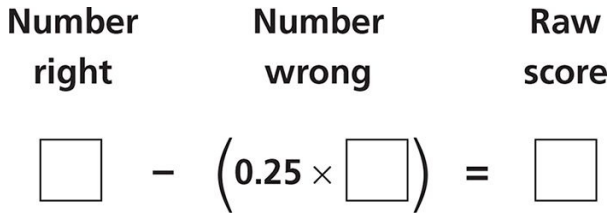
How to Calculate Your Score

Step 1: Figure out your raw score. Use the answer key to count the number of questions you answered correctly and the number of questions you answered incorrectly. (Do not count any questions you left blank.) Multiply the number wrong by 0.25 and subtract the result from the number correct. Round the result to the nearest whole number. This is your raw score.

SAT SUBJECT TEST: PHYSICS PRACTICE TEST 1



Step 2: Find your scaled score. In the Score Conversion Table below, find your raw score (rounded to the nearest whole number) in one of the columns to the left. The score directly to the right of that number will be your scaled score.

A note on your practice test scores: Don't take these scores too literally. Practice test conditions cannot precisely mirror real test conditions. Your actual SAT Subject Test: Physics score will almost certainly vary from your diagnostic and practice test scores. However, your scores on the diagnostic and practice tests will give you a rough idea of your range on the actual exam.

Raw	Scaled
75	800
74	800
73	800
72	800
71	800

70	800
69	800
68	800
67	800
66	800
65	800
64	800
63	800
62	790
61	790
60	780
59	780
58	770
57	770
56	760
55	760
54	750
53	750
52	740
51	730

50	730
49	720
48	720
47	710
46	700
45	700
44	690
43	690
42	680
41	670
40	670
39	660
38	650
37	650
36	640
35	640
34	630
33	630
32	620

31	610
30	610
29	600
28	600
27	590
26	580
25	580
24	570
23	570
22	560
21	550
20	540
19	540
18	530
17	530
16	520
15	510
14	510
13	500

12	490
11	480
10	480
9	470
8	470
7	460
6	450
5	450
4	440
3	430
2	430
1	420
0	410
–1	410
–2	400
–3	390
–4	390
–5	380
–6	370

–7	370
–8	360
–9	350
–10	350
–11	340
–12	330
–13	330
–14	320
–15	310
–16	310
–17	300
–18	290
–19	290

Score Conversion Table

Practice Test 1 Answer Grid

1.	A	B	C	D	E	26.	A	B	C	D	E	51.	A	B	C	D	E
2.	A	B	C	D	E	27.	A	B	C	D	E	52.	A	B	C	D	E
3.	A	B	C	D	E	28.	A	B	C	D	E	53.	A	B	C	D	E
4.	A	B	C	D	E	29.	A	B	C	D	E	54.	A	B	C	D	E
5.	A	B	C	D	E	30.	A	B	C	D	E	55.	A	B	C	D	E
6.	A	B	C	D	E	31.	A	B	C	D	E	56.	A	B	C	D	E
7.	A	B	C	D	E	32.	A	B	C	D	E	57.	A	B	C	D	E
8.	A	B	C	D	E	33.	A	B	C	D	E	58.	A	B	C	D	E
9.	A	B	C	D	E	34.	A	B	C	D	E	59.	A	B	C	D	E
10.	A	B	C	D	E	35.	A	B	C	D	E	60.	A	B	C	D	E
11.	A	B	C	D	E	36.	A	B	C	D	E	61.	A	B	C	D	E
12.	A	B	C	D	E	37.	A	B	C	D	E	62.	A	B	C	D	E
13.	A	B	C	D	E	38.	A	B	C	D	E	63.	A	B	C	D	E
14.	A	B	C	D	E	39.	A	B	C	D	E	64.	A	B	C	D	E
15.	A	B	C	D	E	40.	A	B	C	D	E	65.	A	B	C	D	E
16.	A	B	C	D	E	41.	A	B	C	D	E	66.	A	B	C	D	E
17.	A	B	C	D	E	42.	A	B	C	D	E	67.	A	B	C	D	E
18.	A	B	C	D	E	43.	A	B	C	D	E	68.	A	B	C	D	E
19.	A	B	C	D	E	44.	A	B	C	D	E	69.	A	B	C	D	E
20.	A	B	C	D	E	45.	A	B	C	D	E	70.	A	B	C	D	E
21.	A	B	C	D	E	46.	A	B	C	D	E	71.	A	B	C	D	E
22.	A	B	C	D	E	47.	A	B	C	D	E	72.	A	B	C	D	E
23.	A	B	C	D	E	48.	A	B	C	D	E	73.	A	B	C	D	E
24.	A	B	C	D	E	49.	A	B	C	D	E	74.	A	B	C	D	E
25.	A	B	C	D	E	50.	A	B	C	D	E	75.	A	B	C	D	E

