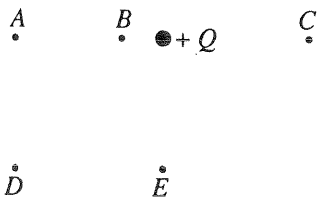


PHYSICS TEST

Part A

Directions: Each set of lettered choices below refers to the numbered questions immediately following it. Select the one lettered choice that best answers each question and then fill in the corresponding oval on the answer sheet. A choice may be used once, more than once, or not at all in each set.

Questions 1-2 relate to a point charge $+Q$ fixed in position, as shown below. Five points near the charge and in the plane of the page are shown.



1. At which point will the magnitude of the electric field be least?
2. At which point will an electron experience a force directed toward the top of the page?

Questions 3-4 refer to the following particles.

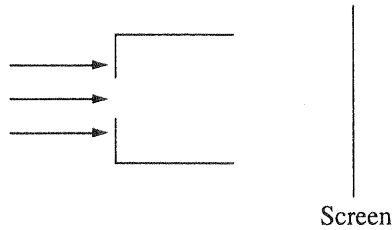
- (A) Alpha particle
- (B) Beta particle
- (C) Neutrino
- (D) Muon
- (E) Photon

3. Which particle is the nucleus of a helium atom?
4. Which particle has a rest mass between that of an electron and a proton?

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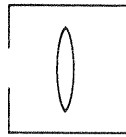
PHYSICS TEST—*Continued*

Questions 5-7

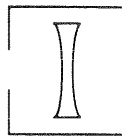


A beam of light is incident on a rectangular opening in the front of a box, as shown in the side view above. The back of the box is open. After passing through the box, the light is incident on a screen. The following devices may be in the box, positioned as shown.

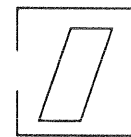
(A) A convex lens



(B) A concave lens



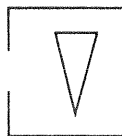
(C) A thick sheet of glass



(D) An opaque card with a very narrow slit



(E) A prism with vertex pointing downward

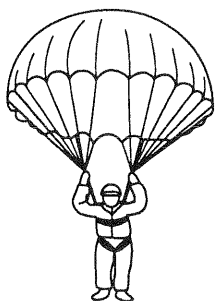


5. Which device could produce a tiny spot of light on the screen?
6. Which device could produce on the screen a rectangular area of light displaced downward from the position at which the light would be if the device were not there?
7. Which device could produce a diffraction pattern consisting of a central bright fringe with parallel secondary fringes that decrease in intensity with increasing distance from the center of the screen?

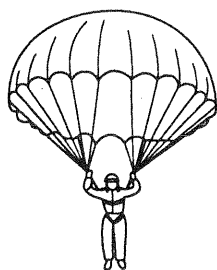
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PHYSICS TEST—*Continued*

Questions 8-9



Al

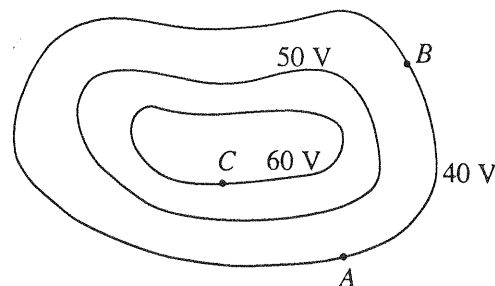


Betty

Al and Betty are wearing identical massless parachutes, as shown above. Al has 3 times the mass of Betty. They descend to the ground, each with constant velocity.

- (A) It is the same.
 - (B) It is 3 times greater.
 - (C) It is $\frac{1}{3}$ as great.
 - (D) It is greater, but the ratio cannot be calculated unless their velocities are known.
 - (E) It is less, but the ratio cannot be calculated unless their velocities are known.
8. How does the net force on Al compare to the net force on Betty?
9. How does the force of air resistance on Al and his parachute compare to the force of air resistance on Betty and her parachute?

Questions 10-11



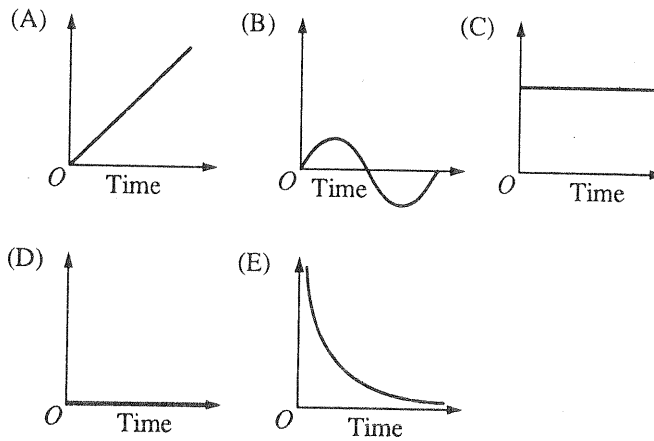
The diagram above shows lines of electrical equipotential in a region of space.

- (A) Zero
 - (B) 20 J
 - (C) 40 J
 - (D) 60 J
 - (E) 80 J
10. What is the work done by an external force in moving a charge of +2 coulombs from *A* to *B*?
11. What is the work done by an external force in moving a charge of +2 coulombs from *A* to *C*?

