ETS PRAXIS

The *PRAXIS*® Study Companion

Physics (5266)

ETS Professional Educator PROGRAMS

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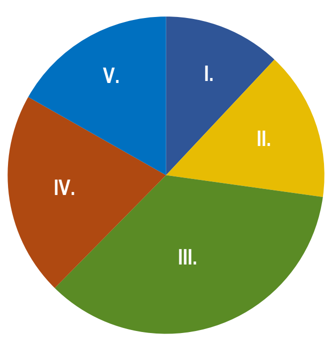
Table of Contents

Physics (5266)

Test at a Glance

The *Praxis*® Physics test is designed to measure knowledge and competencies important for safe and effective beginning practice as a teacher of physics. Test takers have typically completed a bachelor's degree program with appropriate coursework in physics and education.

Test Name	Physics
Test Code	5266
Time	2 hours 30 minutes
Number of Questions	125 selected-response questions
Format	The test consists of a variety of selected-response questions, where you select one or more answer choices and other types of questions. You can review the possible question types in Understanding Question Types.
Test Delivery	Computer Delivered



Content Categories	Approximate Number of Questions	Approximate Percentage of Examination
I. Nature and Impact of Science and Engineering	15	12%
II. Principles and Models of Matter and Energy	19	15%
III. Mechanics	44	35%
IV. Electricity and Magnetism	26	21%
V. Waves	21	17%

Half or more of the questions integrate a Science and Engineering Practice, and approximately one-quarter to one-third of the questions assess content applied to a Task of Teaching of Science.

About The Test

The Physics test content topics span the physics curriculum, including content related to (I) Nature and Impact of Science and Engineering, (II) Principles and Models of Matter and Energy, (III) Mechanics, (IV) Electricity and Magnetism, and (V) Waves.

The assessment is designed and developed through work with practicing physics teachers, teacher educators, and higher education physics specialists to reflect the science knowledge teachers need to teach the physics curriculum and to reflect state and national standards, including the National Science Teaching Association Preparation Standards for physics. Content and practices measured reflect the Disciplinary Core Ideas (DCIs) and Science and Engineering Practices (SEPs) established by the National Research Council in A Framework for K-12 Science Education and included in the Next Generation Science Standards.

The 125 selected-response questions measure concepts, terms, phenomena, methods, applications, data analysis, and problem solving in science. A full list of the topics covered is provided in Content Topics.

Test takers do not need to use a calculator in taking this test. The periodic table of the elements is available as a Help screen, along with a table of information that presents various physical constants and a few conversion factors among SI units. Whenever necessary, additional values of physical constants are included with the text of a question.

Test takers can expect half or more of the questions on the test to integrate physics content knowledge with one or more of the SEPs, listed under Science and Engineering Practices.

Test takers will also find that approximately one-quarter to one-third of the percent of questions call for application of physics content and processes within a teaching scenario or an instructional task. Such questions—designed to measure applications of physics knowledge to the kinds of decisions and evaluations a teacher must make during work with students, curriculum, and instruction—situate physics content questions in tasks critical for teaching. Below, in Tasks of Teaching Science, is a list of tasks that are a routine part of physics instruction. These tasks, identified based on research on science instruction, have been confirmed by a national committee of teachers and teacher educators as important for effective teaching of secondary science.

This test may contain some questions that will not count toward your score.

Content Topics

This list details the topics that may be included on the test. All test questions cover one or more of these topics.

Discussion Questions

In this section, discussion questions are open-ended questions or statements intended to help test your knowledge of fundamental concepts and your ability to apply those concepts to classroom or real-world situations. We do **not** provide answers for the discussion questions but thinking about the answers will help improve your understanding of fundamental concepts and may help you answer a broad range of questions on the test. Most of the questions require you to combine several pieces of knowledge to formulate an integrated understanding and response. They are written to help you gain increased understanding and facility with the test's subject matter. You may want to discuss these questions with a teacher or mentor.

I. Nature and Impact of Science and Engineering

A. Nature of Science

1. Nature of scientific knowledge
   a. Involves a variety of investigation methods
   b. Based on experimental evidence that is reproducible
   c. Major concepts develop and change over time in light of new evidence
   d. Constructing and testing hypotheses
   e. Explain natural phenomena by using existing models and theories
   f. Developing, using, evaluating, and revising models
   g. Involves process skills, including observing, categorizing, comparing, generalizing, inferring, concluding, and communicating
2. Experimental design, data collection, and analysis
   a. Standard units of measurement, dimensional analysis, and unit conversion
   b. Scientific notation
   c. Vector and scalar quantities including vector addition (graphical and mathematical)
   d. Experimental design, including developing and using models, identifying variables, planning data collection, and supporting the testing of the hypothesis
   e. Processing data using mathematical and computational thinking, organizing data, and reporting data
   f. Error analysis, including accuracy and precision, means, and percent error
   g. Identifying sources and effects of error
   h. Interpreting and drawing conclusions from data
3. Laboratory procedures
   a. Appropriate preparation, use, storage, and disposal of materials

   b. Appropriate use of laboratory and measurement equipment, including selection, calibration, and maintenance
   c. Safety procedures and precautions for the laboratory

B. Science, Engineering, Technology, Society, and the Environment

1. Interdependence of science, engineering, and technology
   a. Engineering advances lead to important discoveries in science (e.g., telescopes, lasers, super collider)
   b. Science and technology drive each other forward (e.g., in communications with wireless devices, in medicine with imaging, in transportation with superconductors and magnetic levitation)
   c. Ethics, values, and social and cultural circumstances impact how scientific advances are utilized
2. Application of the engineering design process to the physics classroom
   a. Defining problems, including identifying the criteria and the constraints
   b. Designing solutions, including proposing and evaluating in terms of criteria, constraints, and limitations
   c. Optimizing the design, including systematic modification and refinement
3. Real-world environmental and societal problems impacted by technology or subject to solution through engineering design
   a. Environmental (e.g., climate change, ozone layer depletion, noise pollution)
   b. Sustainability (e.g., production, reduction, reusing, and recycling of consumer goods)
   c. Energy (e.g., renewable and nonrenewable energy resources)

Discussion Questions: Nature and Impact of Science and Engineering

- Be able to present a scientific argument with supporting data.
- Be able to explain the difference between a hypothesis and a theory.
- Be able to determine and control the parameters of measuring devices.
- Be familiar with expressing numbers in scientific notation.
- Be proficient with the use of significant figures.
- Be able to determine the number of significant digits from various measurement instruments.
- Be able to develop mathematical and graphical representations of experimental data.
- Be able to explain what is meant by the greenhouse effect.
- Be able to identify the environmental reasons underlying the development of new refrigerants.
- Be able to describe the procedures to be followed when discarding consumer products.