Practice Test 1

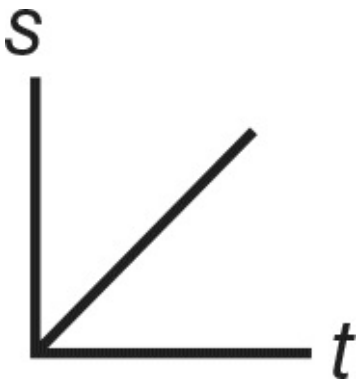
PART A

Directions

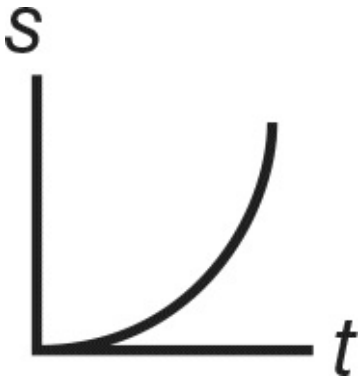
Each set of lettered choices below relates to the numbered questions immediately following it. Select the one lettered choice that best answers each question. A choice may be used once, more than once, or not at all in each set.

Questions 1–3 relate to the following graphs of displacement *s* vs. time *t* and velocity *v* vs. time *t*.

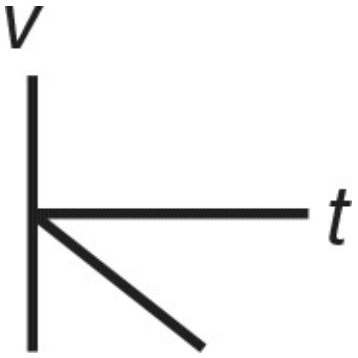
(A)



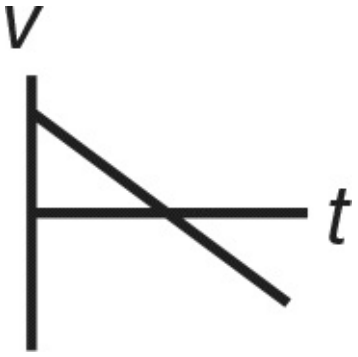
(B)



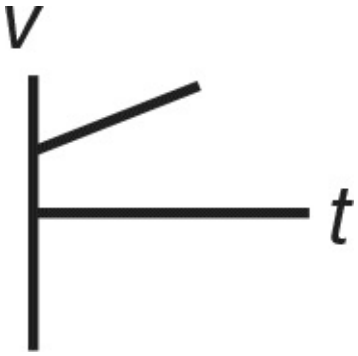
(C)



(D)



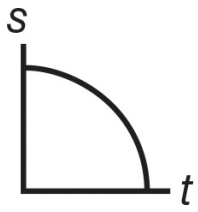
(E)



1. In which of the graphs is the velocity of the moving object constant?

2. In which of the graphs does the moving object reverse its direction?

3. Which of the graphs is equivalent to the displacement vs. time graph below?



Questions 4–7 relate to the following nuclear equations.

