

## SAT Physics Practice Test 25

### Part B

1. The processes of constructive interference and destructive interference occur in
  - A. cosmic rays.
  - B. light rays.
  - C. sound waves.
  - D. water waves.
  - E. all of these.
  
2. A positively charged rod is brought near an uncharged pith ball that is being touched by a copper wire. Both the rod and the copper wire are simultaneously removed, and the pith ball is tested to find if any electrostatic charge is present. What is the result?
  - A. The pith ball has been positively charged by conduction.
  - B. The pith ball has been positively charged by induction.
  - C. The pith ball has been negatively charged by conduction.
  - D. The pith ball has been negatively charged by induction.
  - E. The pith ball has not been charged in any way.
  
3. Two-point charges are separated by a small distance. When the distance between the two particles is halved, which of the following descriptions is true?
  - A. The particles attract one another.
  - B. The particles repel one another.
  - C. The particles exert the same force on one another.
  - D. The particles exert twice as much force on one another.
  - E. The particles exert four times as much force on one another.
  
4. A photon of light from which of the following electromagnetic radiations carries the greater amount of energy?
  - A. Blue
  - B. Green
  - C. Orange
  - D. Red
  - E. Yellow
  
5. A person standing in an elevator watches a spider hanging from a thread attached to the ceiling. Suddenly the elevator accelerates downward. The person watching the spider on the thread will see
  - A. the spider thread snap and the spider slowly fall.
  - B. the spider thread and spider float upward.
  - C. the spider thread snap and the spider slowly float upward.
  - D. the spider thread and the spider remain as they were before the acceleration began.
  - E. the spider thread begins to swing back and forth like a pendulum.

6. Three ice cubes are placed into three equal beakers filled with water. One ice cube has a mass of 50 g, the second ice cube has a mass of 75 g, and the third ice cube has a mass of 100 g. After the ice cubes are added, each beaker is filled to the brim with water at a temperature of 1°C. After a period of time passes and all three ice cubes melt, which of the following situations is most likely?

- A. All three beakers have overflowed.
- B. None of the beakers has overflowed.
- C. The beaker with the 100 g ice cube has overflowed.
- D. The beakers with the 100 g and the 75 g ice cube in them have overflowed.
- E. The beaker with the 50 g ice cube has overflowed.

7. One mole of helium gas and one mole of neon gas are both at STP. Which of the following statements about the gases is correct?

- A. Their pressure is the same.
- B. Their temperature is the same.
- C. Their volume is the same.
- D. Their number of particles is the same.
- E. The pressure, temperature, volume, and a number of particles are the same.

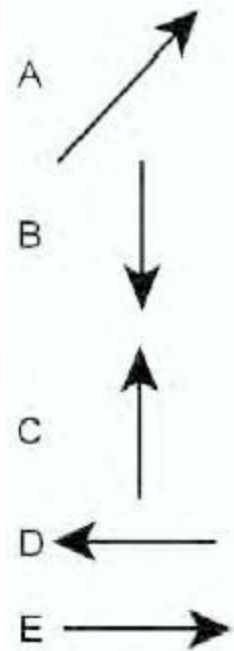
8. A step-down transformer changes the high input voltage used in our houses (120V) into the low voltage used to charge an electric razor (24V). What must be the ratio of the turns of wire from the primary side of the transformer to the secondary side?

- A. 5:1
- B. 2:7
- C. 1:8
- D. 2:9
- E. 1:10



9. Equilibrant

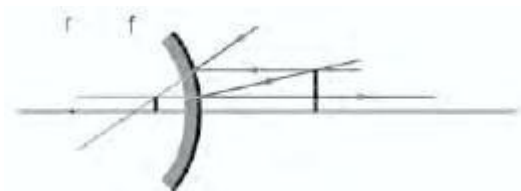
The equilibrant vector of a resultant vector is shown above. Which of the choices below represents the y component of the equilibrant vector?