- Be able to identify the factors that must be taken into consideration when discarding nuclear waste.
- Be familiar with the applications of lasers in daily life.

II. Principles and Models of Matter and Energy

A. Conceptual Understanding of Atomic and Nuclear Structure and Processes

1. Atomic and subatomic structures
   a. Atomic components (protons, neutrons, and electrons)
   b. Bohr model
2. Relationship between atomic spectra and electron energy levels
   a. Electron energy transitions in atoms
   b. Absorption and emission spectra
3. Characteristics and effects of nuclear processes
   a. Radioactivity and radioactive decay processes, including half-life
   b. Alpha particles, beta particles, and gamma radiation
   c. Fission and fusion (conservation of mass energy, charge, and nucleons)
4. Basic quantum physics
   a. Wave-particle duality of matter and electromagnetic energy
   b. Photoelectric effect

B. Relationships Between Energy and Matter

1. Temperature, forms of energy, heating, and heat capacity
   a. Temperature as a measure of average kinetic energy
   b. Distinguish between temperature, heating, and thermal energy
   c. Heat capacity, specific heat, and latent heat
   d. Thermal mechanisms of energy transfer (conduction, convection, radiation)
   e. Meaning and use of different temperature scales (Kelvin, Celsius, Fahrenheit)
2. Conceptual relationships of thermodynamics to physical processes
   a. Conservation of energy for thermal processes (first law)
   b. Entropy does not decrease in a closed system (second law)
   c. Absolute zero (third law)
   d. Thermal equilibrium (zeroth law)

Discussion Questions: Principles and Models of Matter and Energy

- Be familiar with the assumptions of the Bohr model of the atom.
- Be familiar with the Bohr expression for the frequency of the light emitted or absorbed when an electron makes a transition between two energy levels.
- Be able to distinguish between nuclear fission and nuclear fusion.
- Be able to explain why energy is released during the fusion of two deuterium nuclei.

- Be able to determine the amount of radioactive substance left after a specified number of half-lives have elapsed.
- Be able to identify the daughter nucleus that results from the alpha decay of a nucleus of an atom.
- Be able to describe the relationship between the frequency of light incident on a metal and the energy of the ejected photoelectrons.
- Be able to describe the difference between heat and temperature.
- Be able to explain how the concepts of mass and energy are integrated.
- Be able to determine the amount of thermal energy needed for a given amount of ice at zero degrees Celsius to change to a gaseous state at 100 degrees Celsius.
- Be able to explain why metal feels cooler to the touch than wood at the same temperature.
- Be able to make calculations involving the ideal gas law.
- Be able to calculate the work done during the isothermal expansion of an ideal gas.
- Be able to describe the relationship between internal energy and the first law of thermodynamics.
- Be able to describe the relationship between entropy and the second law of thermodynamics.

III. Mechanics

A. Basic Concepts and Applications of Forces and Motion

1. Description of motion
   a. Properties of scalar quantities (e.g., distance, mass, speed, time, energy)
   b. Properties of vector quantities (e.g., displacement, velocity, acceleration, force, momentum)
   c. Linear motion
   d. Two-dimensional motion (e.g., projectile motion)
   e. Graphical analysis of motion
   f. Circular motion
   g. Simple harmonic motion
2. Frames of reference and their applications
   a. Frames of reference (coordinate systems, inertial reference frames)
   b. Relative velocity
3. Newton's laws of motion
   a. First law (mass, inertia, inertial reference frame)
   b. Second law (net force, mass, acceleration)
   c. Third law
4. Gravitation
   a. Newton's law of universal gravitation
   b. Satellites and orbital motion
   c. Acceleration due to gravity and gravitational field
5. Weight, mass, and density
   a. Relationship between weight and mass

   b. Relationship between density and mass
6. Kepler's laws of orbital motion
   a. First law (elliptical orbits)
   b. Second law (equal areas in equal times)
   c. Third law (relationship between orbital period and mean orbital radius)
7. Basic fluid mechanics
   a. Fluid statics (buoyancy, density, pressure)
   b. Fluid dynamics (Bernoulli's principle and the continuity equation)

B. Advanced Concepts and Applications in Mechanics

1. Friction
   a. Normal force and frictional force
   b. Coefficients of static and kinetic friction Mechanisms of evolution
2. Uniform circular motion
   a. Net force directed toward the center
   b. Centripetal acceleration
3. Harmonic motion
   a. Restoring force (Hooke's law)
   b. Period, frequency, amplitude
   c. Pendulums and spring oscillation
4. Energy
   a. Mechanical energy (kinetic and potential)
   b. Conservation of energy, including energy transfers and transformations
   c. Work and power
5. Linear momentum and impulse
   a. Center of mass
   b. Linear momentum and its conservation
   c. Change in momentum (impulse)
6. Rotational motion
   a. Angular displacement, velocity, and acceleration
   b. Angular momentum and conservation of angular momentum
   c. Rotational inertia (moment of inertia)
   d. Torque
   e. Static equilibrium
7. Collisions
   a. Elastic and inelastic collisions
   b. Conservation of momentum
   c. Conservation of mechanical energy
   d. Collisions in one and two dimensions

Discussion Questions: Mechanics

- Be able to determine distance, displacement, average speed, average velocity, and average acceleration for an object in motion.
- Be able to determine the magnitude and direction of the resultant of two vectors.
- Be able to calculate the magnitude and direction of the vector from the cross product of two vectors A and B.
- Be able to describe in graphical form the position, velocity, and acceleration of an object that is thrown vertically upward and returns to its starting point.