(A) $${}_{1}^{2}\mathrm{H} + {}_{1}^{2}\mathrm{H} \rightarrow {}_{1}^{3}\mathrm{H} + {}_{1}^{1}\mathrm{H} + \text{energy}$$

(B) $${}_{88}^{226}\mathrm{Ra} \rightarrow {}_{86}^{222}\mathrm{Rn} + {}_{2}^{4}\mathrm{He}$$

(C) $${}_{83}^{209}\mathrm{Bi} \rightarrow {}_{84}^{209}\mathrm{Po} + {}_{-1}^{0}\mathrm{e}$$

(D) $${}_{92}^{235}\mathrm{U} + {}_{0}^{1}\mathrm{n} \rightarrow {}_{54}^{140}\mathrm{Xe} + {}_{38}^{94}\mathrm{Sr} + {}_{2}^{1}\mathrm{n}$$

(E) $${}_{2}^{4}\mathrm{He} + {}_{13}^{27}\mathrm{Al} \rightarrow {}_{15}^{30}\mathrm{P} + {}_{0}^{1}\mathrm{n}$$

4. Which of the above equations represents nuclear fission?

5. Which of the above equations represents alpha decay?

6. Which of the above equations represents beta decay?

7. Which of the above equations represents nuclear fusion?

Questions 8–11 relate to the following equations or physical principles that might be used to solve certain problems.

(A) first law of thermodynamics (conservation of energy)
(B) second law of thermodynamics (law of entropy)
(C) ideal gas law
(D) heat of fusion and heat of vaporization equation
(E) heat engine efficiency

Select the choice that should be used to provide the best and most direct solution to each of the following problems.

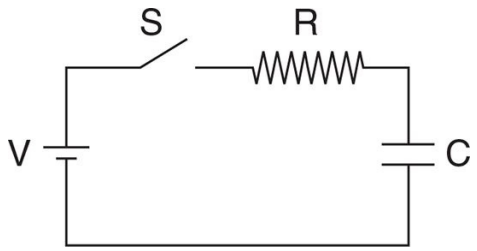
8. If the pressure of a gas remains constant and the temperature is doubled, what happens to the volume of the gas?

9. A new soft drink bottle is opened, allowing gas to escape into the atmosphere. As the gas escapes, how does its degree of disorder change?

10. An unknown liquid at a high temperature is safely mixed with water until an equilibrium temperature is reached. How much heat was gained by the water?

11. Heat is added to a block of ice of mass *m* until the entire block melts into liquid water. How much heat was required to melt the ice?

Questions 12–14 relate to the resistance-capacitance circuit and the choices below.



(A) zero

(B) V

(C) R

(D) C

(E) $\frac{V}{R}$

12. Immediately after the switch S is closed, what is the voltage across the resistor R?

13. Immediately after the switch S is closed, what is the current in the circuit?

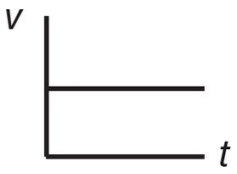
14. A very long time after the switch S has been closed, what is the current in the circuit?

PART B

Directions

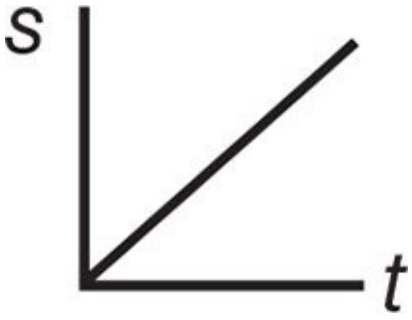
Each of the questions or incomplete statements below is followed by five answer choices. Select the one that is best in each case.

15.

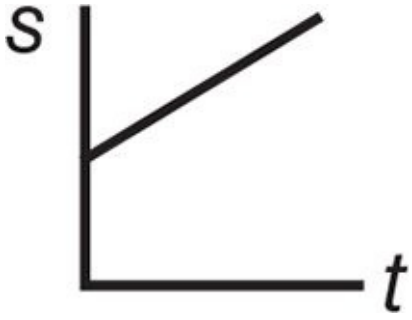


The graph above shows velocity v as a function of time t for a particle moving in a straight line. Graphs of displacement s vs. time t that are consistent with the v vs. t graph above include which of the following?

I.



II.



III. 

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

16. You are sitting on a seat facing forward on an airplane with its wings parallel to the ground. The window shades of the airplane are closed, and the vibration of the plane is negligible. When you place your class ring on the end of a necklace chain and hold the other end in front of you, you notice that the chain and ring hang vertically and point directly to the floor of the airplane. Which of the following could be true of the airplane?

I. The airplane is at rest.
II. The airplane is moving with a constant velocity.
III. The airplane is increasing its speed.
IV. The airplane is decreasing its speed.

