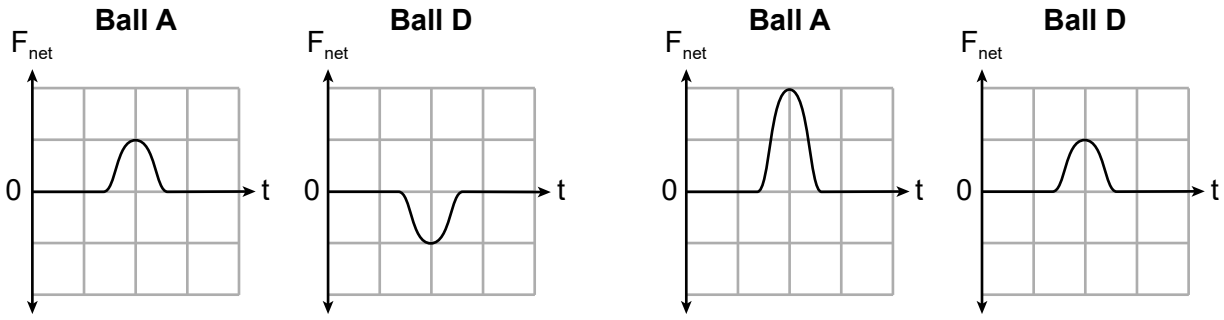
☐ Support ☐ Refute

The computer simulation used to model the collision between Ball *A* and Ball *D* includes the momentum vectors, as shown in Diagram 5.

Diagram 5: Computer Simulation of Momentum Vectors

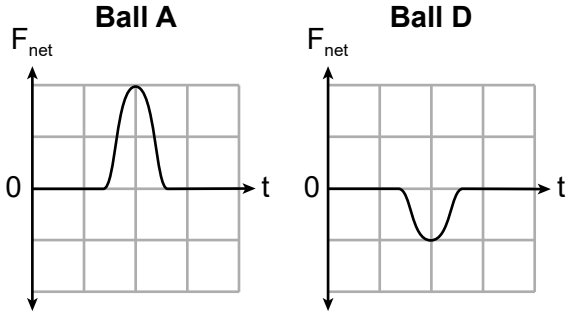


39 Which pair of graphs identifies the net force acting on each ball caused by this collision?

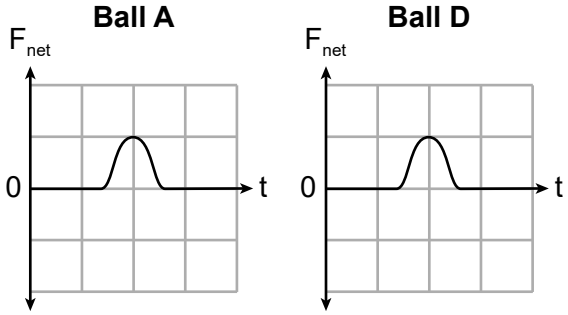


(1)

(3)



(2)

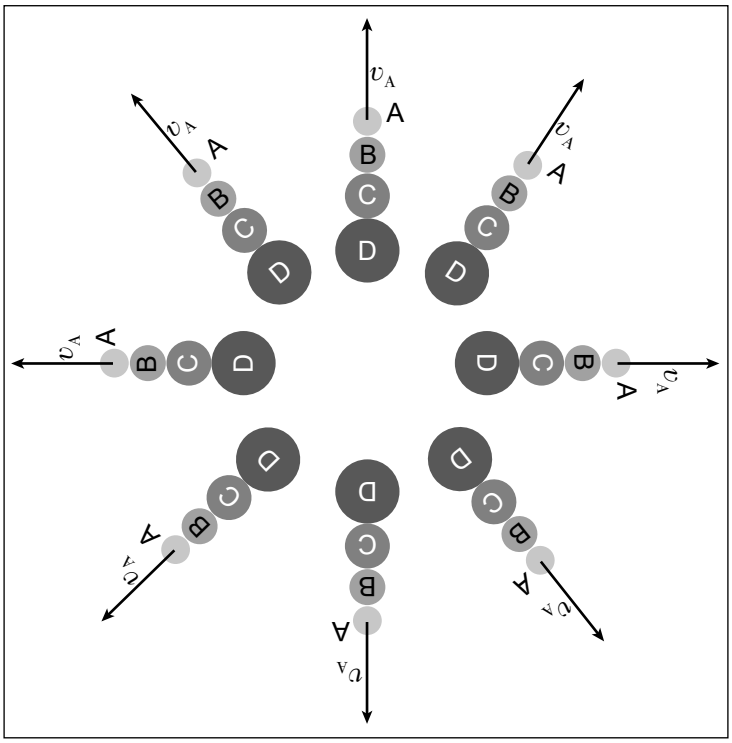


(4)

Scientists can have difficulty predicting information about supernova, such as when they will occur and the velocity of the ejected material. This is partially because the conditions required for a supernova are challenging to recreate in a laboratory setting.

Although supernova can be directly simulated at research facilities, expensive computers are required to quickly process large amounts and types of supernova data. A simpler simulation for high-school students would be to model multiple Astro Blasters to study the velocity of the outermost ejected material, as shown in Diagram 6. This simulation would have the balls fall toward the center, bounce off each other, and then rebound outward. The smallest balls would be propelled outward, like the outermost layers of a star during a supernova.

