

## SAT Physics Practice Test 24

### Part A

1. When can the instantaneous velocity of an object be equal to the average velocity of an object?
  - A. It can never equal the average velocity.
  - B. It can only equal the average velocity during acceleration.
  - C. It can only equal the average velocity when the velocity is constant.
  - D. It is always equal at the end of a displacement.
  - E. They are equal at the end of a displacement
  
2. How does one use the right hand rule to determine the direction of the force applied to a current-carrying wire?
  - A. Point the fingers of the right hand in the same direction as the magnetic lines of force.
  - B. Point the thumb at right angles to the lines of force.
  - C. Point the fingers of the right hand along the wire in the direction of the current.
  - D. Point the thumb in the direction of the magnetic lines of force.
  - E. Point the fingers of the right hand against the direction of the magnetic lines of force.
  
3. When blue light is shined onto a certain metal, no electrons are ejected. Which of the following lights might eject electrons from the metal?
  - A. Red
  - B. Yellow
  - C. Green
  - D. Infrared
  - E. Ultraviolet
  
4. An astronaut visits the planet Mars, which has less of a gravitational acceleration than the earth. While on Mars, the astronaut will notice that his
  - A. weight is less and his mass is greater.
  - B. weight is the same and his mass is the same.
  - C. weight is less and his mass is the same.
  - D. weight is the same and his mass is less.
  - E. weight is less and his mass is less.
  
5. A negative ion is an object that has
  - A. more electrons than neutrons.
  - B. more electrons than protons.
  - C. more protons than neutrons.
  - D. more protons than electrons.
  - E. more neutrons than electrons or protons.
  
6. When it is known that a net force is operating on an object, it is known that the object is
  - A. moving with constant velocity.

- B. losing mass.
- C. at rest.
- D. being accelerated.
- E. gaining weight.

7. Which wave characteristic describes the product of the frequency and the wavelength?

- A. Frequency
- B. Amplitude
- C. Wavelength
- D. Velocity
- E. Period

8. Einstein's theory of relativity states that all the laws of nature are the same in

- A. accelerating reference frames.
- B. constant velocity reference frames.
- C. oscillating reference frames.
- D. vibrating reference frames.
- E. circling reference frames.

9. A 24 V battery supplies a total current of .75 amperes to a circuit. How much power does the battery supply to the circuit?

- A. .04 watts
- B. 13.5 watts
- C. 18 watts
- D. 32 watts
- E. 32 watts

10. Two children are riding a merry-go-round. Child (P) rides on a pony on the outside rim of the merry-go-round, while Child (L) rides a lion on the inside rim of the merry-go-round. At the end of the ride, which of the following statements is true?

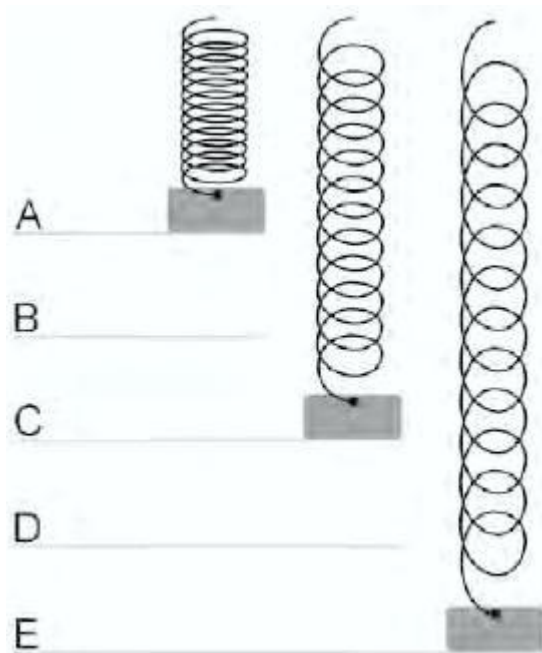
- A. Child (P) had the largest angular displacement.
- B. Child (L) had the largest tangential displacement.
- C. Child (P) had the largest tangential velocity.
- D. Child (L) had the largest angular velocity.
- E. Child (L) had the largest linear acceleration

11. Two high school students attempt to push a car uphill. The car rolls downhill against them for a distance of 10 m before they can bring it to a stop. If both students pushed on the car with a force of 1000N while it rolled downhill, how much work did they do?