(A) I only
(B) III only
(C) I or II, but not III or IV

(D) III or IV, but not I or II
(E) IV only

17. If 400 g of water at 40°C is mixed with 100 g of water at 30°C, the resulting temperature of the water is

(A) 13°C.
(B) 26°C.
(C) 36°C.
(D) 38°C.
(E) 44°C.

18. A 40 Ω resistor in a closed circuit has 20 volts across it. The current flowing through the resistor is

(A) 0.5 A.
(B) 2 A.
(C) 20 A.
(D) 80 A.
(E) 800 A.

19. Two blocks each weighing 50 N are connected to the ends of a light string that is passed over a pulley. The tension in the string is

(A) 25 N.
(B) 50 N.
(C) 100 N.

(D) 200 N.

(E) 500 N.

Questions 20–22 refer to the following.

A horizontal force *F* acts on a block of mass *m* that is initially at rest on a floor of negligible friction. The force acts for a time *t* and moves the block a displacement *d*.

20. The acceleration of the block is

(A) *Ft.*

(B) *Fd.*

(C) $\frac{F}{m}$.

(D) $\frac{m}{F}$.

(E) $\frac{d}{t}$.

21. The change in momentum of the block is

(A) $\frac{F}{t}$.

(B) $\frac{m}{t}$.

(C) *Fd.*

(D) *Ft.*

(E) *mt.*

22. The change in the kinetic energy of the block is

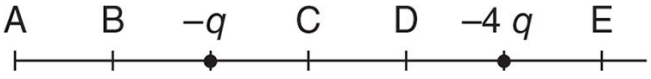
(A) *Fd.*

(B) $\frac{F}{d}$.

(C) *Ft.*

(D) $\frac{F}{t}$.

(E) $\frac{d}{t}$.

23. 

Two charges –*q* and –4 *q* are located on a line as shown above. At which point could a positive charge be placed if it is to experience no force?

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

24. A charge is placed near a magnetic field. In which of the following cases would the charge experience a force?

I. The charge is placed inside the magnetic field and is not moving.
II. The charge is moving and its velocity is perpendicular to the magnetic field lines.
III. The charge is moving and its velocity is parallel to the magnetic field lines.

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

25. A bar magnet is moving through a stationary coil of wire. If the magnet suddenly stops halfway through the coil, which of the following will occur?

(A) The magnet will lose its magnetic field.
(B) The current induced in the coil will continue flowing in the same direction.

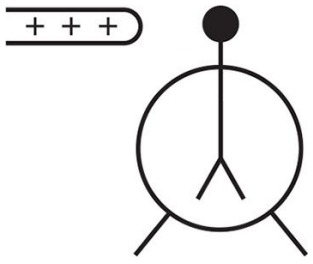
(C) The current induced in the coil will stop.
(D) The current induced in the coil will reverse direction.
(E) The magnet will be pushed out of the coil.

26. An ideal gas is enclosed in a container that has a fixed volume. If the temperature of the gas is increased, which of the following will also increase?

I. The pressure against the walls of the container.
II. The average kinetic energy of the gas molecules.
III. The number of moles of gas in the container.

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

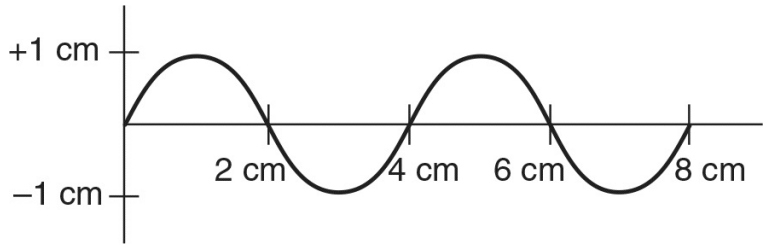
27.



A neutral electroscope is shown above. If a positively charged rod is brought near the knob of the electroscope, which of the following statements is true?

(A) The electroscope can be charged negatively without the positively charged rod touching the knob and using a only grounding wire.
(B) The electroscope can be charged positively without the positively charged rod touching the knob and using only a grounding wire.
(C) The leaves of the electroscope are negatively charged.
(D) The knob of the electroscope is positively charged.
(E) The electroscope has a net positive charge.