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PHYSICS TEST—*Continued*

Questions 12-13 relate to various physical quantities that are functions of time.



12. Which graph best represents the magnetic field established at the center of a coil by a steady current in the coil?
13. Which graph represents the total heat developed from time $t = 0$ by a resistor carrying a steady current?

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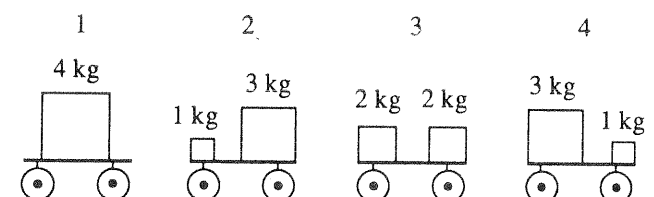
PHYSICS TEST—Continued

Part B

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case and then fill in the corresponding oval on the answer sheet.

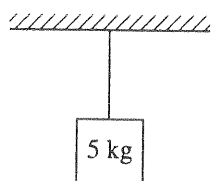
14. When a vector of magnitude 6 units is added to a vector of magnitude 8 units, the magnitude of the resultant vector will be

(A) exactly 2 units
 (B) exactly 10 units
 (C) exactly 14 units
 (D) 0 units, 10 units, or some value between them
 (E) 2 units, 14 units, or some value between them



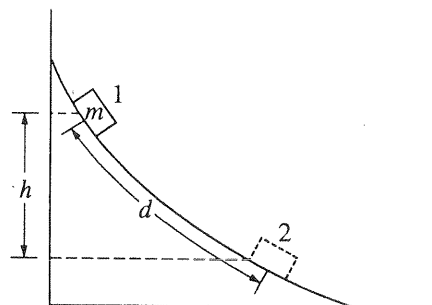
15. Each of the four identical carts shown above is loaded with a total mass of 4 kilograms. All of the carts are initially at rest on the same level surface. Forces of the same magnitude directed to the right act on each of the carts for the same length of time. If friction and air resistance are negligible, which cart will have the greatest velocity when the forces cease to act?

(A) Cart 1
 (B) Cart 2
 (C) Cart 3
 (D) Cart 4
 (E) All four carts will have the same velocity.



16. A 5-kilogram block is suspended by a cord from the ceiling, as shown above. The force exerted on the block by the cord is most nearly

(A) zero
 (B) 25 N
 (C) 50 N
 (D) 100 N
 (E) 200 N



17. A box of mass m is released from rest at position 1 on the frictionless curved track shown above. It slides a distance d along the track in time t to reach position 2, dropping a vertical distance h . Let v and a be the instantaneous speed and instantaneous acceleration, respectively, of the box at position 2. Which of the following equations is valid for this situation?

(A) $h = vt$
 (B) $h = \frac{1}{2}gt^2$
 (C) $d = \frac{1}{2}at^2$
 (D) $v^2 = 2ad$
 (E) $mgh = \frac{1}{2}mv^2$

18. An object initially at rest “explodes” into two fragments of equal mass. Assume that no other forces affect the motion of the fragments during the explosion. Immediately after the explosion, all of the following statements are true EXCEPT:

(A) The fragments have equal speeds.
 (B) The fragments have equal kinetic energies.
 (C) The fragments move in opposite directions.
 (D) The total momentum of the two fragments is zero.
 (E) The total kinetic energy of the two fragments is zero.

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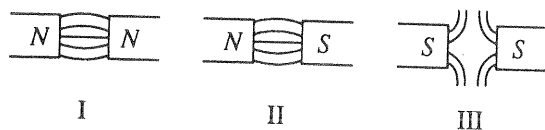
PHYSICS TEST—*Continued*

Questions 19-20

Ocean waves moving toward a beach have a speed of 10 meters per second and a frequency of 2 per second.

19. The wavelength of the waves is most nearly
- 0.2 m
 - 0.5 m
 - 5 m
 - 10 m
 - 20 m
20. The waves are observed by a child sitting in a rowboat offshore. Which of the following properties of the waves seen by the child would be greater when the boat is moving away from the beach than when the boat is stationary with respect to the beach?
- Speed of the waves with respect to the boat
 - Frequency at which the boat encounters successive wave crests
 - Distance between adjacent wave crests
- I only
 - III only
 - I and II only
 - II and III only
 - I, II, and III