- Be able to determine displacement, distance, velocity, and acceleration from graphs of position versus time, velocity versus time, and acceleration versus time.
- Be able to calculate the horizontal and vertical components of velocity for a projectile.
- Be able to identify, compare, and sum the forces acting on a block that is accelerating or moving at constant velocity on a rough horizontal surface, including the reaction forces.
- Be able to explain why gymnasts performing on a balance beam raise their arms to regain their balance.
- Be familiar with the coefficients of static, kinetic, and rolling friction.
- Be able to determine the coefficient of kinetic friction for a box sliding down an inclined plane at constant speed.
- Be able to calculate the centripetal force acting on an object moving at constant speed in a circular path.
- Be able to calculate the period and frequency of a simple pendulum or a spring in simple harmonic motion.
- Be able to plot the potential energy, kinetic energy, and total mechanical energy of a linear harmonic oscillator as a function of position.
- Be able to describe the changes that occur to the moment of inertia, angular momentum, and rotational kinetic energy of a student who extends their arms outward from an initial downward position while rotating about a vertical axis on a frictionless platform.
- Be able to apply the principles of conservation of momentum and energy to predict the results of collisions between objects in one or two dimensions.
- Be able to use the law of conservation of energy to predict the energy transformations of a bungee-cord jumper.
- Be able to calculate the gravitational force between two masses separated by a certain distance.
- Be able to determine the acceleration and period of a satellite in circular orbit about Earth.
- Be able to describe the relationship between a planet's period about the Sun and its mean distance from the Sun.
- Be able to calculate the buoyant force acting on an object.

IV. Electricity and Magnetism

A. Electricity

1. Electrostatics
   a. Electric charge and induced charge
   b. Conservation of charge, including charge transfer
   c. Coulomb's law and point charges
   d. Electric forces and electric fields
   e. Electric potential, energy, and potential difference
2. Conductors and insulators
   a. Electrical properties
   b. Material examples
3. Properties and relationships involving electric current and capacitance

   a. Current, resistance, potential difference, and resistivity
   b. Ohm's law
   c. Energy and power
   d. Direct current and alternating current
   e. Capacitance and capacitors
4. Analysis of simple and combination circuits
   a. Series, parallel, and combination circuits
   b. Ohm's law
   c. Equivalent resistance and capacitance
   d. Kirchhoff's laws
   e. Power
5. Generation of electrical potential
   a. Sources (Batteries, photocells, generators)
   b. Electromotive force (EMF)

B. Magnetism

1. Magnetic fields, forces, and materials
   a. Magnetic field and magnetic flux
   b. Magnetic force
   c. Magnets (bar magnets and poles, permanent magnets, electromagnets)
   d. Transformers, motors, and generators
   e. Direction of fields and forces (right-hand rules)
   f. Magnetic field generated by steady current (Biot-Savart law)
   g. Force between current-carrying wires
   h. Force on moving charges in magnetic fields (Lorentz force)
2. Basic conceptual relationships between electric fields and magnetic fields
   a. Magnetic field caused by changing electric field (Ampere's law)
   b. Direction of induced current caused by changing magnetic field (Lenz's law)
   c. Induced EMF (Faraday's law of induction)
   d. EMF (due to motion of conductor)

Discussion Questions: Electricity and Magnetism

- Be able to calculate the electrostatic force between two point charges separated by a certain distance.
- Be able to determine the electric field and electric potential at a point midway between two point charges.
- Be able to determine the electric potential energy of a simple configuration of point charges.
- Be able to calculate the power dissipated by a resistor in a circuit.
- Be able to describe how the resistivity of a wire depends on its length and cross-sectional area.
- Be able to calculate the equivalent capacitance of two capacitors connected in series or two capacitors connected in parallel.
- Be able to calculate the capacitance of a parallel-plate capacitor.
- Be familiar with the effect of a dielectric on the capacitance of a parallel-plate capacitor.
- Be able to calculate the equivalent resistance of two resistors

connected in series or two resistors connected in parallel.

- Be able to calculate the current in a circuit consisting of series and parallel combinations of resistors.
- Be able to describe how to measure the resistance of a resistor in a circuit using a voltmeter and an ammeter.
- Be able to determine the magnitude and direction of the electric field needed to allow an electron to travel eastward undeflected in Earth's magnetic field.
- Be able to determine the magnitude and direction of the resultant magnetic field at a point midway between two long, parallel wires carrying currents in opposite directions and separated by a certain distance.
- Be able to determine the magnitudes and directions of the magnetic forces on two long, parallel current-carrying wires.
- Be able to determine the direction of the current induced in a metal rod that is aligned east-west and is dropped in Earth's magnetic field.

V. Waves

A. Conceptual Understanding of Wave Characteristics and Phenomena

1. Types of waves and their characteristics
   a. Transverse and longitudinal
   b. Mechanical and electromagnetic
   c. Relationships between amplitude, wavelength, frequency, period, speed of propagation, and energy
   d. Superposition and phase
   e. Intensity
   f. Spherical and plane waves
   g. Standing waves
2. Wave phenomena
   a. Reflection, refraction (including Snell's law), and total internal reflection
   b. Diffraction, interference and Young's double-slit interference experiment
   c. Polarization
   d. Scattering, absorption, dispersion, and transmission
   e. Resonance and natural frequencies, harmonics
   f. Doppler effect (moving source or observer)

B. Electromagnetic Waves, Sound, and Geometric Optics

1. Electromagnetic waves and the electromagnetic spectrum
   a. Electromagnetic waves (electric and magnetic fields, speed of light, energy)
   b. Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, x-rays, gamma rays)
   c. The visible spectrum (red, orange, yellow, green, blue, violet)
   d. Applications of the Doppler effect involving electromagnetic waves

2. Sound
   a. Compression waves
   b. Speed of sound (sonic boom and sound barrier)
   c. Pitch (frequency) and loudness (intensity)
   d. Beats
   e. Resonance (open and closed pipes; strings)
   f. Applications of Doppler effect involving sound
3. Geometric optics
   a. Ray tracing
   b. Focal point, image distance, image size and magnification, real versus virtual image, image orientation
   c. Lenses (converging and diverging)
   d. Mirrors (plane, convex, concave)
   e. Simple instruments (magnifying glass, telescope, microscope, prisms)

Discussion questions: Waves

- Be able to explain why the sky appears blue.
- Be able to explain why colors are observed when sunlight falls on a soap bubble or an oil slick.
- Be able to calculate the fundamental frequency and harmonics of an organ pipe that is closed at one end.
- Be familiar with the procedures for ray tracing.
- Be able to locate and describe the image formed when an object is placed 50 centimeters in front of a thin converging lens of focal length 20 centimeters.

Science and Engineering Practices

The SEPs represent eight practices that scientists and engineers—and students and teachers—use to investigate the world and to design and build systems. Many test questions will integrate one or more of these practices.