Diagram 6: Supernova Simulation with Astro Blasters



(Not drawn to scale)

40 In the absence of expensive computers only available at research facilities, using a simpler simulation of multiple Astro Blasters would still be a beneficial tool because it

(1) can precisely model the material in supernova to accurately predict the velocity of ejected material

(2) takes more time to change input variables to determine how they affect when supernova will occur

(3) can precisely model the conditions required for supernova to accurately predict when they will occur

(4) takes less time to change input variables to determine how they affect velocity of ejected material in supernova

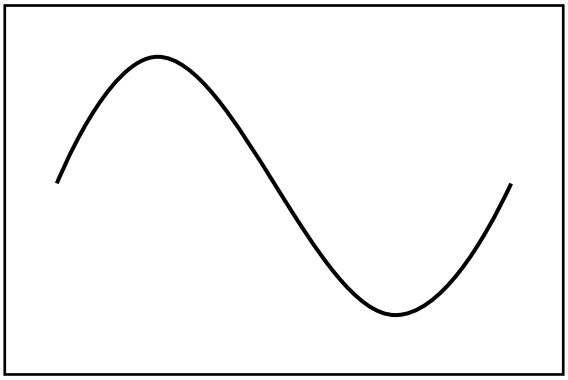
Base your answers to questions 41 through 45 on the information below and on your knowledge of Physical Science: Physics. Some questions may require the use of the ***2025 Edition Reference Tables for Physical Science: Physics***.

Voice Recognition Software

Voice recognition is widely used to simplify texting and control smart devices. Voice recognition technology uses a microphone to detect the human voice.

In the past, sound was only stored using analog methods on a physical medium (vinyl records, audio tapes). Diagram 1 shows one analog-processed sound wave.

Diagram 1: Analog-Processed Sound

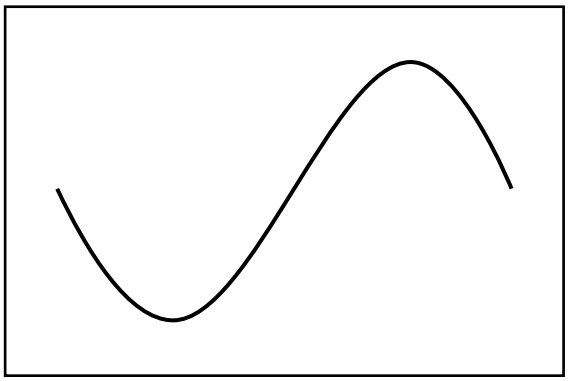


Presently, digital technologies store sound as a sequence of numerical values obtained through sampling, which can be placed on physical media (DVDs, CDs, or flash drives). The stored data are then interpreted by electronics to recreate the sound.

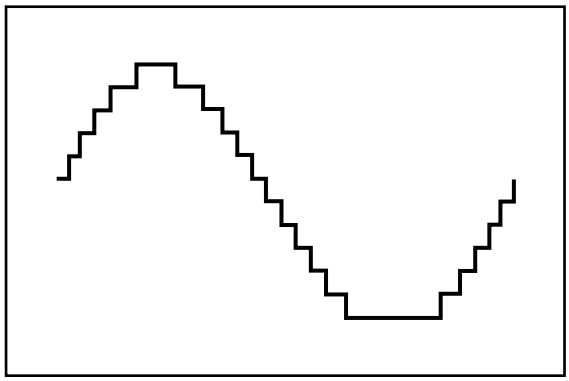
Voice recognition technology is often used to convert speech to text. In this application, the software samples the human voice and converts it to bits of digital data. This data is temporarily stored in memory, processed, and outputted as text.

During the processing phase, the software breaks speech down into tiny, recognizable parts called phonemes (vowel and consonant sounds). The order, combination, and context of these phonemes allows the software to distinguish your words, which may or may not be accurate.

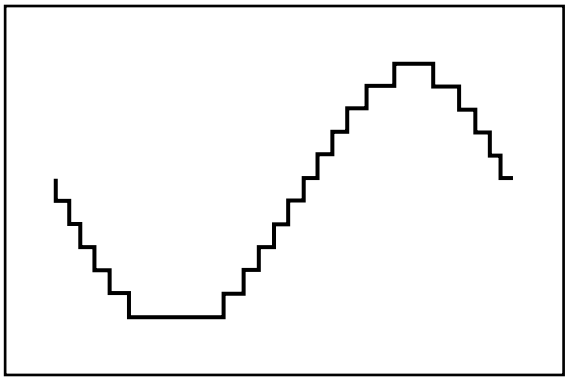
41 Which model best represents a digital reproduction of the analog-processed sound in Diagram 1?



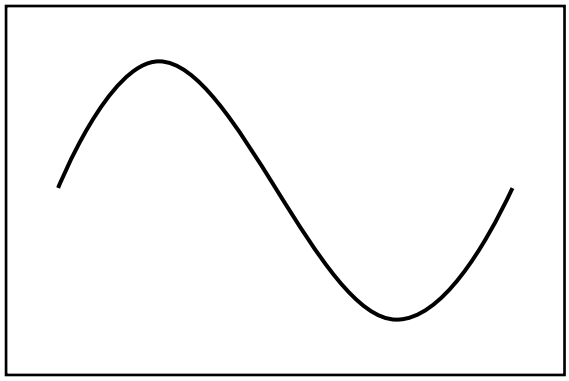
(1)



(3)



(2)