21. Appropriate magnetic field lines between two magnetic poles are shown in which of the following diagrams?



- I only
- II only
- III only
- I and II only
- II and III only



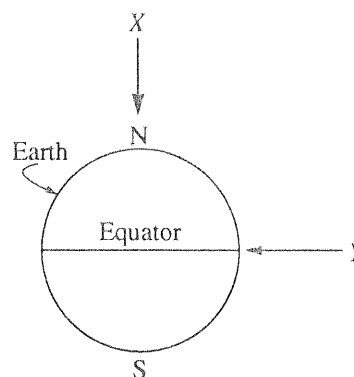
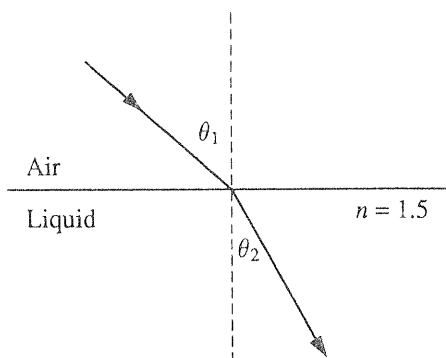
22. A known positive charge is located at point P , as shown above, between two unknown charges, Q_1 and Q_2 . P is closer to Q_2 than to Q_1 . If the net electric force acting on the charge at P is zero, it may correctly be concluded that
- both Q_1 and Q_2 are positive
 - both Q_1 and Q_2 are negative
 - Q_1 and Q_2 have opposite signs
 - Q_1 and Q_2 have the same sign, but the magnitude of Q_1 is greater than the magnitude of Q_2
 - Q_1 and Q_2 have the same sign, but the magnitude of Q_1 is less than the magnitude of Q_2
23. A person can become sunburned outdoors on a cloudy day, but will not burn indoors behind a plate-glass window on a bright day for which of the following reasons?
- The glass absorbs ultraviolet light, but the clouds do not.
 - The clouds absorb infrared light, but the glass does not.
 - The clouds scatter light, but the glass does not.
 - The speed of the light coming through the clouds is greater than that of the light coming through the glass.
 - The wavelength of the light coming through the clouds is greater than that of the light coming through the glass.

24. Which of the following would be LEAST likely to result in the separation of white light into spectral colors?

- Diffraction
- Dispersion
- Reflection
- Interference
- Refraction

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PHYSICS TEST—Continued

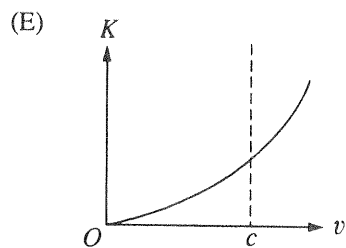
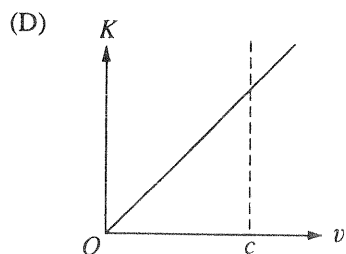
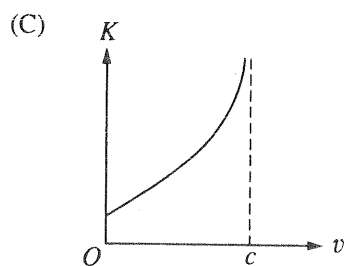
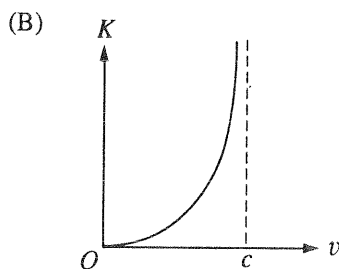
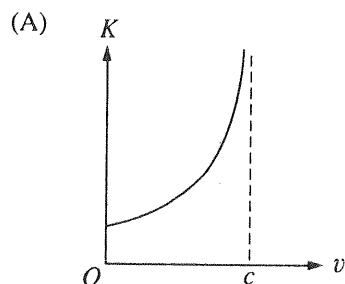


25. A ray of light passes from air into a liquid that has an index of refraction of 1.5, as shown above. If the sine of the angle of incidence θ_1 is 0.75, then the sine of the angle of refraction θ_2 is
- (A) 0.11
(B) 0.25
(C) 0.50
(D) 0.67
(E) 1.1
26. Which of the following electromagnetic waves may have a wavelength of 20 meters?
- (A) X-ray
(B) Microwave
(C) Radio wave
(D) Gamma ray
(E) Infrared ray
27. An experiment is performed to measure the specific heat of copper. A lump of copper is heated in an oven, then dropped into a beaker of water. To calculate the specific heat of copper, the experimenter must know or measure the value of all of the quantities below EXCEPT the
- (A) mass of the water
(B) original temperatures of the copper and the water
(C) final (equilibrium) temperature of the copper and the water
(D) time taken to achieve equilibrium after the copper is dropped into the water
(E) specific heat of the water
28. In a given process, 12 joules of heat is added to an ideal gas and the gas does 8 joules of work. Which of the following is true about the internal energy of the gas during this process?
- (A) It has increased by 20 joules.
(B) It has increased by 4 joules.
(C) It has not changed.
(D) It has decreased by 4 joules.
(E) It has decreased by 20 joules.
29. Cosmic ray protons in space headed toward one of the Earth's poles (direction X shown above) are only slightly deflected, whereas those headed toward the equator (direction Y shown above) are strongly deflected. The difference can be attributed to the
- (A) electrical storms that occur mainly in tropical regions
(B) positive charge of the Earth
(C) maximum strength of the Earth's magnetic field near the equator
(D) greater intensity of the solar wind near the equator than near the poles
(E) greater deflection of charged particles crossing magnetic field lines than of those moving along magnetic field lines
30. Two small conducting spheres are identical except that sphere X has a charge of -10 microcoulombs and sphere Y has a charge of $+6$ microcoulombs. After the spheres are brought in contact and then separated, what is the charge on each sphere, in microcoulombs?
- | | Sphere X | Sphere Y |
|-----|------------|------------|
| (A) | -4 | 0 |
| (B) | -2 | -2 |
| (C) | $+2$ | -2 |
| (D) | $+4$ | 0 |
| (E) | $+6$ | 10 |

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PHYSICS TEST—Continued

31. Which of the following graphs best represents the kinetic energy K of an elementary particle as a function of its speed v , where c is the speed of light?