Questions 28–30 refer to the figure below, which represents a wave propagating along a string with a speed of 320 cm/s.



28. The wave is an example of a(n)

(A) sound wave.
(B) transverse wave.
(C) electromagnetic wave.
(D) longitudinal wave.
(E) interference wave.

29. The frequency of the wave is

(A) 1,280 Hz.
(B) 640 Hz.
(C) 320 Hz.
(D) 80 Hz.
(E) 40 Hz.

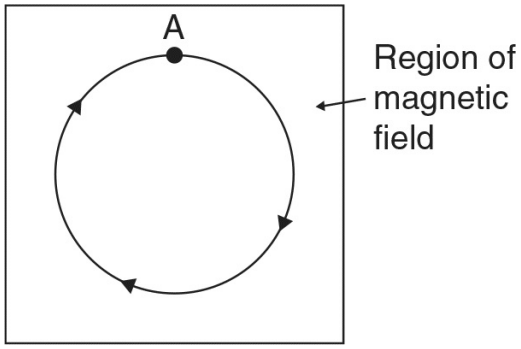
30. The amplitude of the wave is

(A) 1 cm.
(B) 2 cm.
(C) 4 cm.
(D) 8 cm.
(E) 16 cm.

31. A generator is constructed by placing a coil of wire in a magnetic field. The coil is rotated in a clockwise direction in the magnetic field at a constant rate to induce a current in the wire. If the coil of wire is rotated in a counterclockwise direction at the same constant rate, which of the following will occur?

(A) The current in the coil will reverse its direction.
(B) The current in the coil will stop flowing.
(C) The current in the coil will continue to flow in the same direction as before.
(D) The current in the coil will decrease steadily.
(E) The current in the coil will increase steadily.

Questions 32–33 relate to the positive charge following a circular path in a region of magnetic field in the figure below.



32. At point A, what is the direction of the net force acting on the positive charge?

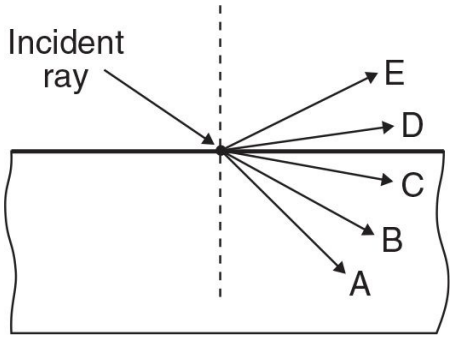
(A) →
(B) ←
(C) ↑
(D) ↓
(E) There is no net force acting on the charge at point A.

33. The direction of the magnetic field in the region shown is

(A) out of the page and perpendicular to it.
(B) into the page and perpendicular to it.
(C) toward the top of the page.
(D) toward the bottom of the page.
(E) to the right.

Questions 34–35 refer to the following.

A beam of light is incident onto a glass plate. Possible angles for the reflected and refracted rays are drawn in the figure below.



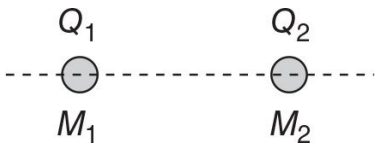
34. Which of the rays best represents the reflected ray?

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

35. Which of the rays best represents the refracted ray?

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

Questions 36–38 relate to the two masses M_1 and M_2, which have a charge Q_1 and Q_2, respectively. The masses are initially separated by a distance r.



36. If the distance between the masses is doubled, which of the following is true?

(A) The gravitational force will increase.
(B) The electric force will increase.
(C) The gravitational force will decrease, but the electric force will remain the same.
(D) The electric force will decrease, but the gravitational force will remain the same.
(E) Both the gravitational and electric forces will decrease.

37. If both masses are doubled, but the charge on each remains the same, which of the following is true?

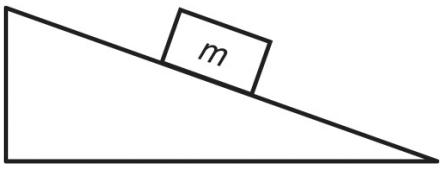
(A) The gravitational force will decrease.
(B) The electric force will increase.
(C) The gravitational force will increase, but the electric force will remain the same.
(D) The electric force will increase, but the gravitational force will remain the same.
(E) Both the gravitational and electric forces will decrease.