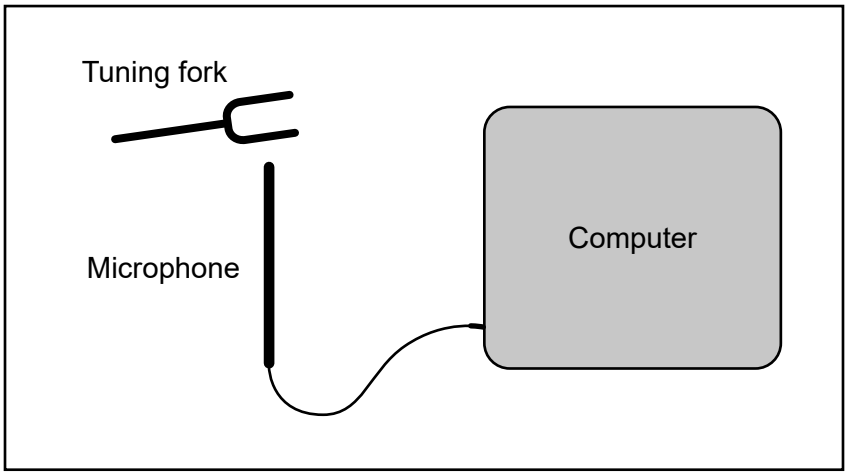


(4)

42 Describe **one** characteristic of voice recognition software that makes it a ***less*** reliable system to store sound data compared to analog methods. [1]

In an effort to learn more about voice recognition systems, students perform an experiment to digitally record a sound produced by a tuning fork. The experimental setup is shown in Diagram 2.

Diagram 2: Experimental Setup



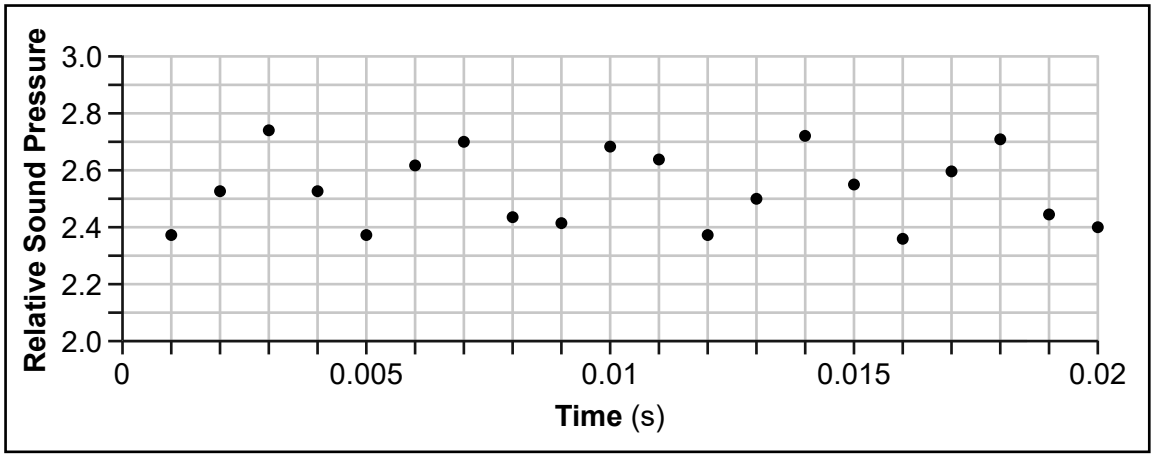
(Not drawn to scale)

43 Which row in the table below identifies the wave produced by the tuning fork?

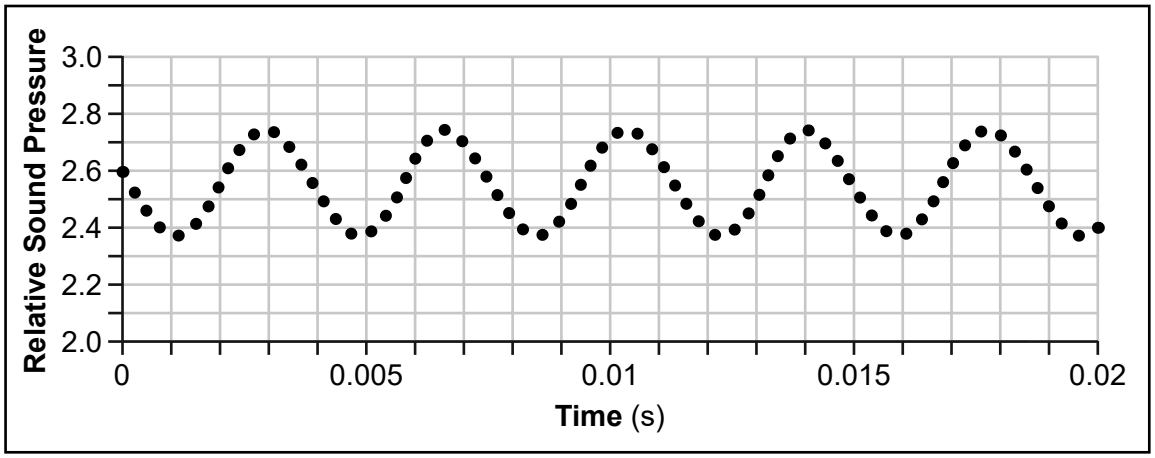
Row	Type of Wave	Wave Motion
(1)	Electromagnetic	Longitudinal
(2)	Electromagnetic	Transverse
(3)	Mechanical	Longitudinal
(4)	Mechanical	Transverse

As part of the investigation, the students collect data using various sampling rates. The computer's software generates relative sound pressure values as a ratio to a chosen baseline. Graph 1 and Graph 2 are obtained using the same tuning fork.

Graph 1: Tuning Fork Data for 0.001-second Sampling Time



Graph 2: Tuning Fork Data for 0.0002-second Sampling Time



44 The approximate frequency of the sound produced by the tuning fork is determined by which mathematical representation?