1. Asking questions (for science) and defining problems (for engineering)
   - Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.
   - Ask questions that arise from examining models or a theory, to clarify and/or seek additional information and relationships.
   - Ask questions to determine relationships, including quantitative relationships, between independent and dependent variables.
   - Ask questions to clarify and refine a model, an explanation, or an engineering problem.
   - Ask questions that can be investigated within the scope of the school laboratory, research facilities, or field (e.g., outdoor environment) with available resources and, when appropriate, frame a hypothesis based on a model or theory.
   - Ask and/or evaluate questions that challenge the premise(s) of an argument, the interpretation of a data set, or the suitability of a design.
   - Define a design problem that can be solved through the development of an object, tool, process or system

and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.

2. Developing and using models
    - Evaluate merits and limitations of two different models of the same proposed tool, process, mechanism, or system in order to select or revise a model that best fits the evidence or design criteria.
    - Design a test of a model to ascertain its reliability.
    - Develop, revise, and/or use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system.
    - Develop and/or use multiple types of models to provide mechanistic accounts and/or predict phenomena, and move flexibly between model types based on merits and limitations.
    - Develop a complex model that allows for manipulation and testing of a proposed process or system.
    - Develop and/or use a model (including mathematical and computational) to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems.
3. Planning and carrying out investigations
    - Plan an investigation or test a design individually and collaboratively to produce data to serve as the basis for evidence as part of building and revising models, supporting explanations for phenomena, or testing solutions to problems. Consider possible confounding variables or effects and evaluate the investigation's design to ensure variables are controlled.
    - Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.
    - Plan and conduct an investigation or test a design solution in a safe and ethical manner including considerations of environmental, social, and personal impacts.
    - Select appropriate tools to collect, record, analyze, and evaluate data.
    - Make directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated.
    - Manipulate variables and collect data about a complex model of a proposed process or system to identify failure points or improve performance relative to criteria for success or other variables.
4. Analyzing and interpreting data
    - Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution.

- Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible.
- Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data.
- Compare and contrast various types of data sets (e.g., self-generated, archival) to examine consistency of measurements and observations.
- Evaluate the impact of new data on a working explanation and/or model of a proposed process or system.
- Analyze data to identify design features or characteristics of the components of a proposed process or system to optimize it relative to criteria for success.

5. Using mathematics and computational thinking
   - Create and/or revise a computational model or simulation of a phenomenon, designed device, process, or system.
   - Use mathematical, computational, and/or algorithmic representations of phenomena or design solutions to describe and/or support claims and/or explanations.
   - Apply techniques of algebra and functions to represent and solve scientific and engineering problems.
   - Use simple limit cases to test mathematical expressions, computer programs, algorithms, or simulations of a process or system to see if a model "makes sense" by comparing the outcomes with what is known about the real world.
   - Apply ratios, rates, percentages, and unit conversions in the context of complicated measurement problems involving quantities with derived or compound units (such as mg/mL, kg/m^3, acre-feet, etc.).

6. Constructing explanations (for science) and designing solutions (for engineering)
   - Make a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables.
   - Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
   - Apply scientific ideas, principles, and/or evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects.
   - Apply scientific reasoning, theory, and/or models to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion.
   - Design, evaluate, and/or refine a solution to a complex real-world

problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.

7. Engaging in argument from evidence
   - Compare and evaluate competing arguments or design solutions in light of currently accepted explanations, new evidence, limitations (e.g., trade-offs), constraints, and ethical issues.
   - Evaluate the claims, evidence, and/or reasoning behind currently accepted explanations or solutions to determine the merits of arguments.
   - Respectfully provide and/or receive critiques on scientific arguments by probing reasoning and evidence and challenging ideas and conclusions, responding thoughtfully to diverse perspectives, and determining what additional information is required to resolve contradictions.
   - Construct, use, and/or present an oral and written argument or counter-arguments based on data and evidence.
   - Make and defend a claim based on evidence about the natural world or the effectiveness of a design solution that reflects scientific knowledge, and student-generated evidence.
   - Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and/or logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations).

8. Obtaining, evaluating, and communicating information
   - Critically read scientific literature adapted for classroom use to determine the central ideas or conclusions and/or to obtain scientific and/or technical information to summarize complex evidence, concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
   - Compare, integrate and evaluate sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a scientific question or solve a problem.
   - Gather, read, and evaluate scientific and/or technical information from multiple authoritative sources, assessing the evidence and usefulness of each source.
   - Evaluate the validity and reliability of and/or synthesize multiple claims, methods, and/or designs that appear in scientific and technical texts or media reports, verifying the data when possible.
   - Communicate scientific and/or technical information or ideas (e.g. about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically).

Tasks of Teaching Science

This list includes instructional tasks that teachers engage in that are essential for effective Physics teaching. Many test questions will measure content through application to one or more of these tasks.

Scientific Instructional Goals, Big Ideas, and Topics

1. Selecting or sequencing appropriate instructional goals or big ideas for a topic
2. Identifying the big idea or instructional goal of an instructional activity
3. Choosing which science ideas or instructional activities are most closely related to a particular instructional goal
4. Linking science ideas to one another and to particular activities, models, and representations within and across units

Scientific Investigations and Demonstrations

5. Selecting investigations or demonstrations, including virtual, that facilitate understanding of disciplinary core ideas, scientific practices, or crosscutting concepts
6. Evaluating investigation questions for quality (e.g., testable, empirical)
7. Determining the variables, techniques, or tools that are appropriate for use by students to address a specific investigation question
8. Critiquing scientific procedures, data, observations, or results for their quality, accuracy, or appropriateness
9. Supporting students in generating questions for investigation or identifying patterns in data and observations

Scientific Resources (texts, curriculum materials, journals, and other print and media-based resources)

10. Evaluating instructional materials and other resources for their ability to address scientific concepts; engage students with relevant phenomena; develop and use scientific ideas; promote students' thinking about phenomena, experiences, and knowledge; take account of students' ideas and background; and assess student progress
11. Choosing resources that support the selection of accurate, valid, and appropriate goals for science learning

Student Ideas (including common misconceptions, alternate conceptions, and partial conceptions)

12. Analyzing student ideas for common misconceptions regarding intended scientific learning
13. Selecting diagnostic items and eliciting student thinking about scientific ideas and practices to identify common student misconceptions and the basis for those misconceptions
14. Developing or selecting instructional moves, approaches, or representations that provide evidence about common student misconceptions and help students move toward a better understanding of the idea, concept, or practice