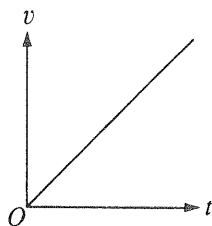
32. When acted on by a net force F , an object of mass M experiences an acceleration a . If the net force is increased to $3F$ and the mass is increased to $6M$, then the new acceleration is

- (A) $a/6$
 (B) $a/3$
 (C) $a/2$
 (D) $2a$
 (E) $3a$

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PHYSICS TEST—*Continued*

Questions 33-35

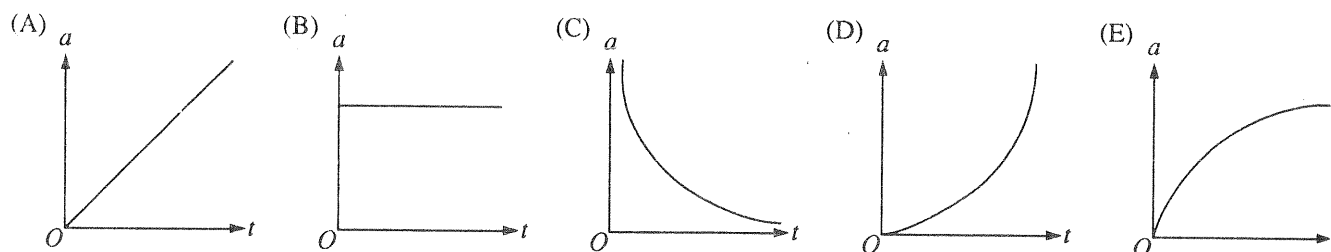


A block is pulled along a horizontal surface with a constant horizontal force of magnitude F . The surface exerts a frictional force of constant magnitude f on the block. The graph of speed v as a function of time t for the block is shown above.

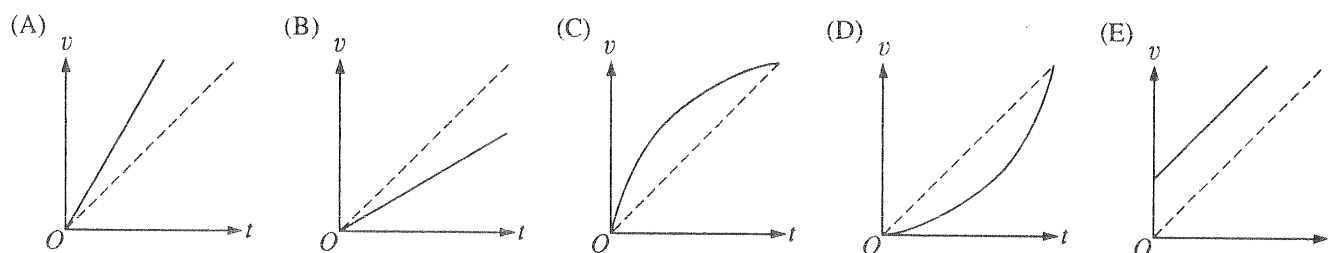
33. Which of the following relationships between F and f is correct?

- (A) $F < f$
- (B) $F = f$
- (C) $F > f$
- (D) It cannot be determined without knowing the mass of the block.
- (E) It cannot be determined without knowing the value of g at this location.

34. Which of the following shows the graph of acceleration a as a function of time t for the block?

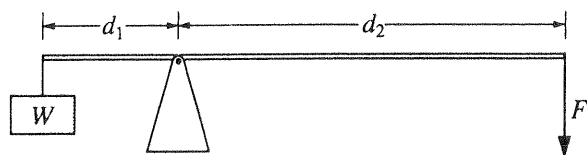


35. If, instead, the block slides without friction but is pulled with the same horizontal force of magnitude F , which of the following would be a possible new graph of speed v as a function of time t ? (The dashed line represents the old graph.)



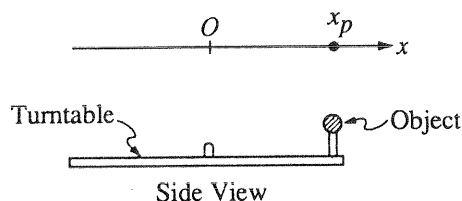
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PHYSICS TEST—Continued



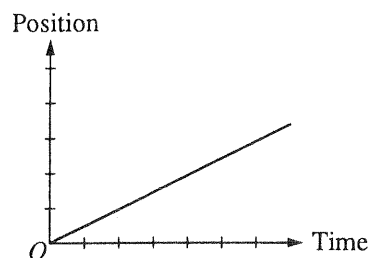
36. A block of weight 30 newtons is hung at one end of a bar of negligible mass, as shown in the diagram above. If d_2 is equal to $3d_1$, what is the magnitude of the vertical force F needed to balance the bar?