(1) $\frac{5 \text{ waves}}{0.019 \text{ s}}$

(2) $\frac{0.019 \text{ s}}{5 \text{ waves}}$

(3) $\frac{1 \text{ wave}}{0.002 \text{ s}}$

(4) $\frac{0.002 \text{ s}}{1 \text{ wave}}$

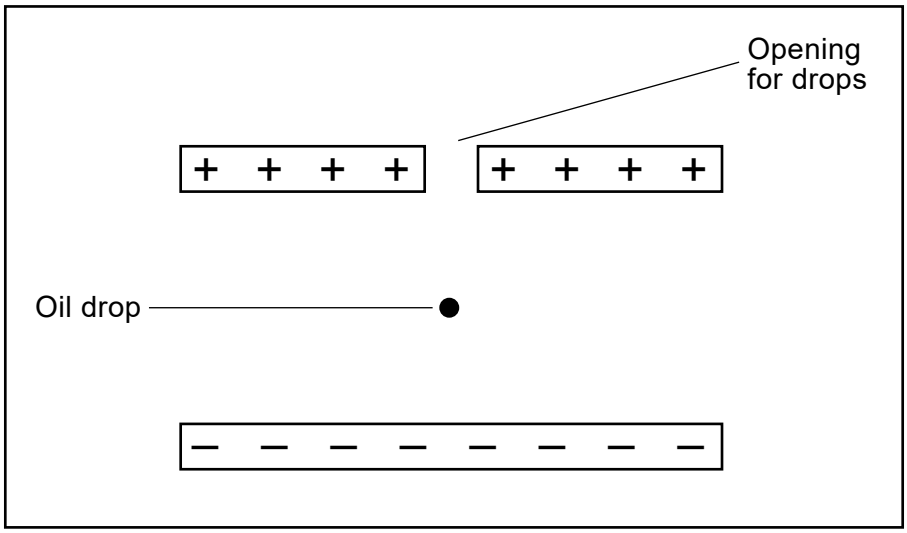
45 Based on the results of the tuning fork experiment, a student would like to determine which sampling rate in voice recognition software would improve the accuracy of the text displayed. Describe the evidence from *Graph 1* and *Graph 2* that can be used to evaluate this question. [1]

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

Charged Drops

For a class project, students took apart an inkjet printer to examine the functions of its components. After additional research, they discovered that a pair of charged parallel plates was important to the printer's operation. The teacher then presented a computer simulation of the Millikan oil drop experiment to the students. In this simulated experiment, shown in Diagram 1, charged oil drops were sprayed into a chamber. One drop was suspended motionless between two oppositely charged parallel plates as a result of electrostatic and gravitational forces acting on the drop.

Diagram 1: Millikan's Oil Drop Experiment Simulation



(Not drawn to scale)

46 Which row in the table below identifies the relative magnitude and direction of the electrostatic and gravitational forces acting on the oil drop in the experiment?

Row	Magnitude of Forces	Direction of Forces
(1)	$F_e = F_g$	Opposite
(2)	$F_e = F_g$	Same
(3)	$F_e > F_g$	Opposite
(4)	$F_e > F_g$	Same

47 Place a check mark (✓) in **one** box below to indicate the charge on the oil drop in *Diagram 1*. Justify your response using evidence from the information provided. [1]

☐ Negative

☐ Positive

☐ Neutral

Justification: _____

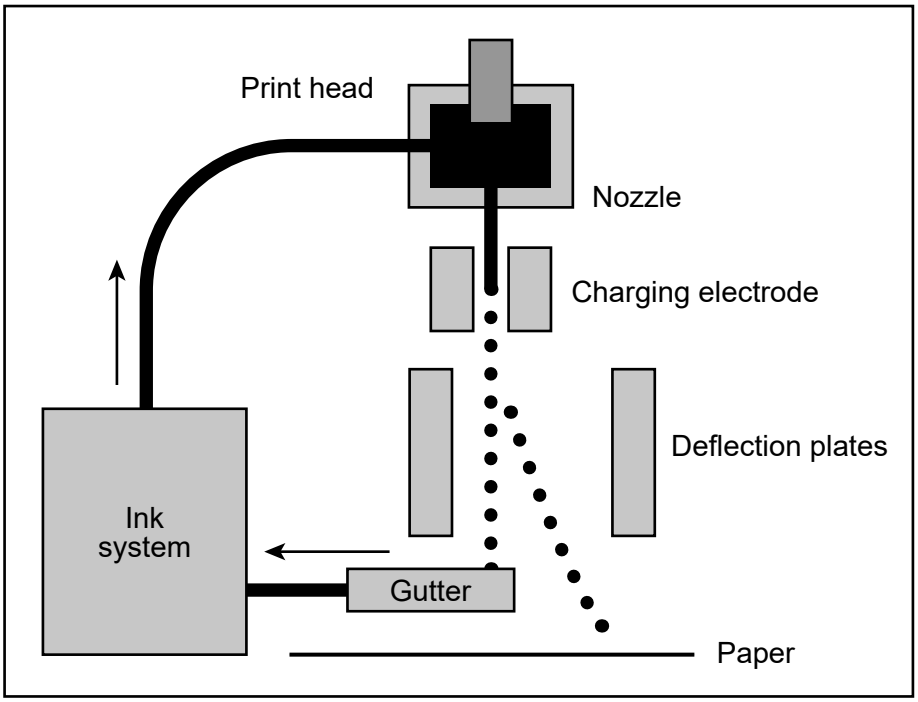
_____

48 The teacher adjusted the charges on the parallel plates in *Diagram 1*, causing the electric field strength between the plates to increase. Which row in the table describes the subsequent change in energies of the oil drop-Earth system due to this adjustment?

