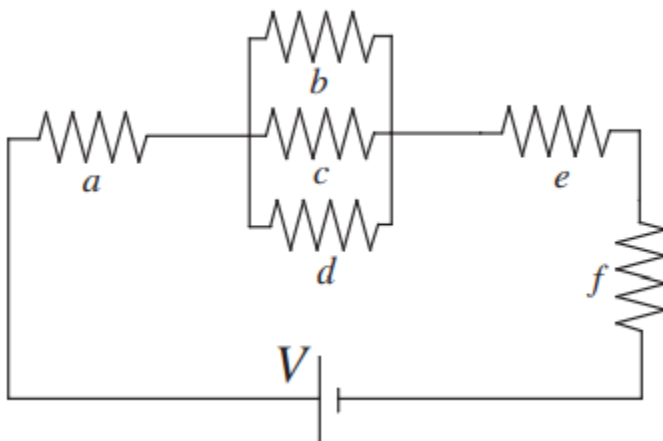


SAT Physics Practice Paper 32

Q1. Four point charges are labeled Charge 1, Charge 2, Charge 3, and Charge 4. It is known that Charge 1 attracts Charge 2, Charge 2 repels Charge 3, and Charge 3 attracts Charge 4. Which of the following must be true?

- (A) Charge 1 attracts Charge 4.
- (B) Charge 2 attracts Charge 3.
- (C) Charge 1 repels Charge 3.
- (D) Charge 2 repels Charge 4.
- (E) Charge 1 repels Charge 4.

Q2.



All six resistors in the circuit have the same resistance,  $R$ , and the battery is a source of constant voltage,  $V$ .

How does the current through Resistor  $a$  compare with the current through Resistor  $b$  ?

- (A) The current through Resistor  $a$  is 9 times the current through Resistor  $b$ .
- (B) The current through Resistor  $a$  is 3 times the current through Resistor  $b$ .
- (C) The current through Resistor  $a$  is the same as the current through Resistor  $b$ .
- (D) The current through Resistor  $b$  is 3 times the current through Resistor  $a$ .
- (E) The current through Resistor  $b$  is 9 times the current through Resistor  $a$ .

Q3. Sound waves travel at 350 m/s through warm air and at 3,500 m/s through brass.

What happens to the wavelength of a 700 Hz acoustic wave as it enters brass from warm air?

- (A) It decreases by a factor of 20.
- (B) It decreases by a factor of 10.
- (C) It increases by a factor of 10.
- (D) It increases by a factor of 20.
- (E) The wavelength remains unchanged when a wave passes into a new medium.

**Q4. Which of the following types of electromagnetic radiation has the longest wavelength?**

- (A) Gamma rays
- (B) Ultraviolet
- (C) Blue light
- (D) X-rays
- (E) Orange light

**Q5.**



The circular metal plate has a concentric circular hole. If the plate is heated uniformly, so that the outer circumference of the plate increases by 4 percent, then the circumference of the hole will

- (A) decrease by 16 percent
- (B) decrease by 8 percent
- (C) decrease by 4 percent
- (D) increase by 4 percent
- (E) increase by 8 percent

**Q6. The table records the mass and speed of an object traveling at constant velocity on a frictionless track, as performed by a student conducting a physics lab exercise. In her analysis, the student had to state the trial in which the object had the greatest momentum and the trial in which it had the greatest kinetic energy. Which of the following gives the correct answer?**

	<u>Greatest Momentum</u>	<u>Greatest Kinetic Energy</u>
(A)	Trial 1	Trial 3
(B)	Trial 2	Trial 2
(C)	Trial 3	Trial 2
(D)	Trial 3	Trial 3
(E)	Trial 4	Trial 4

**Q7. What happens to the pressure, P, of an ideal gas if the temperature is increased by a factor of 2 and the volume is increased by a factor of 8 ?**

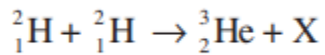
- (A) P decreases by a factor of 16.
- (B) P decreases by a factor of 4.

- (C) P decreases by a factor of 2.
- (D) P increases by a factor of 4.
- (E) P increases by a factor of 16.

Q8. How much current does a 60-watt light bulb draw if it operates at a voltage of 120 volts?

- (A) 0.25 amp
- (B) 0.5 amp
- (C) 2 amps
- (D) 4 amps
- (E) 30 amps

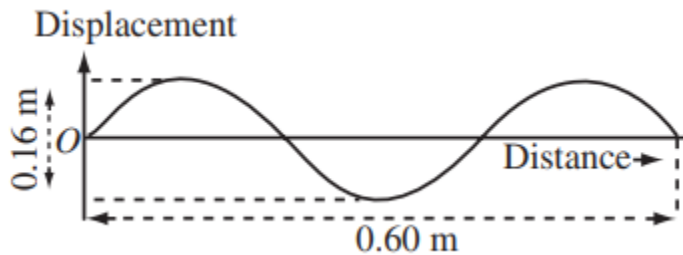
Q9.