- A. Line A
- B. Line B
- C. Line C
- D. Line D
- E. Line E

10. Object A (which is cold) is placed on top of object B (which is hot) in a closed system. Which of the following is the best description of what occurs in the system?

- I. Both A and B eventually reach the same temperature.
  - II. Gravity stops heat from moving up into A.
  - III. Heat flows from A to B.
- A. I only
  - B. II only
  - C. I and III only
  - D. II and III only
  - E. I, II, and III



11.

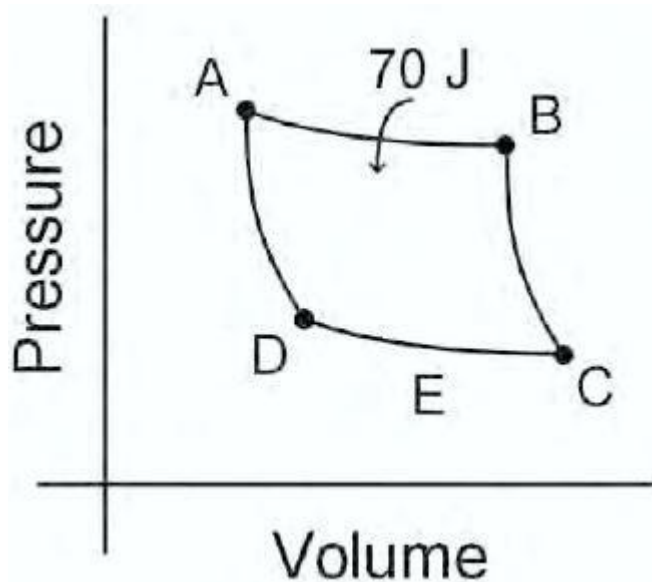
Look at the image above produced by the convex mirror shown and choose the correct description of the image.

- A. Erect and real
- B. Real and enlarged
- C. Enlarged and virtual

- D. Virtual and reduced
- E. Reduced and real

12. An object is moving in a circular path with a constant velocity ( $v$ ). If the radius of the circle in which the object is moving is decreased by one-half and the velocity remains the same, what will happen to the centripetal force?

- A. It will be  $4F$ .
- B. It will be  $2F$ .
- C. It will be  $F$ .
- D. It will be  $F/2$ .
- E. It will be  $F/4$ .



13. For the gas shown below, 70 Joules of energy is added between AB. The gas does 35 Joules of work. How much heat is exhausted between CD?

- A. .5J
- B. 2J
- C. 35J
- D. 105J
- E. 2,450J

14. Which wave characteristic describes the number of wave crests passing a given point per unit time?

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

15. What is the centripetal acceleration on the rim of a wagon wheel of 44 cm diameter if the wagon is being pulled at a constant 2.5 m/s?

- A. 10.8 m/s
- B. 18.6 m/s
- C. 28.4 m/s
- D. 32.7 m/s
- E. 36.3 m/s

## Part C

1. The specific heat for substance A is twice the specific heat of substance B. The same mass of each substance is allowed to gain 50 Joules of heat energy. As a result of the heating process

- A. the temperature of A rises twice as much as B.
- B. the temperature of A rises four times as much as B.
- C. the temperature of B rises twice as much as A.
- D. the temperature of B rises four times as much as A.
- E. the temperature of both B and A rise the same amount.

2. A golf ball is placed inside an unmounted tire, which is then rolled down a long hill. Identify the statement(s) that best describe the situation while the tire and golf ball is rolling down the hill.

- I. The centripetal force on the tire operates in the same direction as the centripetal force on the golf ball.
  - II. The centripetal force acting on the tire is opposite the centripetal force acting on the golf ball.
  - III. The centripetal force acting on the golf ball is equal to the centripetal force on the tire.
- A. I only
  - B. II only
  - C. I and III only
  - D. II and III only
  - E. I, II, and III

3. A 50 kg block slides down a plane that has been raised to an angle of  $30^\circ$  above the horizontal at a constant rate. After the block slides completely to the bottom of the plane, a rope is attached to the block. The rope pulls parallel to the surface of the plane as the block is pulled up the plane at a constant rate. Which statement about the tension in the rope is correct?