(A) 10 N
(B) 15 N
(C) 30 N
(D) 60 N
(E) 90 N



37. When an object on a rotating turntable is viewed from the side, it appears to oscillate back and forth. If its horizontal position x_p is observed as a function of time and the turntable rotates once in 1.5 seconds, the frequency of oscillation is most nearly

(A) 0.11 Hz
(B) 0.33 Hz
(C) 0.67 Hz
(D) 1.33 Hz
(E) 4.19 Hz

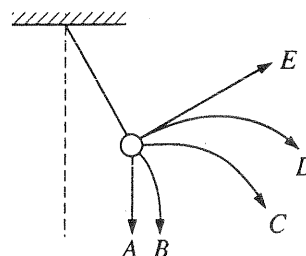


38. The graph of position *versus* time for an object moving along a straight line is given above. During the time shown on the graph, the speed and acceleration of the object will have which of the following characteristics?

Speed

Acceleration

(A) Increasing	Increasing
(B) Increasing	Constant but not zero
(C) Constant but not zero	Increasing
(D) Constant but not zero	Zero
(E) Zero	Constant but not zero



39. A pendulum is swinging upward and is halfway toward its highest position, as shown above, when the string breaks. Which of the paths shown best represents the one that the ball would take after the string breaks?

(A) A
(B) B
(C) C
(D) D
(E) E

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PHYSICS TEST—Continued

40. After landing on a planet that has no atmosphere, an astronaut drops a 4-kilogram object from a height of 1 meter above the surface. The speed of the object just before it hits the surface is 2 meters per second. The acceleration due to gravity near the surface of the planet is

(A) 1 m/s^2
 (B) 2 m/s^2
 (C) 4 m/s^2
 (D) 8 m/s^2
 (E) 16 m/s^2

41. If the addition of 20 calories of heat to 100 grams of a substance raises its temperature 2°C , the specific heat of the substance is

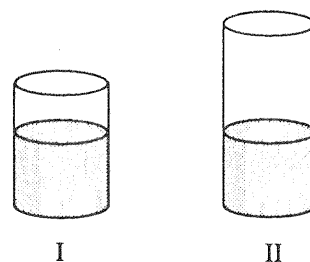
(A) $0.02 \text{ cal/g} \cdot ^\circ \text{C}$
 (B) $0.1 \text{ cal/g} \cdot ^\circ \text{C}$
 (C) $0.2 \text{ cal/g} \cdot ^\circ \text{C}$
 (D) $10 \text{ cal/g} \cdot ^\circ \text{C}$
 (E) $20 \text{ cal/g} \cdot ^\circ \text{C}$

42. Two blocks of iron, one of mass m at 10.0°C and the other of mass $2m$ at 25.0°C , are placed in contact with each other. If no heat is exchanged with the surroundings, which of the following is the final temperature of the two blocks?

(A) 10.0°C
 (B) 15.0°C
 (C) 17.5°C
 (D) 20.0°C
 (E) 25.0°C

43. A constant net force F_1 acts for 10 seconds on an object of mass m and accelerates it from rest to velocity v . The object is then brought to rest in 2 seconds by a constant net force F_2 . The magnitude of F_2 is equal to

(A) $5F_1$
 (B) $2F_1$
 (C) F_1
 (D) $\frac{F_1}{m}$
 (E) mv



44. Two cylindrical vases, I and II, are open at the top and have equal cross sections, but vase II is taller than vase I, as shown above. Both vases are filled to equal heights with water. The frequencies of the fundamental standing waves in the air columns are f_I and f_{II} , respectively. Which of these is greater?

(A) f_I
 (B) f_{II}
 (C) Neither is greater: the frequencies are equal.
 (D) It cannot be determined without knowing the exact amount of water.
 (E) It cannot be determined without knowing the exact dimensions of the vases.

45. Light is reflected from a plane mirror. Statements that are always true about the incident ray, the reflected ray, and the normal to the surface at the point of incidence include which of the following?

I. They lie in the same plane.
 II. They lie along the same straight line.
 III. They are perpendicular to the surface of the mirror.

(A) I only
 (B) II only
 (C) I and III only
 (D) II and III only
 (E) I, II, and III

46. Both transverse waves and longitudinal waves may exhibit all of the following properties EXCEPT

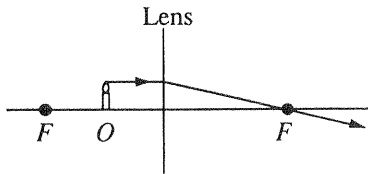
(A) interference
 (B) polarization
 (C) dispersion
 (D) reflection
 (E) refraction

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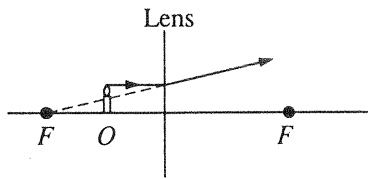
PHYSICS TEST—*Continued*

47. The following diagrams show the path of a light ray from an object O passing through a thin lens having focal points F . In which diagram is the ray correct for both a diverging lens and a converging lens?