Scientific Language, Discourse, Vocabulary, and Definitions

15. Selecting scientific language that is precise, accurate, grade-appropriate, and illustrates key scientific concepts
16. Anticipating scientific language and vocabulary that may be difficult for students
17. Modeling the use of appropriate verbal and written scientific language in critiquing arguments or explanations, in describing observations, or in using evidence to support a claim, etc.
18. Supporting and critiquing students' participation in and use of verbal and written scientific discourse and argumentation

Scientific Explanations (includes claim, evidence, and reasoning)

19. Critiquing student-generated explanations or descriptions for their generalizability, accuracy, precision, or consistency with scientific evidence
20. Selecting explanations of natural phenomena that are accurate and accessible to students

Scientific Models and Representations (analogies, metaphors, simulations, illustrations, diagrams, data tables, performances, videos, animations, graphs, and examples)

21. Evaluating or selecting scientific models and representations that predict or explain scientific phenomena or address instructional goals
22. Engaging students in using, modifying, creating, and critiquing scientific models and representations that are matched to an instructional goal
23. Evaluating student models or representations for evidence of scientific understanding
24. Generating or selecting diagnostic questions to evaluate student understanding of specific models or representations
25. Evaluating student ideas about what makes for good scientific models and representations

Physics (5266) Sample Test Questions

The sample questions that follow represent a number of the types of questions and topics that appear on the test. They are not, however, representative of the entire scope of the test in either content or difficulty. Answers with explanations follow the questions.

Directions: Each of the questions or incomplete statements below is followed by suggested answers or completions. Select the one that is best in each case.

1. A teacher is preparing a classroom demonstration. Of the following, which **TWO** should the teacher use as examples of material with high electrical conductivity?

   (A) Copper
   (B) Distilled water
   (C) Hard rubber
   (D) Stainless steel

2. Based on Snell's law, which **THREE** of the following are true about a ray of visible light that travels obliquely from air into glass?

   (A) The wavelength of the light increases.
   (B) The speed of the light decreases.
   (C) The frequency of the light remains the same.
   (D) The light ray bends toward the normal.

3. Which of the following is true about the production of electricity by means of nuclear power?

   (A) It causes carbon dioxide to be emitted in large amounts into the atmosphere.
   (B) Radioactive waste is produced as a by-product and must be disposed of safely.
   (C) It is much less efficient than other methods of producing electricity.
   (D) It involves nuclear fusion as the primary energy source for producing electricity.

4. A teacher explains that in the photoelectric effect, light incident on the surface of a metal results in the emission of electrons from the surface. Which of the following student statements after the lesson indicates the best understanding about the photoelectric effect?

   (A) The incident light must be above a threshold frequency for electrons to be emitted.
   (B) The work function of the metal surface must be equal to zero for electrons to be emitted.
   (C) The number of electrons emitted is independent of the intensity of the incident light.
   (D) The energy of the emitted electrons increases with an increase in the wavelength of the incident light.

5. A large rock is dropped from rest from the edge of a cliff that is 200 m above the surface of the ocean. How long does it take for the rock to hit the water? (Note: Ignore air resistance and assume $g = 10\ \text{m/s}^2$).

   (A) $2\sqrt{5}$ s
   (B) 5 s
   (C) $2\sqrt{10}$ s
   (D) 20 s

6. Object 1 has kinetic energy K_1. Object 2 has 4 times the mass and 1/4 the speed of object 1. What is the kinetic energy K_2 of object 2?

   (A) $K_2 = \frac{1}{16}K_1$
   (B) $K_2 = \frac{1}{4}K_1$
   (C) $K_2 = K_1$
   (D) $K_2 = 4K_1$

7. The electrostatic force between two point charges, q_1 and q_2, is F_1. If the distance R between the two charges is decreased to 1/3 R, what is the force F_2 between the charges?

(A) $F_2 = 9F_1$
(B) $F_2 = 3F_1$
(C) $F_2 = F_1$
(D) $F_2 = \frac{1}{9}F_1$

8. What is the speed of a wave if the wave crests are 4 meters apart and the period of the wave is 2 seconds?

(A) 0.5 m/s
(B) 2 m/s
(C) 4 m/s
(D) 8 m/s

9. Which of the following scientists first proposed the concept of matter waves?

(A) Bohr
(B) Einstein
(C) Planck
(D) de Broglie

10. The Bohr model was successful at explaining which of the following?

(A) Electromagnetic induction
(B) Wave-particle duality
(C) Expansion of the universe
(D) Emission and absorption spectra of hydrogen

11. A person, starting at point A, walks 300 m directly north. The person then turns and walks 400 m directly east, stopping at point B. What is the displacement of the person between points A and B?

    (A) 100 m
    (B) 350 m
    (C) 500 m
    (D) 700 m

12. A block of mass m is sliding at constant speed v down a ramp inclined at an angle θ with respect to level ground. The magnitude of the frictional force acting on the block is equal to which of the following? (Note: g is the acceleration due to gravity.)

    (A) 0
    (B) mv
    (C) mg
    (D) $mg\sin\theta$

13. According to kinetic molecular theory, the average translational kinetic energy of the particles of an ideal gas is proportional to which of the following properties of the gas?

    (A) Pressure
    (B) Absolute temperature
    (C) Volume
    (D) Entropy

14. A projectile is launched upward at a 45° angle relative to level ground. In the absence of air resistance, which of the following statements is true about the projectile at all points along its path of motion?

    (A) The net force acting on the projectile is equal to zero.
    (B) The only force acting on the projectile is the force of gravity.
    (C) The speed of the projectile is constant.
    (D) The acceleration of the projectile is equal to zero.

15. A simple pendulum that has a period T on Earth's surface is transported to the surface of a planet where the force of gravity is twice as great as the force of gravity on Earth. What is the period of the pendulum on the planet? (Note: Assume air resistance is negligible on both planets.)

(A) $2T$
(B) T
(C) $\frac{T}{\sqrt{2}}$
(D) $\frac{T}{2}$

16. After a lesson about electromagnetic induction, students are asked to name a device that transforms mechanical energy into electrical energy. Which of the following student responses indicates a good understanding about electromagnetic induction?