38. If the two charged masses are placed in space so that no other forces affect them, and they remain at a distance r apart indefinitely, which of the following must be true?

(A) Both charges are positive.
(B) Q_1 is positive and Q_2 is negative.
(C) Q_1 is negative and Q_2 is positive.
(D) $Q_1 = Q_2$
(E) $M_1 = M_2$

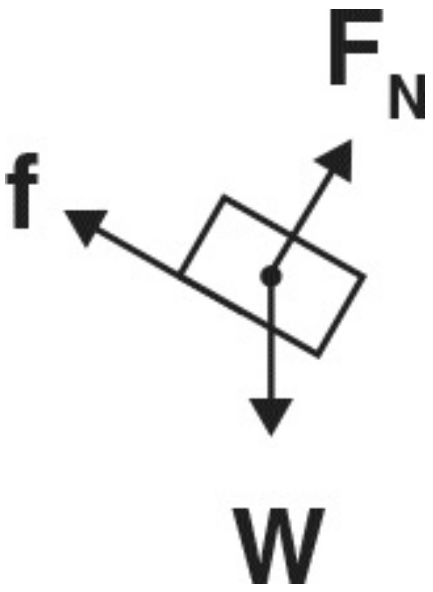
39. An ohm is defined as one volt per ampere, and an ampere is a coulomb per second. A farad, the unit for capacitance, is a coulomb per volt. An ohm times a farad is a unit of

(A) voltage.
(B) resistance.
(C) energy.
(D) time.
(E) charge.

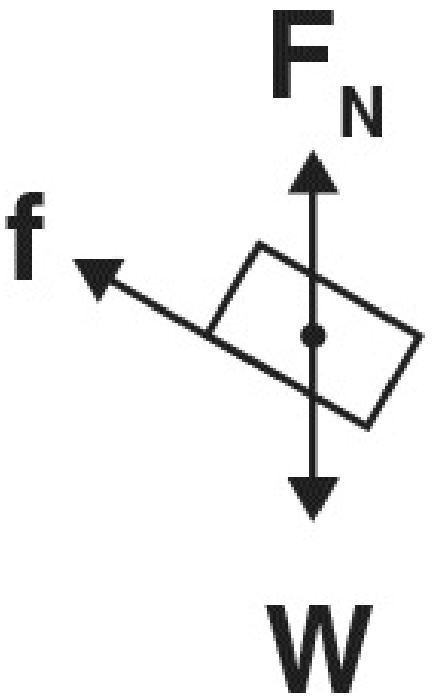
40. 

A block of mass m is at rest on a rough inclined plane. Which of the following diagrams best represents the correct directions for the forces acting on the block?

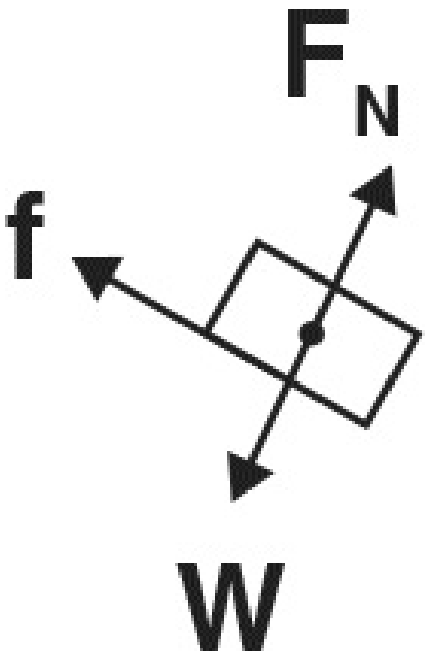
(A)