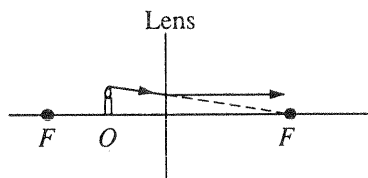
(A)



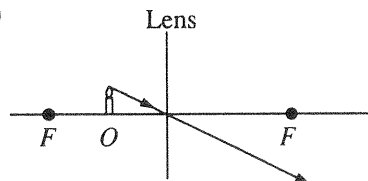
(B)



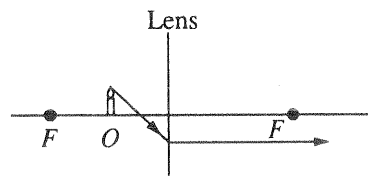
(C)



(D)



(E)



48. Which of the following is true of the magnetic field produced by a current in a long, straight wire?

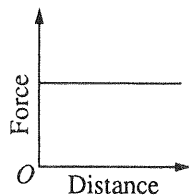
- (A) The field is uniform.
- (B) The field increases in strength as the distance from the wire increases.
- (C) The field lines are directed parallel to the wire, but opposite to the direction of the current.
- (D) The field lines are directed radially outward from the wire.
- (E) The field lines form circles about the wire.

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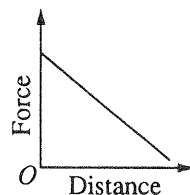
PHYSICS TEST—Continued

49. Which of the following graphs best represents the force that one point charge exerts on another as a function of the distance between them?

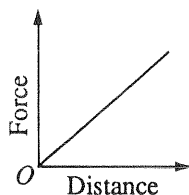
(A)



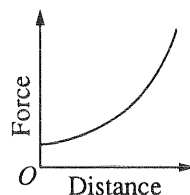
(B)



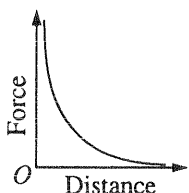
(C)



(D)



(E)



50. The impossibility of making simultaneous precise measurements of both the position and the momentum of a particle is a consequence of

(A) the exclusion principle
(B) relativity
(C) strangeness
(D) the uncertainty principle
(E) complementarity

51. A source emits light of frequency 5.0×10^{14} hertz. Planck's constant h is 6.6×10^{-34} joule-second. The energy of one photon of this light is most nearly

(A) 10^{-19} J
(B) 10^{-6} J
(C) 1 J
(D) 10^6 J
(E) 10^{19} J

Questions 52-53 relate to an ideal gas that is heated in a closed container at constant volume.

52. Which of the following properties of the gas remains constant as the gas is heated?

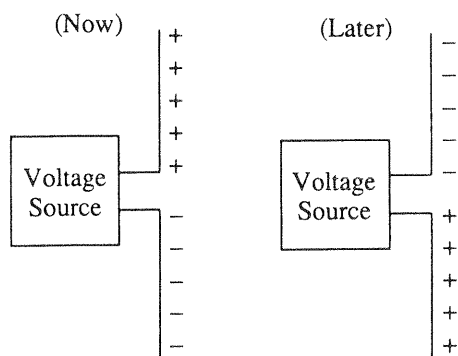
(A) Density
(B) Temperature
(C) Pressure
(D) Internal energy
(E) Average kinetic energy of the molecules

53. Which of the following properties of the gas increases as the gas is heated?

(A) Atomic number of the atoms in the molecules
(B) Number of molecules of the gas
(C) Molecular weight of the gas
(D) Average spacing between the molecules
(E) Number of collisions per unit of time between the molecules and the walls of the container

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PHYSICS TEST—Continued



54. Two rods are connected to a source of voltage as shown above. The polarity of the source of voltage is changing periodically so that the rods are charged alternately as shown. True statements about this phenomenon include which of the following?

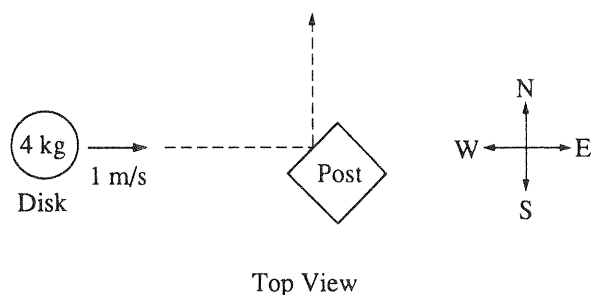
- I. A constant electric field is established throughout all space.
- II. A changing electric field is produced near the rods.
- III. Electromagnetic radiation is produced.

- (A) I only
- (B) III only
- (C) I and II only
- (D) II and III only
- (E) I, II, and III

n	Energy Above Ground State
3	7 eV
2	4 eV
1	0 eV

55. Three energy levels of an atom are shown above. Atoms in the $n = 2$ state can spontaneously emit photons having which of the following energies?