(A) A transformer
(B) A generator
(C) A motor
(D) A solar cell

17. Of the following regions of the electromagnetic spectrum, which has waves with the highest frequencies?

(A) X-ray
(B) Radio
(C) Visible
(D) Ultraviolet

X	*Y*
2.0	0.50
3.0	0.33
4.0	0.25
5.0	0.20

18. In a lab experiment, students were asked to determine the relationship between two variables *X* and *Y*. Based on the experimental data in the preceding table, which of the following student conclusions about the relationship between the two variables is correct?

(A) *X* and *Y* have a direct linear relationship.
(B) *X* and *Y* have an inverse linear relationship.
(C) *X* and *Y* have a direct nonlinear relationship.
(D) *X* and *Y* have an inverse nonlinear relationship.

19. The transfer of thermal energy through a vacuum by means of electromagnetic wave propagation is known as

(A) radiation
(B) convection
(C) absorption
(D) conduction

20. A satellite of mass m is in a circular orbit of radius R around Earth. What is the orbital speed of the satellite? (Note: M_E is the mass of Earth and G is the universal constant.)

(A) 0

(B) $\sqrt{\dfrac{GM_E}{R}}$

(C) $\sqrt{\dfrac{GmM_E}{R^2}}$

(D) $\sqrt{GM_ER}$

21. In a lesson about Kepler's laws, a teacher explains that Earth takes 1 year to make a complete revolution around the Sun and that Jupiter has an orbital radius slightly greater than 5 times the orbital radius of Earth. The students are asked to predict how long it takes Jupiter to make a complete revolution around the Sun. Which of the following student responses is best?

    (A) $\sqrt{5}$ years
    (B) 5 years
    (C) $5\sqrt{5}$ years
    (D) 25 years

22. How much power is dissipated by a 4.0-ohm resister connected in series to a 12-volt battery?

    (A) 3.0 watts
    (B) 12 watts
    (C) 36 watts
    (D) 72 watts

23. A 2-ohm resistor and a 4-ohm resistor are connected in parallel to an ideal 12-volt battery to form a closed circuit. What is the current supplied by the battery?

    (A) 2 amps
    (B) 6 amps
    (C) 9 amps
    (D) 16 amps

24. Which of the following phenomena is an example of the Doppler effect?

    (A) Diffraction of electrons
    (B) Emission and absorption spectra of hydrogen
    (C) Blackbody radiation
    (D) Redshift of light from distant galaxies

25. Of the following devices, which would be the best choice for a teacher to use in a lesson about the photoelectric effect?

    (A) Camera
    (B) Telescope
    (C) LED lightbulb
    (D) Automatic door opener

26. The first law of thermodynamics is a relationship involving which of the following quantities?

    (A) Internal energy, heat, and work
    (B) Force, mass, and acceleration
    (C) Voltage, current, and resistance
    (D) Pressure, volume, and temperature

27. After a lesson about buoyancy, students are asked to indicate a property of an object that determines whether the object will float or sink in water. Which of the following student responses identifies a property of the object that determines its buoyancy?

    (A) Density
    (B) Inertia
    (C) Volume
    (D) Weight

28. After a lesson about angular momentum, which of the following student claims about the angular momentum of a rotating object is true?

    (A) The angular momentum is always conserved.
    (B) The angular momentum decreases as the speed of rotation of the object increases.
    (C) The angular momentum depends on the mass of the rotating object.
    (D) The angular momentum is equal to the kinetic energy of a rotating object.

29. A block of mass m, moving to the right with speed v along a frictionless surface, collides with and sticks to a second block of mass $2m$ that is initially at rest. With what speed and in what direction do the blocks move after the collision?

(A) $\frac{1}{3}v$ to the right
(B) $\frac{1}{3}v$ to the left
(C) $\frac{1}{2}v$ to the right
(D) $\frac{1}{2}v$ to the left

30. An electron moving with velocity **v** enters a region in which the magnetic field **B** is perpendicular to the velocity of the electron. The magnetic force on the electron in the region is

(A) equal to zero
(B) parallel to **v**
(C) parallel to **B**
(D) perpendicular to both **v** and **B**

31. According to which of the following laws does a changing magnetic flux through a closed circuit induce an electromotive force in that circuit?

(A) Gauss's law
(B) Coulomb's law
(C) Faraday's law
(D) Lorentz force law

32. An organ pipe of length L, open at both ends, will vibrate at a fundamental frequency equal to which of the following? (Note: υ_s is the speed of sound in air.)

(A) $\frac{\upsilon_s}{4L}$

(B) $\frac{\upsilon_s}{2L}$

(C) $\frac{\upsilon_s}{L}$

(D) $\frac{2\upsilon_s}{L}$

Physics (5266) Answers

1. **Options (A) and (D) are correct.** Copper and stainless steel (an alloy of iron) are both good conductors of electricity.

Content	IV A
Science and Engineering	3
Task of Teaching	1

2. **Options (B), (C) and (D) are correct.** The index of refraction of a medium is defined as the ratio of the speed of light in a vacuum to the speed of light in that medium. Glass has a higher index of refraction than air, which means that the speed of the visible light is less in the glass. The frequency is not affected by the medium and remains the same. According to Snell's law, the light ray will bend toward the normal. Since the speed of the light is equal to the wavelength multiplied by the frequency, the wavelength does not increase but decreases.

Content	V A
Science and Engineering	2

3. **Option (B) is correct.** Radioactive waste is a by-product of a nuclear power plant and must be disposed of safely. Nuclear power plants use nuclear fission as the primary energy source.

Content	I B

4. **Option (A) is correct.** There is a minimum frequency of the incident light, known as the threshold frequency, below which electrons will not be emitted.

Content	II A
Science and Engineering	6

5. **Option (C) is correct.** From kinematics, the distance traveled *y* is found from $y = y_0 + v_0 t + \frac{1}{2}gt^2$. Since $v_0 = 0$ and assuming that the distance traveled *y* is 200 m and that the initial starting point y_0 is 0, then $y = 200 \text{ m} = \frac{1}{2}gt^2$. Solving for *t* gives $t = \sqrt{\frac{2 \times 200 \text{ m}}{10 \text{ m/s}^2}} - \sqrt{40} \text{ s} - 2\sqrt{10} \text{ s}$.

