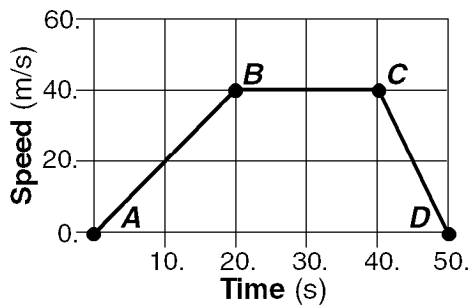


Physics Sample Questions

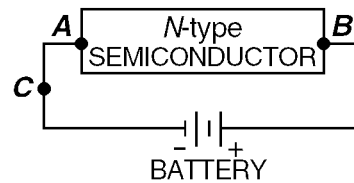
Name: _____

- 1) A ball is thrown horizontally at a speed of 20. meters per second from the top of a cliff. How long does the ball take to fall 19.6 meters to the ground?
 A) 2.0 s C) 1.0 s
 B) 4.0 s D) 9.8 s
- 2) A 1.0-kilogram mass gains kinetic energy as it falls freely from rest a vertical distance, d . How far would a 2.0-kilogram mass have to fall freely from rest to gain the same amount of kinetic energy?
 A) $\frac{2}{d}$ B) $\frac{d}{2}$ C) d D) $\frac{d}{4}$
- 3) The speed-time graph below, which represents the linear motion of a cart.



- (a) Determine the magnitude of the acceleration of the cart during interval AB. [Show all calculations, including the equation and substitution with units.]
- (b) Calculate the distance traveled by the cart during interval BC. [Show all calculations, including the equation and substitution with units.]
- (c) What is the average speed of the cart during interval CD?

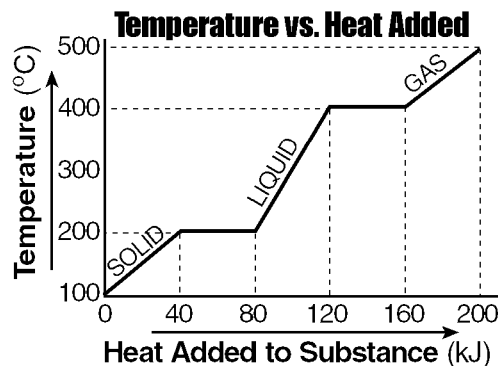
- 4) Isotopes of the same element must have different
 A) mass numbers
 B) numbers of electrons
 C) atomic number
 D) numbers of protons
- 5) The potential difference between a pair of charged parallel plates 0.050 meter apart is 50. volts. What is the electric field intensity between the plates?
 A) 1.0×10^3 N/C C) 2.5×10^2 N/C
 B) 5.0×10^2 N/C D) 1.0×10^2 N/C
- 6) The diagram below represents an N-type silicon semiconductor connected to a battery.



A very small amount of antimony, which has 5 valence electrons, had previously been added to the silicon crystal. This process produced

- A) an excess of free protons
- B) an excess of free electrons
- C) more resistance
- D) a higher emf

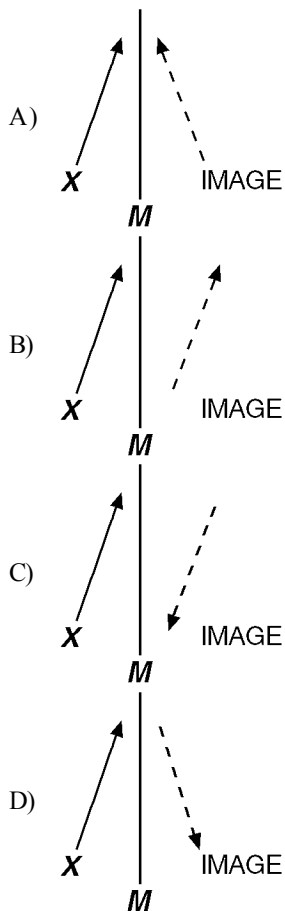
- 7) The graph below shows the relationship between the temperature of 1.0 kilogram of a pure substance and the heat energy added to the substance.



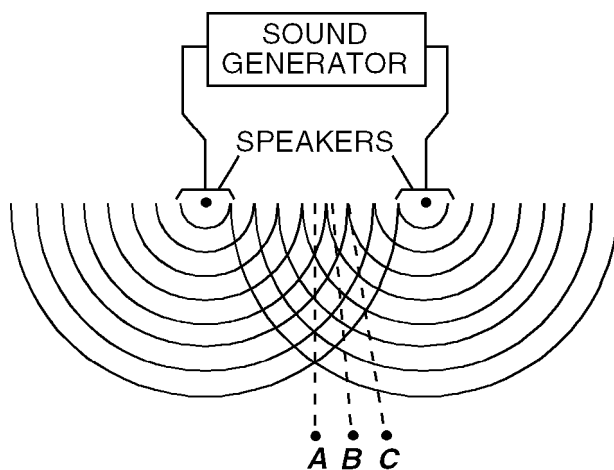
What is the heat of fusion of the substance?

- A) 120 kJ/kg B) 160 kJ/kg C) 40 kJ/kg D) 80 kJ/kg

- 8) Which diagram correctly shows the image of object X produced by plane mirror M ?