Row	**KE**	**PE_g**
(1)	Increases	Remains constant
(2)	Increases	Increases
(3)	Remains constant	Decreases
(4)	Decreases	Increases

The students researched the operation of an inkjet printer and gathered some data for a single ink drop. Similar to the Millikan experiment, the inkjet printer in Diagram 2 uses charged drops of ink that pass through a pair of deflection plates. This type of printer uses a nozzle to make a fine stream of tiny ink drops that receive a negative charge when passing through a charging electrode. Once charged, the drops can be selected from the stream using a pair of deflection plates to become part of letters and images on paper. Drops that are not selected fall into a gutter that collects the unused ink. Table 1 shows some information for a drop of ink.

Diagram 2: Inkjet Printer Components



(Not drawn to scale)

Table 1: Drop of Ink Data

Mass (kg)	**Charge** (C)	**Magnitude of Force Produced by Charged Deflection Plates** (N)
1.1×10^{-10}	-1.9×10^{-10}	8.8×10^{-5}

49 The magnitude of the electric field which causes the force experienced by the drop of ink in *Diagram 2* is

(1) 1.3×10^{-6} N/C
(2) 2.2×10^{-6} N/C
(3) 4.6×10^{5} N/C
(4) 8.0×10^{5} N/C

50 Based on the information provided, what is the magnitude of the acceleration of the drop of ink caused by the deflection plates in *Diagram 2*?

(1) 9.7×10^{-15} m/s^2
(2) 1.3×10^{-6} m/s^2
(3) 4.6×10^{5} m/s^2
(4) 8.0×10^{5} m/s^2

PHYSICAL SCIENCE: PHYSICS (NYSP12SLS)

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

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

Scoring Key: Multiple-Choice Questions

Examination	Date	Question Number	Scoring Key	Question Type	Credit	Weight
PS: Physics (NYSP12SLS)	June '26	**1**	2	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**3**	1	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**5**	1	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**6**	2	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**8**	3	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**9**	2	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**12**	2	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**14**	2	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**15**	1	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**16**	3	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**17**	1	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**19**	4	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**22**	1	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**23**	4	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**24**	3	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**27**	4	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**28**	4	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**30**	1	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**31**	2	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**33**	4	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**34**	3	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**36**	3	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**39**	1	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**40**	4	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**41**	3	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**43**	3	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**44**	1	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**46**	1	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**48**	2	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**49**	3	MC	1	1
PS: Physics (NYSP12SLS)	June '26	**50**	4	MC	1	1

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

Scoring Key: Constructed-Response Questions

Examination	Date	Question Number	Scoring Key	Question Type	Credit	Weight
PS: Physics (NYSP12SLS)	June '26	**2**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**4**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**7**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**10**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**11**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**13**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**18**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**20**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**21**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**25**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**26**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**29**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**32**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**35**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**37**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**38**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**42**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**45**	–	CR	1	1
PS: Physics (NYSP12SLS)	June '26	**47**	–	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: Physics (NYSP12SLS)** will be available on the Department's website at **https://www.nysedregents.org/ps-physics/** no later than June 26, 2026. Conversion charts provided for the previous administrations of the Physical Setting/Physics 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: PHYSICS (NYSP12SLS)

Wednesday, June 10, 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: Physics. 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.

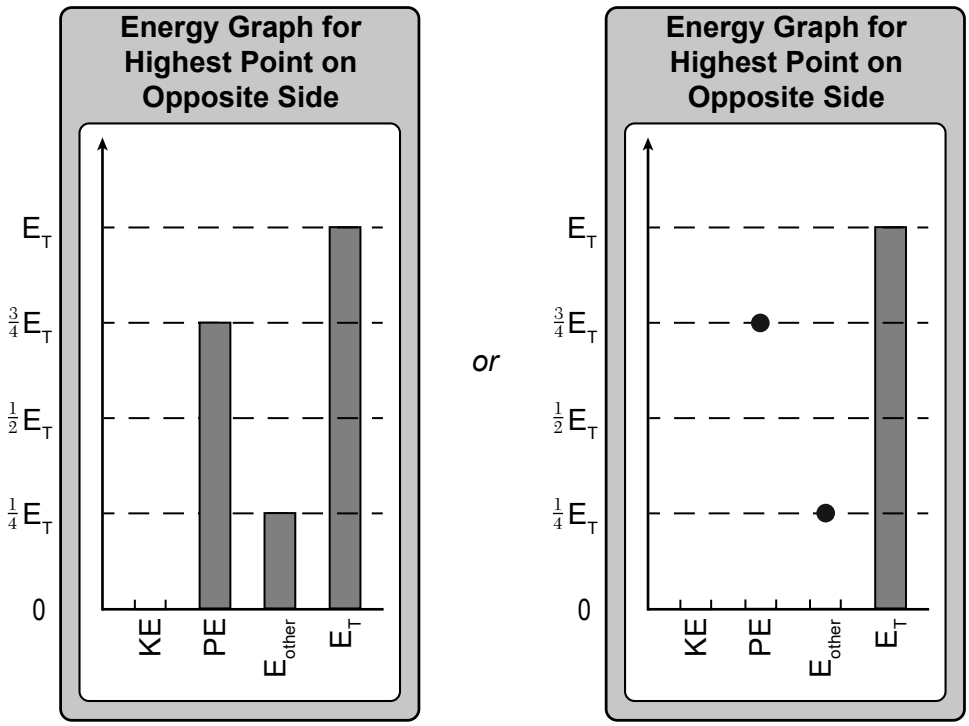
Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score.

The test item map on page 12 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 for 2.

2 [1] Allow 1 credit for a graph that shows that the sum of *PE* and E_{other} equals E_T, where *PE* is $\frac{3}{4}$ of E_T and E_{other} is $\frac{1}{4}$ of E_T.