Content	III A
Science and Engineering	5

6. **Option (B) is correct.** $K_2 = \frac{1}{2}m_2 v_2^2 = \frac{1}{2}4m_1 \times \left(\frac{1}{4}v_1\right)^2 = \frac{1}{8}m_1 \times v_1^2 = \frac{1}{4}K_1$

Content	III B
Science and Engineering	1
Task of Teaching	1

7. **Option (A) is correct.** According to Coulomb's law, the electrostatic force between the two point charges separated by a distance *R* is $F_1 = \frac{1}{4\pi\varepsilon_0} \times \frac{q_1 q_2}{R^2}$. If the distance is decreased to 1/3 *R*, the force between the charges is $F_2 = \frac{1}{4\pi\varepsilon_0} \times \frac{q_1 q_2}{(R/3)^2} = 9F_1$.

Content	IV A
Science and Engineering	1

8. **Option (B) is correct.** The speed is found from $v = \lambda \times f$, where λ is the wavelength or distance between wave crests and *f* is the frequency of the wave. The frequency is found from the period from $f = \frac{1}{\text{period}} = \frac{1}{2 \text{ s}} = 0.5 \text{ s}^{-1}$. Thus the speed of the wave is $v = \lambda \times f = 4 \text{ m} \times 0.5 \text{ s}^{-1} = 2 \text{ m/s}$

Content	V A
Science and Engineering	5

9. **Option (D) is correct.** Louis de Broglie first proposed that all matter has wave properties.

Content	I A

10. **Option (D) is correct.** The Bohr model of the atom, which introduced the concept of discrete atomic energy levels, was able to explain the emission and absorption spectra of hydrogen.

Content	II A
Science and Engineering	2

11. **Option (C) is correct.** The person's path from point A to point B consists of two sides of a 3-4-5 right triangle of lengths 300 m and 400 m. The displacement of the person is equal to the length of the hypotenuse of the triangle, which is 500 m, since $(300\text{ m})^2 + (400\text{ m})^2 = (500\text{ m})^2$ for the triangle.

Content	III A
Science and Engineering	5

12. **Option (D) is correct.** The block is moving at constant speed down the ramp, which means that the net force on the block is equal to zero. Thus, the frictional force must be equal in magnitude to the component of the weight of the block that is directed along the ramp, or $mg\sin\theta$.

Content	III B
Science and Engineering	5

13. **Option (B) is correct.** For an ideal gas, the average translational kinetic energy of the gas particles is proportional to absolute temperature, since it is equal to $\frac{3}{2}kT$, where k is Boltzmann's constant and T is the absolute temperature.

Content	II B
Science and Engineering	6

14. **Option (B) is correct.** In the absence of air resistance, gravity is the only force acting on the projectile at all points along its path of motion.

Content	III A
Science and Engineering	7

15. **Option (C) is correct.** The correct answer is (C). The period T of a simple pendulum is given by $T = 2\pi\sqrt{\frac{L}{g}}$, in which L is the length of the pendulum and g is the acceleration due to gravity. On the planet, the period of the pendulum is T_{planet} and acceleration due to gravity is g_{planet}. Thus, on the planet the period of the pendulum is found from $T_{\text{planet}} = 2\pi\sqrt{\frac{L}{g_{\text{planet}}}} = 2\pi\sqrt{\frac{L}{2g}} = \frac{T}{\sqrt{2}}$.

Content	III B
Science and Engineering	1

16. **Option (B) is correct.** A generator converts mechanical energy into electrical energy by means of electromagnetic induction.

Content	IV B
Science and Engineering	4

17. **Option (A) is correct.** Of the listed regions of the electromagnetic spectrum, waves in the x-ray region have the highest frequencies.

Content	V B

18. **Option (D) is correct.** The relationship between X and Y is expressed in the equation $Y = k\frac{1}{x}$, where k is a constant. A plot of the data will yield a curve that indicates a nonlinear relationship.

Content	I A
Science and Engineering	4
Task of Teaching	2

19. **Option (A) is correct.** Radiation is the transfer of thermal energy through a vacuum by means of electromagnetic waves.

Content	II B

20. **Option (B) is correct.** For circular motion in a gravitational field, the centripetal force on the satellite is equal to the gravitational force on the satellite, which is found from $F = \frac{mv^2}{R} = \frac{GmM_E}{R^2}$. Solving for the orbital speed gives $v = \sqrt{\frac{GM_E}{R}}$.

Content	III A
Science and Engineering	5

21. **Option (C) is correct.** According to Kepler's third law, the square of the orbital period *T* of a planet is proportional to the cube of its semimajor axis *R*. The constant of proportionality is the same for all of the planets. Thus,

$$T_{\text{Jupiter}} = T_{\text{Earth}} \times \left(\frac{R_{\text{Jupiter}}}{R_{\text{Earth}}}\right)^{\frac{3}{2}} \cong 1\,\text{year} \times \left(\frac{5}{1}\right)^{\frac{3}{2}} = 5\sqrt{5}\ \text{years}.$$

Content	III A
Science and Engineering	5
Task of Teaching	6

22. **Option (C) is correct.** The power *P* dissipated is found from $P = iR^2$, where $i = \frac{V}{R}$. Thus,

$$P = \left(\frac{V}{R}\right)^2 R = \frac{V^2}{R} = \frac{12\text{ V} \times 12\text{ V}}{4.0\text{ ohms}} = 36\text{ watts}.$$

Content	IV A
Science and Engineering	1

23. **Option (C) is correct.** According to Ohm's law, the current supplied by the battery is given by $I = \frac{12\text{ V}}{R_{eq}}$, where R_{eq} is the equivalent resistance. The resistors are connected in parallel, and the battery is ideal with zero internal resistance. This means that

$$R_{eq} = \frac{2\text{ ohms} \times 4\text{ ohms}}{2\text{ ohms} + 4\text{ ohms}} = \frac{4}{3}\text{ ohms}. \text{ Thus, } I = \frac{12\text{ V}}{4/3\text{ ohms}} = 9\text{ amps}.$$

Content	IV A
Science and Engineering	5

24. **Option (D) is correct.** The Doppler effect is used to explain the shift toward longer wavelengths of the spectral lines from distant, receding galaxies.

Content	V B
Science and Engineering	5

25. **Option (D) is correct.** When a person passes through a beam of infrared light, the beam of light is interrupted from reaching a sensor that is based on the photoelectric effect. This results in a process that opens the door.

Content	I B
Science and Engineering	1

26. **Option (A) is correct.** The first law of thermodynamics is a statement of the law of conservation of energy and relates the following quantities: internal energy, heat, and work.

Content	II B

27. **Option (A) is correct.** From Archimedes' principle, it is the density of an object that determines whether the object will float or sink in water. Objects with a density less than the density of water will float.