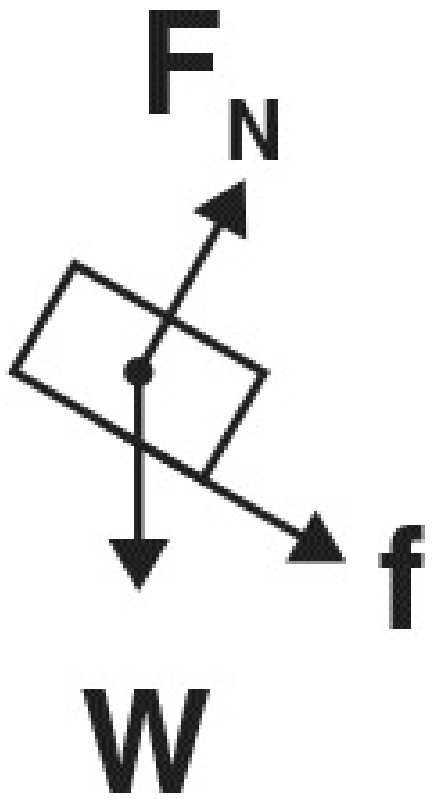
(B)



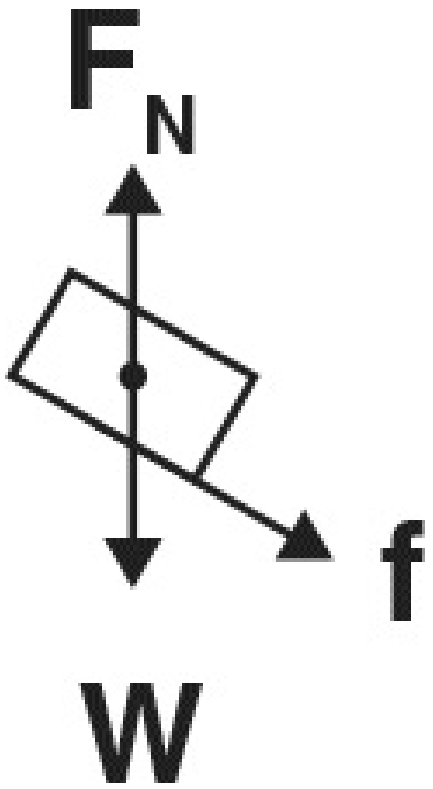
(C)



(D)



(E)



Questions 41–42 refer to the following.

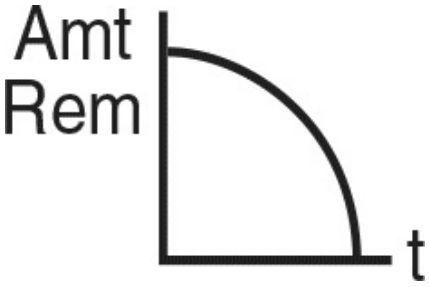
A sealed bottle contains 100 grams of radioactive iodine. After 24 days, the bottle contains only 12.5 grams of radioactive iodine.

41. The half-life of this isotope of iodine is most nearly

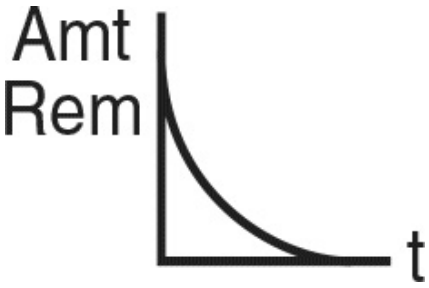
(A) 24 days.
(B) 16 days.
(C) 12 days.
(D) 8 days.
(E) 3 days.

42. Which of the following graphs best represents the amount of iodine remaining versus time?

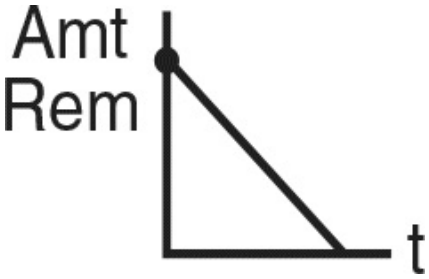
(A)



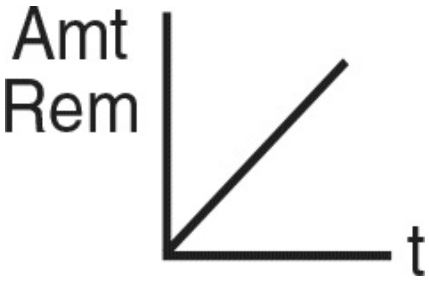
(B)