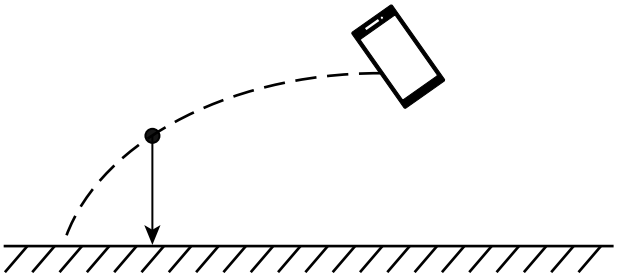
Examples of a 1-credit response:



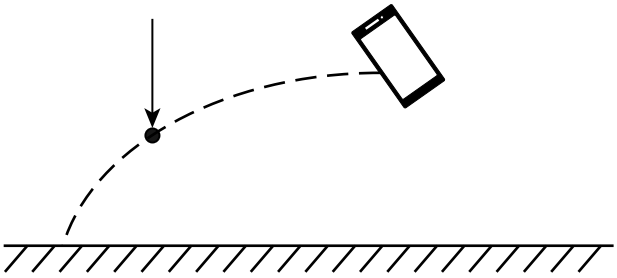
3 [1] Allow 1 credit for 1.

4 [1] Allow 1 credit for an arrow pointing directly downward *and* a net force of 1.5 N, *or* any value between 1.4 N and 1.5 N, inclusive. The arrow does not have to be on the dot.

Examples of a 1-credit response:



or



5 [1] Allow 1 credit for 1.

6 [1] Allow 1 credit for 2.

7 [1] Allow 1 credit for an algebraic relationship that uses $v = f\lambda$ with appropriate numerical values. Acceptable responses including, but are not limited to:

— $v = f\lambda$

$1560 = (7.5 \times 10^6)\lambda$

— $\lambda = \dfrac{1560 \text{ m/s}}{5.0 \times 10^6 \text{ Hz}}$

Note: Allow credit for the substitution of any frequency between 5.0×10^6 and 7.5×10^6, inclusive, and a substitution of 1560 for speed.

8 [1] Allow 1 credit for 3.

9 [1] Allow 1 credit for 2.

10 [1] Allow 1 credit for one or more mathematical relationships that determines the photon energy for a holmium laser is less than the photon energy for a pulsed dye laser. Acceptable responses include, but are not limited to:

— Holmium has a smaller frequency and $E_{photon} = hf$.

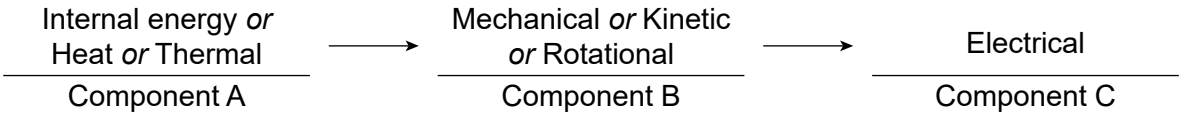
— As frequency increases, the energy increases.

— Holmium: $E_{photon} = hf = (6.63 \times 10^{-34})(1.43 \times 10^{14})$

Pulsed Dye: $E_{photon} = hf = (6.63 \times 10^{-34})(5.13 \times 10^{14})$

Note: Do *not* allow credit for a response that *only* gives the mathematical relationship $E = hf$.

11 [1] Allow 1 credit for the energies shown below.



12 [1] Allow 1 credit for 2.

13 [1] Allow 1 credit for indicating *three* correct choices, as shown below:

☐ Boiling point

☑ Mass

☑ Temperature change

☐ Melting point

☑ Specific heat capacity

☐ Color

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

14 [1] Allow 1 credit for 2.

15 [1] Allow 1 credit for 1.

16 [1] Allow 1 credit for 3.

17 [1] Allow 1 credit for 1.

18 [1] Allow 1 credit for a correct magnitude of 1.06×10^4 *or* any answer between 1.0×10^4 and 1.1×10^4, inclusive, *and* indicating Up.

19 [1] Allow 1 credit for 4.

20 [1] Allow 1 credit for indicating Helmet 3 *and* an appropriate explanation. Acceptable responses include, but are not limited to:

- The head in Helmet 3 has the smallest maximum acceleration in Table 2. The force is reduced along with the acceleration based upon $F_{net} = ma$.
- It has the smallest maximum force because $F_{net} = ma$, and it has the smallest acceleration.
- $F_{net} = ma$, and smallest a is produced by the smallest F_{net}.
- Newton's 2nd Law, F_{net}, is directly related to a.
- The smallest maximum acceleration results from the smallest maximum force if the masses are the same.

Note: Do *not* allow credit for a response that *only* gives the mathematical relationship $F_{net} = ma$.

21 [1] Allow 1 credit for appropriate evidence *and* a correct description. Acceptable responses include, but are not limited to:

Evidence of relative motion:

- The Tadpole Galaxy spectrum is shifted (red shift).
- The wavelengths observed from the Tadpole Galaxy are different than the wavelengths emitted by the gas emission tube.
- The wavelength for each spectral line is shorter using the gas emission tube than the wavelength for the corresponding spectral line observed from the galaxy.
- The Tadpole Galaxy exhibits a Doppler shift.

Description of relative motion:

- The Tadpole Galaxy is moving away from Earth.
- The distance between Earth and the Tadpole Galaxy is increasing.