Content	III A
Science and Engineering	5

28. **Option (C) is correct.** The equation for the angular momentum L of the rotating object is $L = m\upsilon r$. Hence the angular momentum depends on the mass m. As the speed of rotation v increases, the angular momentum increases rather than decreases. The angular momentum is not equal to the kinetic energy. Angular momentum is not conserved unless the net external torque acting on the object is zero.

Content	III B
Science and Engineering	7
Task of Teaching	7

29. **Option (A) is correct.** Linear momentum is conserved because there are no external forces acting on the system. The magnitude of the momentum before the collision is mv and is directed to the right. Thus, the magnitude of the momentum after the collision must also be mv and be directed to the right. The combined mass of the two blocks is $3m$, which means their speed is equal to $\frac{1}{3}\upsilon$.

Content	III B
Science and Engineering	7

30. **Option (D) is correct.** According to the Lorentz force law, the magnetic force **F** on the electron is equal to the vector product $-e\mathbf{v} \times \mathbf{B}$, which means that **F** is perpendicular to both **v** and **B**.

Content	IV B

31. **Option (C) is correct.** Faraday's law of electromagnetic induction states that the induced electromotive force in a closed circuit is equal to the rate of change of the magnetic flux through it.

Content	IV B

32. **Option (B) is correct.** For an open organ pipe vibrating at the fundamental frequency f, both ends of the pipe must be antinodes. This means that the length L of the pipe must be equal to half the wavelength λ of the sound, or $L = \frac{\lambda}{2}$.

Thus, $f = \frac{\upsilon_s}{\lambda} = \frac{\upsilon_s}{2L}$.

Content	V B
Science and Engineering	5

Understanding Question Types

The *Praxis*® assessments include a variety of question types: constructed response (for which you write a response of your own); selected response, for which you select one or more answers from a list of choices or make another kind of selection (e.g., by selecting a sentence in a text or by selecting part of a graphic); and numeric entry, for which you enter a numeric value in an answer field. You may be familiar with these question formats from taking other standardized tests. If not, familiarize yourself with them so you don't spend time during the test figuring out how to answer them.

Understanding Selected-Response and Numeric-Entry Questions

For most questions, you respond by selecting an oval to select a single answer from a list of answer choices.

However, interactive question types may also ask you to respond by:

- Selecting more than one choice from a list of choices.
- Typing in a numeric-entry box. When the answer is a number, you may be asked to enter a numerical answer. Some questions may have more than one entry box to enter a response. Numeric-entry questions typically appear on mathematics-related tests.
- Selecting parts of a graphic. In some questions, you will select your answers by selecting a location (or locations) on a graphic such as a map or chart, as opposed to choosing your answer from a list.
- Selecting sentences. In questions with reading passages, you may be asked to choose your answers by selecting a sentence (or sentences) within the reading passage.
- Dragging and dropping answer choices into targets on the screen. You may be asked to select answers from a list of choices and to drag your answers to the appropriate location in a table, paragraph of text or graphic.
- Selecting answer choices from a drop-down menu. You may be asked to choose answers by selecting choices from a drop-down menu (e.g., to complete a sentence).

Remember that with every question you will get clear instructions.

Understanding Constructed-Response Questions

Some tests include constructed-response questions, which require you to demonstrate your knowledge in a subject area by writing your own response to topics. Essays and short-answer questions are types of constructed-response questions.

For example, an essay question might present you with a topic and ask you to discuss the extent to which you agree or disagree with the opinion stated. You must support your position with specific reasons and examples from your own experience, observations, or reading.

Review a few sample essay topics:

- *Brown v. Board of Education of Topeka*

  "We come then to the question presented: Does segregation of children in public schools solely on the basis of race, even though the physical facilities and other 'tangible' factors may be equal, deprive the children of the minority group of equal educational opportunities? We believe that it does."

  A. What legal doctrine or principle, established in *Plessy v. Ferguson* (1896), did the Supreme Court reverse when it issued the 1954 ruling quoted above?

  B. What was the rationale given by the justices for their 1954 ruling?

- *In his self-analysis, Mr. Payton says that the better-performing students say small-group work is boring and that they learn more working alone or only with students like themselves. Assume that Mr. Payton wants to continue using cooperative learning groups because he believes they have value for all students.*

  - Describe **TWO** strategies he could use to address the concerns of the students who have complained.
  - Explain how each strategy suggested could provide an opportunity to improve the functioning of cooperative learning groups. Base your response on principles of effective instructional strategies.

- *"Minimum-wage jobs are a ticket to nowhere. They are boring and repetitive and teach employees little or nothing of value. Minimum-wage employers take advantage of people because they need a job."*

  - Discuss the extent to which you agree or disagree with this opinion. Support your views with specific reasons and examples from your own experience, observations, or reading.

Keep these things in mind when you respond to a constructed-response question:

1. **Answer the question accurately.** Analyze what each part of the question is asking you to do. If the question asks you to describe or discuss, you should provide more than just a list.
2. **Answer the question completely.** If a question asks you to do three distinct things in your response, you should cover all three things for the best score. Otherwise, no matter how well you write, you will not be awarded full credit.
3. **Answer the question that is asked.** Do not change the question or challenge the basis of the question. You will receive no credit or a low score if you answer another question or if you state, for example, that there is no possible answer.
4. **Give a thorough and detailed response.** You must demonstrate that you have a thorough understanding of the subject matter. However, your response should be straightforward and not filled with unnecessary information.
5. **Take notes on scratch paper** so that you don't miss any details. Then you'll be sure to have all the information you need to answer the question.
6. **Reread your response.** Check that you have written what you thought you wrote. Be sure not to leave sentences unfinished or omit clarifying information.

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Develop Your Study Plan

Planning your study time is important to help ensure that you review all content areas covered on the test. View a sample plan and learn how to create your own. Learn more at Develop a Study Plan.

Helpful Links

Ready to Register – How to register and the information you need to know to do so.

Disability Accommodations – Testing accommodations are available for test takers who meet ETS requirements.

PLNE Accommodations (ESL) – If English is not your primary language, you may be eligible for extended testing time.

What To Expect on Test Day – Knowing what to expect on test day can make you feel more at ease.

Getting Your Scores – Find out where and when you will receive your test scores.

Getting Your Scores – Find out where and when you will receive your test scores.

State Requirements – Learn which tests your state requires you to take.
Other Praxis Tests – Learn about other *Praxis* tests and how to prepare for them.

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