- A. 0
- B. 1000 J
- C. -1000 J
- D. 10,000 J
- E. -10,000 J

12. During a collision between two objects, the kinetic energy is conserved. Which statement best describes the momentum after the collision?

- A. The momentum equals the kinetic energy.
- B. The momentum may be conserved.
- C. The momentum must be conserved.
- D. The momentum decreases by half.
- E. The momentum increases to double the original value.



13. The hanging spring shown above has a mass attached to it. The spring is set in motion by displacing the mass downward and releasing it. At which point is the kinetic energy of the mass the greatest value? (Point A is the maximum compression of the spring, and Point E is the maximum expansion of the spring.)

- A. Point A
- B. Point B
- C. Point C
- D. Point D
- E. Point E

14. A gamma ray is emitted from the nucleus of an unstable atom. What is the result?

- A. The number of electrons decreases.
- B. The number of electrons increases.
- C. The mass of the nucleus increases.
- D. The mass of the nucleus decreases.
- E. The mass of the nucleus remains the same.

15. Which of the following statements is true about an ideal gas contained at a fixed volume when its temperature is raised?

- A. The density of the gas decreases.
- B. The average velocity of the gas particles increases.
- C. The density of the gas increases.
- D. The pressure remains constant.
- E. The pressure decreases.

## Part B

1. Two objects have the same mass and are located near each other at a distance ( $r$ ). If the mass of one of the objects is doubled and the mass of the other object is tripled, what would be the change in gravitational attraction between them?

- A. Decrease by  $1/6$
- B. Decrease by  $2/3$
- C. Increase by  $3/2$
- D. Increase by 5
- E. Increase by 6

2. The critical angle for a beam of light passing from a diamond into the air is  $24.4^\circ$ . This means that any light rays that strike the surface interface between the diamond and the air with an angle less than  $24.4^\circ$  are

- A. completely reflected.
- B. partially reflected and partially refracted.
- C. completely absorbed.
- D. partially absorbed and partially transmitted.
- E. completely transmitted.

3. A pendulum has a 1 second period of vibration. At what period in time would the string have to break for the pendulum bob to fly away the maximum possible distance from, but not below, the rest position of the pendulum bob? (The zero point for the pendulum at  $t = 0$  is at the maximum displacement)

- A.  $t = .125$  sec
- B.  $t = .25$  sec
- C.  $t = .375$  sec
- D.  $t = .5$  sec
- E.  $t = .625$  sec

4. A 400N box is suspended motionless from a steel frame by two ropes, A and B, which hang straight up and down. Which of the following statements about the tension in the two ropes is correct?

- A. The tension in rope A is larger than in rope B.
- B. The tension in rope B is larger than in rope A.

- C. The tension in the two ropes is greater than 400N.
- D. The tension in the two ropes is less than 400N.
- E. The tension in the two ropes is equal to 400N.

5. When a skydiver jumps from an airplane, he eventually reaches terminal velocity. At that time the force of the air resistance is

- A. equal to his mass.
- B. equal to twice his mass.
- C. equal to his weight.
- D. equal to twice his weight.
- E. equal to 1/2 his weight.

6. During an electrostatics experiment a student touches an electroscope with a negatively charged rod, and the leaves of the electroscope separate. What will be the result when a second positively charged rod is brought near, but does not touch, the electroscope?