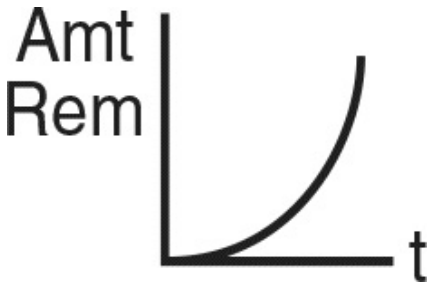


(C)

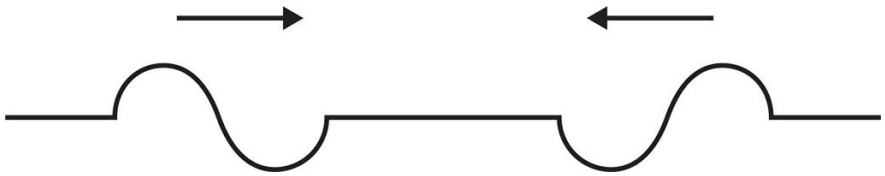


(D)

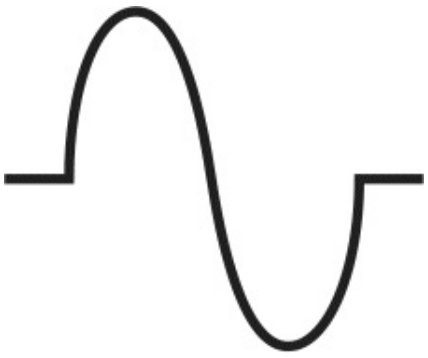


(E) 

Questions 43–44 relate to two waves of equal wavelength and amplitude approaching each other in the same rope as shown.

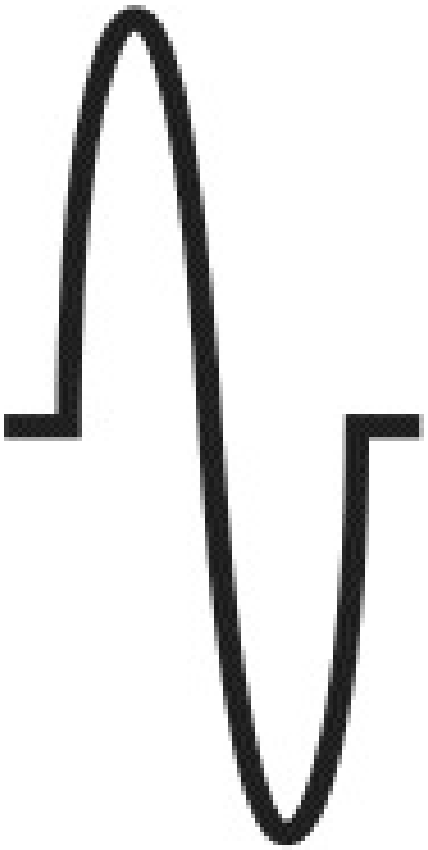


43. When the waves occupy exactly the same space at the same time, what will the shape of the rope be?

(A) 

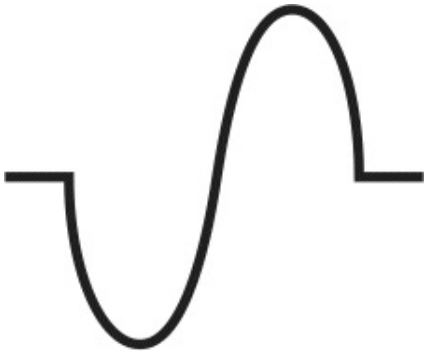
(B) 

(C)



(D)

(E)



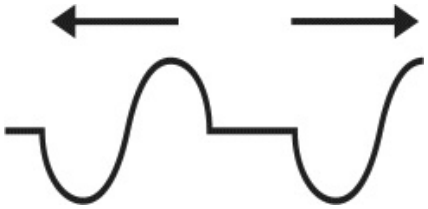
44. After the waves have completely passed each other, what will the shape of the rope be?

(A) 

(B) 

(C) 

(D) 

(E) 

45. A converging lens forms an image primarily due to the phenomenon of

(A) refraction.
(B) reflection.
(C) diffraction.
(D) constructive interference.
(E) destructive interference.

46. Sound is an example of a(n)

(A) electromagnetic wave.