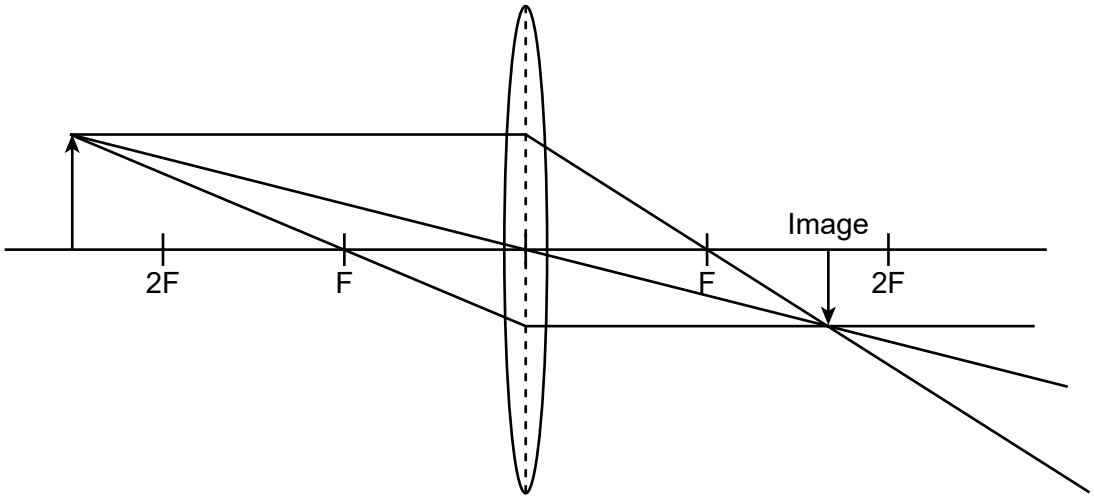
22 [1] Allow 1 credit for 1.

23 [1] Allow 1 credit for 4.

24 [1] Allow 1 credit for 3.

25 [1] Allow 1 credit for a correctly constructed ray diagram that shows the image inverted *and* located between F and 2F.

Example of a 1-credit response:



Note: Students *only* have to draw two rays *and* an image arrow for credit.

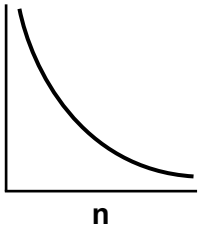
26 [1] Allow 1 credit for indicating Refute *and* an appropriate justification. Acceptable responses include, but are not limited to:

Justification:

— $n = \frac{c}{v}$: as n increases, v decreases.

— As the index of refraction increases, the speed of light decreases.

— Any example using $n = \frac{c}{v}$ *or* $\frac{n_2}{n_1} = \frac{v_1}{v_2}$ where students substituted numbers for n and solved for v to show n and v are inversely proportional.

— 

Note: Students can indicate increase/decrease with arrows. Use of the terms "denser" or "optically denser" as terms for index of refraction are acceptable.

Do *not* accept a response that *only* gives the mathematical relationship $n = \frac{c}{v}$.

27 [1] Allow 1 credit for 4.

28 [1] Allow 1 credit for 4.

29 [1] Allow 1 credit for indicating Refute *and* an appropriate justification. Acceptable responses include, but are not limited to:

— Neither network will cause ionization of elements commonly found in the human body because the maximum photon energy for each network is less than the ionization energy of all elements.

— The energy for each network is too small to cause ionization of elements commonly found in the human body that could cause cancer.

Note: Do *not* accept the conclusions from the National Cancer Institute in the article as justification.

30 [1] Allow 1 credit for 1.

31 [1] Allow 1 credit for 2.

32 [1] Allow 1 credit for indicating Refute *and* an appropriate justification that refers to the relationship between voltage and current, *and* a constant resistance. Acceptable responses include, but are not limited to:

— When resistance is kept constant, both tables show that current and potential difference are proportional.

— Both circuits follow Ohm's law because potential difference divided by current yields the resistance that is shown in Table 2 and Table 3.

— $V = IR$ is valid for both tables.

33 [1] Allow 1 credit for 4.

34 [1] Allow 1 credit for 3.

35 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— LED bulbs contain heavy metals and must be recycled.

— The initial cost of an LED bulb is greater than that of an incandescent bulb.

— The LED bulb in Diagram 5 is non-dimmable and the incandescent bulb is dimmable.

— LED bulbs contain toxic metals like lead and should be recycled.

36 [1] Allow 1 credit for 3.

37 [1] Allow 1 credit for indicating Refute *and* an appropriate justification.
Acceptable responses include, but are not limited to:

— $v_f = \sqrt{2gh}$ and g and h are the same for both balls.

— The balls are in free fall so their speeds change at the same rate.

— They both accelerate at 9.8 m/s^2.

— They both experience the same acceleration due to gravity.

— The mass of the object does not affect this motion.

38 [1] Allow 1 credit for indicating Support *and* an appropriate mathematical representation. Acceptable responses include, but are not limited to:

— $m_A v_A + m_D v_D = m_A v'_A + m_D v'_D$

$(0.0038\text{kg})(-3.13\frac{\text{m}}{\text{s}}) + (0.0627\text{kg})(+2.57\frac{\text{m}}{\text{s}}) = (0.0038\text{kg})(+10.1\frac{\text{m}}{\text{s}}) + (0.0627\text{kg})(+1.77\frac{\text{m}}{\text{s}})$

$0.15\text{kg}\bullet\frac{\text{m}}{\text{s}} = 0.15\text{kg}\bullet\frac{\text{m}}{\text{s}}$

— $\Delta p_1 = -\Delta p_2$

$m_1\Delta v_1 = -m_2\Delta v_2$

$.05 = .05$

— $p = mv$

$p_{initial} = (0.0627)(2.57) + (0.0038)(-3.13) = 0.149$

$p_{final} = (0.0627)(1.77) + (0.0038)(10.1) = 0.149$

or

Allow 1 credit for indicating Refute *and* an approriate mathematical representation that results in momentum ***not*** being conserved due to significant digits.