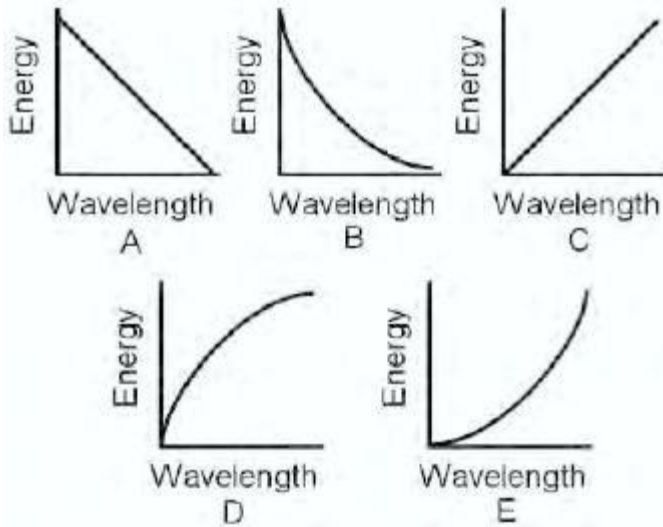
- A. The leaves will begin to flutter.
- B. The leaves will separate further.
- C. The leaves will move closer together.
- D. The leaves will be unaffected.
- E. None of the above will happen.

7. An object is placed inside the focal point of a concave mirror. Which of the following describes the image?

- A. Virtual, erect, and reduced
- B. Virtual, erect, and magnified
- C. Virtual, inverted, and reduced
- D. Real, erect, and reduced
- E. Real, inverted, and magnified

8. Two separate 10L containers each contain a different gas. One gas is at a temperature of 400K; the other gas is at a temperature of 200K. When both gases are added to the same 10L container, which statement is correct?

- I. The hotter gas loses heat to the cooler gas.
  - II. The hotter gas increases in temperature when the two are squeezed together.
  - III. The cooler gas decreases in temperature when placed into the second container.
- A. I only
  - B. II only
  - C. I and III only
  - D. II and III only
  - E. I, II, and III



9.

Select the graph shown above that most correctly represents the relationship between the energy of the photon and its wavelength.

- A. Graph A
- B. Graph B
- C. Graph C
- D. Graph D
- E. Graph E

10. Water drips from a leaky rainspout that is located at the top of a high building. The droplets of water fall at an interval of  $\frac{1}{2}$  second. As time passes, the distance between two consecutive drops of water

- A. decreases in a linear manner.
- B. increases in a linear manner.
- C. remains the same.
- D. decreases in a parabolic manner.
- E. increases in a parabolic manner.

11. A pendulum swings at a rate of .75 vibration/ sec. Which of the following changes could be made to the pendulum to cause the period of the pendulum to increase?

- A. Mass of the bob was increased
- B. Length of the pendulum was increased
- C. Mass of the bob was decreased
- D. Length of the pendulum was decreased
- E. The material from which the pendulum bob was made

12. A constant voltage power source is in a circuit where the resistance is increased by four. The voltage in the circuit

- A. increases by two.
- B. increases by four.
- C. decreases by two.

- D. decreases by four.
- E. remains the same.

13. Materials called dielectrics are placed between the plates of capacitors to

- A. speed the current flow.
- B. slow the current flow.
- C. reduce charge leakage from the capacitor.
- D. increase capacitance of the capacitor.
- E. decrease capacitance of the capacitor.

14. Water waves strike a solid barrier in which there is a single small opening. Waves that pass through the opening

- A. converge.
- B. fan out.
- C. invert.
- D. interfere.
- E. polarize.

15. A mass is suspended by a rubber band. The rubber band is stretched by the weight of the mass, but it is not moving. The action force that causes the rubber band to stretch comes from the earth. What is the reaction force of the force pair?

- A. The rubber band pulling on the mass
- B. The rubber band pulling on the earth
- C. The mass pulling on the rubber band
- D. The mass pulling on the earth
- E. The earth pulling on the rubber band