- (A) 4 eV only
- (B) 7 eV only
- (C) 3 eV and 4 eV only
- (D) 3 eV and 7 eV only
- (E) 3 eV, 4 eV, and 7 eV



56. A 4-kilogram disk slides over level ice toward the east at a velocity of 1 meter per second, as shown above. The disk strikes a post and rebounds toward the north at the same speed. The change in the magnitude of the eastward component of the momentum of the disk is

- (A) $-4 \text{ kg} \cdot \text{m/s}$
- (B) $-1 \text{ kg} \cdot \text{m/s}$
- (C) $0 \text{ kg} \cdot \text{m/s}$
- (D) $1 \text{ kg} \cdot \text{m/s}$
- (E) $4 \text{ kg} \cdot \text{m/s}$

57. A 10-kilogram steel ball is raised to the top of a tower 100 meters high. With respect to the ground, the potential energy of the ball when it is at the top of the tower is most nearly

- (A) 10 J
- (B) 10^2 J
- (C) 10^3 J
- (D) 10^4 J
- (E) 10^5 J

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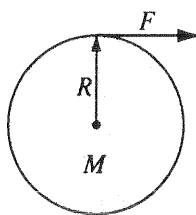
PHYSICS TEST—*Continued*

58. A 1-kilogram block attached to a string revolves in a vertical circle of 1-meter radius near the surface of the Earth. What is the minimum speed of the block which will keep the string taut all the time?

(A) $(9.8)^2$ m/s
(B) 9.8 m/s
(C) $(9.8)^{\frac{1}{2}}$ m/s
(D) $\frac{1}{9.8}$ m/s
(E) $\frac{1}{(9.8)^2}$ m/s

59. A projectile of mass m traveling horizontally with velocity v strikes a stationary block of equal mass resting on a horizontal frictionless plane. If the projectile remains embedded in the block, which of the following is the velocity of the projectile-block system immediately after the collision?

(A) $\frac{v}{4}$
(B) $\frac{v}{2}$
(C) v
(D) $2v$
(E) $4v$



60. A uniform cylindrical disk of mass M and radius R is free to turn about an axle through its center, which is fixed in space. A tangential force of magnitude F is exerted on the disk, as shown above. The angular acceleration can be maximized by making

(A) F , M , and R as large as possible
(B) F and M as large as possible and R as small as possible
(C) F as large as possible and M and R as small as possible
(D) M as large as possible and F and R as small as possible
(E) R as large as possible and F and M as small as possible

61. A ball is thrown vertically upward with an initial speed of exactly 15 meters per second. If air resistance is *not* negligible, the kinetic energy of the ball when it has fallen back to the point from which it was thrown will be

(A) greater than its initial kinetic energy
(B) less than its initial kinetic energy
(C) exactly one-half its initial kinetic energy
(D) exactly the same as its potential energy at the top of its rise
(E) exactly one-half its potential energy at the top of its rise

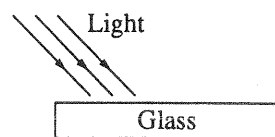
62. Which of the following may transmit energy from one point to another?

I. Electromagnetic radiation
II. Sound waves
III. Convection currents

(A) I only
(B) III only
(C) I and II only
(D) II and III only
(E) I, II, and III

63. A teacher measures and records her own mass to an accuracy of better than $\frac{1}{2}$ percent. Which of the following is most likely the mass that she recorded?

(A) 6.43 kg
(B) 60 kg
(C) 64.3 kg
(D) 600 kg
(E) 643 kg



64. Parallel light rays are incident on a rectangular block of clear glass, as shown above. Which of the following phenomena does NOT occur?

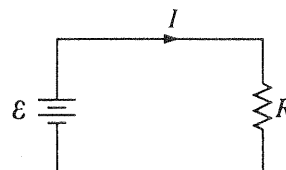
(A) Reflection
(B) Transmission
(C) Refraction
(D) Focusing
(E) Absorption

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PHYSICS TEST—Continued

65. A pendulum of length ℓ with a bob of mass m is oscillating with small amplitude. Which of the following changes in the pendulum would double its period?
- (A) Doubling the mass m of the bob
 - (B) Doubling the initial force used to set the pendulum in motion
 - (C) Doubling the amplitude of the pendulum's swing
 - (D) Quadrupling the mass m of the bob
 - (E) Quadrupling the length ℓ of the pendulum
66. The Earth has a radius of 6,400 kilometers. A satellite orbits the Earth at a distance of 12,800 kilometers from the center of the Earth. If the weight of the satellite on Earth is 100 kilonewtons, the gravitational force on the satellite in orbit is
- (A) 11 kilonewtons
 - (B) 25 kilonewtons
 - (C) 50 kilonewtons
 - (D) 100 kilonewtons
 - (E) 200 kilonewtons

Questions 67-68 relate to the following circuit.



A single resistor R is connected to a battery as shown above. The current is I and the power dissipated as heat is P . The circuit is changed by doubling the emf \mathcal{E} of the battery while R is kept constant.