Identify the particle X resulting from the nuclear reaction shown above.

- (A) Positron
- (B) Electron
- (C) Proton
- (D) Neutron
- (E) Alpha particle

Question 10-12



Q10. What is the amplitude of the wave?

- (A) 0.08 m
- (B) 0.16 m
- (C) 0.32 m
- (D) 0.48 m
- (E) 0.60 m

Q11. What is the wavelength of the wave?

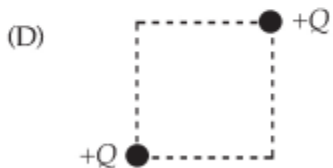
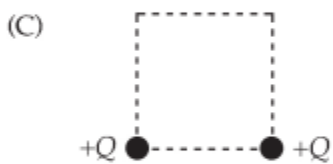
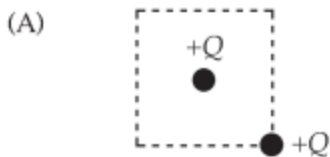
- (A) 0.08 m
- (B) 0.16 m
- (C) 0.20 m
- (D) 0.40 m

(E) 0.60 m

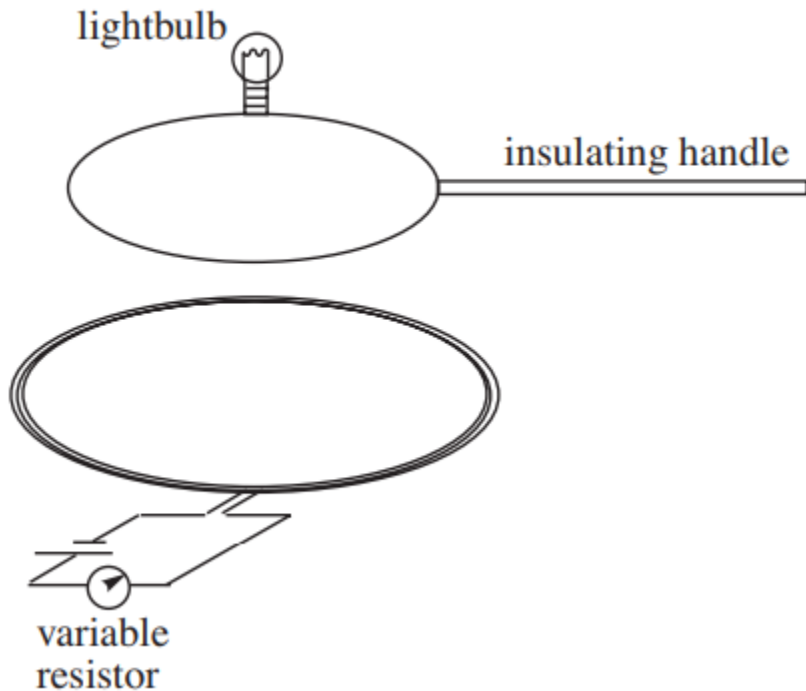
Q12. The drawing shows the displacement of a traveling wave at time  $t = 0$ . If the wave speed is 0.5 m/sec, and the wavelength is  $\lambda$  m, what is the period of the wave (in seconds)?

- (A)  $1/4\lambda$
- (B)  $1/2\lambda$
- (C)  $1/\lambda$
- (D)  $2\lambda$
- (E)  $4\lambda$

Q13. The square shown is the same size in each of the following diagrams. In which diagram is the electrical potential energy of the pair of charges the greatest?



Q14.



A loop of metal wire containing a tiny lightbulb is attached to an insulating handle and placed over a coil of wire in which a current can be established by a source of emf and controlled by a variable resistor. The plane of the top loop is parallel to the plane of the bottom coil. Which of the following could NOT cause the bulb to light?

- (A) Rotating the handle  $90^\circ$  while keeping the plane of the top loop parallel to the plane of the bottom coil
- (B) Raising the handle up and away from the coil
- (C) Lowering the handle down toward the coil
- (D) Decreasing the resistance of the coil
- (E) Increasing the resistance of the coil

Q15. During each cycle, a heat engine with an efficiency of 25% takes in 800 J of energy. How much waste heat is expelled during each cycle?

- (A) 100 J
- (B) 200 J
- (C) 300 J
- (D) 400 J
- (E) 600 J