- A. The tension in the rope is greater than the frictional force but less than the weight of the block.
- B. The tension in the rope is greater than the frictional force plus the weight of the block.
- C. The tension in the rope is equal to the weight of the block minus the frictional force.
- D. The tension in the rope is equal to the weight of the block.
- E. The tension in the rope is equal to the frictional force.

4. The length of time a satellite takes to orbit the earth depends on its

- A. launch speed.
- B. mass.
- C. distance from the earth.
- D. weight.
- E. orbital direction.

5. An object falls with constant acceleration near the earth. Which statement best describes the velocity of the object?

- A. The velocity is constant.
- B. The velocity is decreasing.
- C. The velocity constantly changes in proportion to its weight.
- D. The velocity is not related to its acceleration.
- E. The velocity changes by the same amount each second.

6. The normal force between two surfaces is increased by four times. The coefficient of static friction will

- A. be cut in half.
- B. be doubled.
- C. remain the same.
- D. be quadrupled.
- E. be undetermined.

7. Which of the following methods can be used to induce a voltage into a coil of wire?

- A. Rotating a magnet around the coils of wire
- B. Passing a magnet through the center of the coils of wire
- C. Rotating the coil of wire in a magnetic field
- D. Changing the strength of the magnetic field applied to the wire
- E. All of the methods listed can be used to induce current into a coil of wire.

8. Scientists identify the elements that are burning in the stars by using which of the following devices?

- A. Refractive telescopes
- B. Reflective telescopes
- C. Spectroscopes
- D. Polarimeters
- E. Photoelectric microscopes

9. The discrete spectral lines of line spectra occur when the excitation of electrons takes place in

- A. solids.
- B. liquids.
- C. gases.
- D. plastics.
- E. all of these.

10. A proton and an electron are each placed in an electric field between a pair of parallel plates. The electron is placed exactly halfway between the two plates, and the proton is placed midway between the electron and the negative plate. Which of the following statements is correct about the forces the particles experience?

- A. The force on the electron is larger because it has less mass.
- B. The force on the proton is larger because it has greater mass
- C. The force on the electron is larger because it is in the strongest part of the electric field.
- D. The force on the proton is larger because it is closer to the negative plate.
- E. They both experience the same force.

11. A light ray that enters a glass block from the air is refracted because

- A. the light travels faster in the glass than in the air.
- B. the light travels slower in the glass than in the air.
- C. the light waves invert as they enter the glass.
- D. the light waves increase their amplitudes in the glass.
- E. the light intensity is greater in the glass than in the air.

12. Each and every person on earth is made of atoms that originated in

- A. the food we eat.
- B. the ancient stars.
- C. our mother's body.
- D. the oceans.
- E. the earth.

13. A toy rocket is launched straight up. At the exact top of its flight path, which of the following is true?

- A. Its velocity and acceleration are zero.
- B. Its velocity is zero and acceleration is  $9.8 \text{ m/s}^2$ .
- C. Its velocity is  $9.8 \text{ m/s}$  and acceleration is  $9.8 \text{ m/s}^2$ .
- D. Its velocity is  $9.8 \text{ m/s}$  and acceleration is zero.
- E. Its velocity is  $9.8 \text{ m/s}$  and displacement is  $9.8 \text{ m}$ .

14. Sir Isaac Newton's third law of motion is called the action-reaction law. Which of the following statements appropriately describes the action-reaction forces?

- A. They act on different objects.
- B. They act on the same object.
- C. They are unequal in magnitude.
- D. They act at right angles to one another.
- E. They act in the same direction.

15. When a gas undergoes an adiabatic compression its

- A. temperature decreases.
- B. temperature increases.

- C. volume increases.
- D. pressure decreases.
- E. energy decreases.