— $p_{initial} = mv = 0.149245$

$p_{final} = mv = 0.149359$

Note: Equations are *not* required.

39 [1] Allow 1 credit for 1.

40 [1] Allow 1 credit for 4.

41 [1] Allow 1 credit for 3.

42 [1] Allow 1 credit for providing a disadvantage. Acceptable responses include, but are not limited to:

— Digital processed sounds have less information than the original sound.

— Voice recognition software often misinterprets the spoken words.

— Text displayed may not be accurate.

— Memory storage is limited.

— Text displayed may be slow due to processing speeds.

43 [1] Allow 1 credit for 3.

44 [1] Allow 1 credit for 1.

45 [1] Allow 1 credit for describing evidence from Graph 1 and Graph 2 that addresses accuracy. Acceptable responses include, but are not limited to:

— Decreasing the time between samples increases the number of data points collected, which will improve the accuracy of the text.

— Increasing the sampling rate increases the number of data points and improves accuracy.

— Graph 2 has more data points, which is more accurate.

— Graph 1 has more gaps in the data and is less accurate.

— Graph 2 resembles a wave more accurately.

46 [1] Allow 1 credit for 1.

47 [1] Allow 1 credit for indicating Negative *and* an appropriate justification. Acceptable responses include, but are not limited to:

— The negatively charged oil drop will be attracted to the positively charged plate and repelled from the negatively charged plate.

— The oil drop must be attracted to the top positively charged plate. Therefore, the oil drop is negatively charged.

— The negatively charged plate repels the oil drop upward.

— The electrostatic force is opposite the downward gravitational force.

48 [1] Allow 1 credit for 2.

49 [1] Allow 1 credit for 3.

50 [1] Allow 1 credit for 4.

The *Chart for Determining the Final Examination Score for the June 2026 Regents Examination in Physical Science: Physics* 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: Physics Test Item Map to the Standards

Question	Type	Points	Performance Expectation
1	Multiple Choice	1	HS-PS3-2
2	Constructed Response	1	HS-PS3-2
3	Multiple Choice	1	HS-PS2-1
4	Constructed Response	1	HS-PS2-1
5	Multiple Choice	1	HS-PS2-1
6	Multiple Choice	1	HS-PS4-5
7	Constructed Response	1	HS-PS4-1
8	Multiple Choice	1	HS-PS4-1
9	Multiple Choice	1	HS-PS4-3
10	Constructed Response	1	HS-PS4-1
11	Constructed Response	1	HS-PS3-3
12	Multiple Choice	1	HS-PS3-3
13	Constructed Response	1	HS-PS3-4
14	Multiple Choice	1	HS-PS3-4
15	Multiple Choice	1	HS-ETS1-2
16	Multiple Choice	1	HS-PS3-3
17	Multiple Choice	1	HS-PS2-3
18	Constructed Response	1	HS-PS2-1
19	Multiple Choice	1	HS-PS3-2
20	Constructed Response	1	HS-PS2-3
21	Constructed Response	1	HS-ESS1-2
22	Multiple Choice	1	HS-PS4-1
23	Multiple Choice	1	HS-PS1-8
24	Multiple Choice	1	HS-PS1-8
25	Constructed Response	1	HS-PS4-6
26	Constructed Response	1	HS-PS4-1
27	Multiple Choice	1	HS-PS3-3
28	Multiple Choice	1	HS-PS4-6
29	Constructed Response	1	HS-PS4-4
30	Multiple Choice	1	HS-PS2-4
31	Multiple Choice	1	HS-PS4-1
32	Constructed Response	1	HS-PS3-6
33	Multiple Choice	1	HS-PS3-6
34	Multiple Choice	1	HS-PS3-6
35	Constructed Response	1	HS-ETS1-1
36	Multiple Choice	1	HS-PS3-1
37	Constructed Response	1	HS-PS2-1
38	Constructed Response	1	HS-PS2-2
39	Multiple Choice	1	HS-PS2-1
40	Multiple Choice	1	HS-ETS1-3
41	Multiple Choice	1	HS-PS4-2
42	Constructed Response	1	HS-PS4-2
43	Multiple Choice	1	HS-PS4-1
44	Multiple Choice	1	HS-PS4-1
45	Constructed Response	1	HS-PS4-2
46	Multiple Choice	1	HS-PS2-4
47	Constructed Response	1	HS-PS2-4
48	Multiple Choice	1	HS-PS3-5
49	Multiple Choice	1	HS-PS2-4
50	Multiple Choice	1	HS-PS2-1

Regents Examination in Physical Science: Physics (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	**98**	5
48	**96**	5
47	**95**	5
46	**93**	5
45	**92**	5
44	**91**	5
43	**89**	5
42	**88**	5
41	**87**	5
40	**86**	5
39	**85**	5
38	**84**	4
37	**83**	4
36	**82**	4
35	**81**	4
34	**80**	4

Raw Score	Scale Score	Performance Level
33	**79**	4
32	**78**	4
31	**77**	3
30	**75**	3
29	**74**	3
28	**73**	3
27	**71**	3
26	**70**	3
25	**68**	3
24	**67**	3
23	**65**	3
22	**63**	2
21	**61**	2
20	**59**	2
19	**57**	2
18	**55**	2
17	**53**	1

Raw Score	Scale Score	Performance Level
16	**50**	1
15	**48**	1
14	**45**	1
13	**43**	1
12	**40**	1
11	**37**	1
10	**34**	1
9	**31**	1
8	**28**	1
7	**24**	1
6	**21**	1
5	**18**	1
4	**14**	1
3	**11**	1
2	**7**	1
1	**4**	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: Physics (NYSP12SLS).