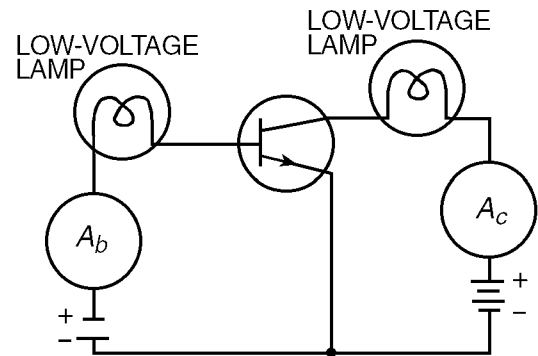
- 9) In the diagram below, two speakers are connected to a sound generator. The speakers produce a sound pattern of constant frequency such that a listener will hear the sound very well at A and C , but not as well at point B .



Which wave phenomenon is illustrated by this experiment?

- A) reflection
B) polarization
C) refraction
D) interference

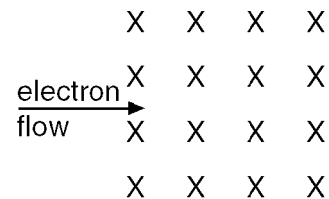
- 10) The diagram below represents an operating $N-P-N$ transistor circuit. Ammeter A_c reads the collector current and ammeter A_b reads the base current.



Compared to the reading of ammeter A_c , the reading of ammeter A_b is

- A) less
B) greater
C) the same

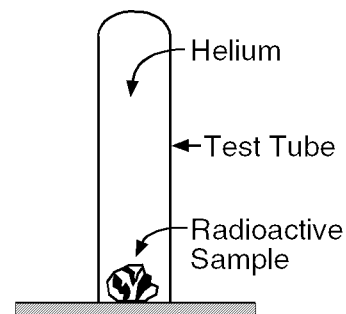
- 11) The diagram below represents a straight conductor in a uniform magnetic field. The field is directed into the page and the electron flow in the conductor is to the right.



What is the direction of the magnetic force of the wire?

- A) toward the top of the page
B) toward the bottom of the page
C) toward the left
D) toward the right

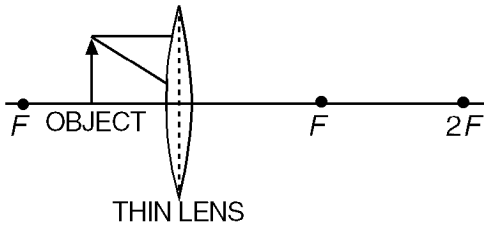
- 12) The diagram below represents an inverted test tube over a sample of a radioactive material. Helium has collected in the test tube.



The presence of helium indicates that the sample is most probably undergoing the process of

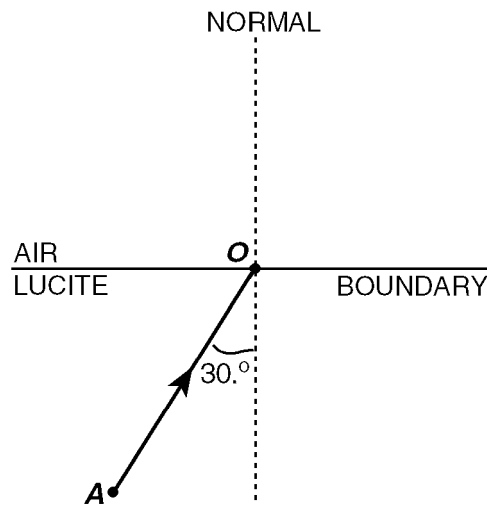
- A) alpha decay
B) neutron decay
C) beta decay
D) gamma emission

- 13) The diagram below shows a thin convex (converging) lens with F as the principal focus.



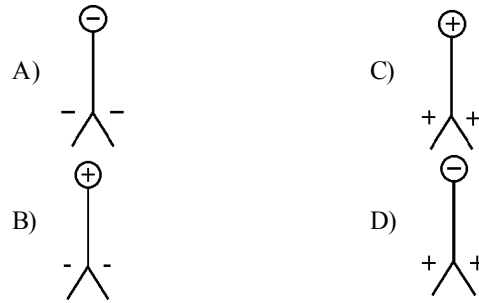
After passing through the lens, the light rays from the arrowhead of the object will

- A) converge at F
 B) converge at $2F$
 C) diverge
 D) emerge as a parallel beam
- 16) The diagram below shows light ray AO in Lucite. The light ray strikes the boundary between Lucite and air at point O with an angle of incidence of $30.^\circ$. The dotted line represents the normal to the boundary at point O .



- (a) Calculate the angle of refraction for incident ray AO . [Show all calculations, including the equation and substitutions with units.]
 (b) On the diagram above, using your answer from part (a), construct an arrow with a protractor and straightedge, to represent the refracted ray.
 (c) Calculate the critical angle for a Lucite-air boundary. [Show all calculations, including the equation and substitutions with units.]

- 14) A negatively charged rod is held near the knob of an uncharged electroscope. Which diagram *best* represents the distribution of charge on the electroscope?



- 15) A 0.20-kilogram sample of ethyl alcohol is at a temperature of 28°C .

How much heat is needed to raise the temperature of the ethyl alcohol from 28°C to its boiling point?

- A) 51 kJ
 B) 38 kJ
 C) 16 kJ
 D) 25 kJ