67. After the change, the current is
- (A) $\frac{I}{4}$
 - (B) $\frac{I}{2}$
 - (C) I
 - (D) $2I$
 - (E) $4I$
68. After the change, the power dissipated in R is
- (A) $\frac{P}{4}$
 - (B) $\frac{P}{2}$
 - (C) P
 - (D) $2P$
 - (E) $4P$

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PHYSICS TEST—*Continued*

69. The diffraction of sound waves is more evident than that of light waves in ordinary experience because
- (A) the wavelength of sound is small compared with the wavelength of light
 - (B) the wavelength of sound is large compared with the wavelength of light
 - (C) light waves are never diffracted
 - (D) sound is a longitudinal wave whereas light is a transverse wave
 - (E) sound waves are mechanical whereas light waves are electromagnetic
70. A ball, initially at rest at $t = 0$ seconds, rolls with constant acceleration down an inclined plane 10 meters long. If the ball rolls 1 meter in the first 2 seconds, how far will it have rolled at $t = 4$ seconds?
- (A) 2 m
 - (B) 3 m
 - (C) 4 m
 - (D) 5 m
 - (E) 8 m

Questions 71-72

A piece of chalk is thrown vertically upward and caught during its descent at the same height from which it was thrown. Position is measured from the location of the chalk when it left the hand. The positive direction for position, velocity, and acceleration is upward.

71. What are the signs of the position, velocity, and acceleration during the ascending part of the trajectory?

	<u>Position</u>	<u>Velocity</u>	<u>Acceleration</u>
(A)	Positive	Positive	Positive
(B)	Positive	Positive	Negative
(C)	Positive	Negative	Negative
(D)	Negative	Positive	Negative
(E)	Negative	Negative	Negative

72. What are the signs of the position, velocity, and acceleration during the descending part of the trajectory?

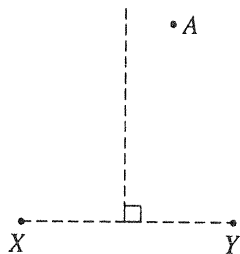
	<u>Position</u>	<u>Velocity</u>	<u>Acceleration</u>
(A)	Positive	Positive	Positive
(B)	Positive	Positive	Negative
(C)	Positive	Negative	Negative
(D)	Negative	Positive	Negative
(E)	Negative	Negative	Negative

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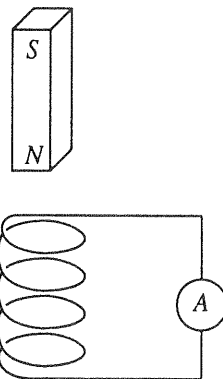
PHYSICS TEST—*Continued*

73. Part of the energy of a wave traveling in a material medium is dissipated in the form of heat. This is sure to cause a decrease in which of the following properties of the wave?

(A) Amplitude
(B) Frequency
(C) Period
(D) Speed
(E) Wavelength



74. Two wave generators of the same frequency and phase operate at points X and Y shown above. If point A is a distance of seven wavelengths from Y and eight wavelengths from X , then A is
- (A) on the central antinodal line
(B) at a point where there is always destructive interference
(C) at a point where there is always constructive interference
(D) at a point where there is alternate constructive and destructive interference during one period
(E) at a point where the two waves originating at X and Y are superimposed to produce a standing wave



75. A bar magnet is located next to a coil of wire that is fixed in position and connected to an ammeter A , as shown above. There will be an induced electric current through the ammeter if the magnet is moving in which of the following ways?

I. Toward the coil with constant speed
II. Toward the coil with increasing speed
III. Away from the coil with constant speed
IV. Away from the coil with increasing speed

(A) I or II only
(B) I or III only
(C) II or IV only
(D) III or IV only
(E) I or II or III or IV

STOP

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS TEST ONLY.
DO NOT TURN TO ANY OTHER TEST IN THIS BOOK.

TABLE A

**Answers to the SAT II: Physics Subject Test, Form 3OAC, and
Percentage of Students Answering Each Question Correctly**

Question Number	Correct Answer	Right	Wrong	Percentage of Students Answering the Question Correctly*	Question Number	Correct Answer	Right	Wrong	Percentage of Students Answering the Question Correctly*
1	D			89	41	B			60
2	E			77	42	D			51
3	A			59	43	A			78
4	D			14	44	A			34
5	A			65	45	A			66
6	C			55	46	B			65
7	D			68	47	D			51
8	A			30	48	E			61
9	B			30	49	E			62
10	A			49	50	D			46
11	C			40	51	A			61
12	C			64	52	A			60
13	A			76	53	E			81
14	E			73	54	D			47
15	E			90	55	A			52
16	C			90	56	A			47
17	E			53	57	D			63
18	E			57	58	C			28
19	C			82	59	B			70
20	C			59	60	C			52
21	E			92	61	B			44
22	D			63	62	E			52
23	A			69	63	C			57
24	C			56	64	D			64
25	C			70	65	E			42
26	C			57	66	B			26
27	D			61	67	D			64
28	B			64	68	E			33
29	E			66	69	B			40
30	B			70	70	C			30
31	B			72	71	B			45
32	C			81	72	C			31
33	C			77	73	A			33
34	B			75	74	C			24
35	A			76	75	E			28
36	A			75					
37	C			62					
38	D			71					
39	D			64					
40	B			59					

*These percentages are based on an analysis of the answer sheets for a random sample of 6,255 students who took this form of the test in June 1992 and whose mean score was 618. They may be used as an indication of the relative difficulty of a particular question. Each percentage may also be used to predict the likelihood that a typical SAT II: Physics Subject Test candidate will answer correctly that question on this edition of this test.