SAT Physics Practice Paper 30

SET 1

1. A 30 kg child is standing in the back of a stationary 10 kg wagon that is free to move.The child jumps from the wagon into his mother's arms. Which of the following statements is correct at the moment he jumps from the wagon?

A. The child's velocity is greater than the wagon's velocity.

B. The wagon's velocity is greater than the child's velocity

C. The impulse exerted by the child on the wagon is the same as the momentum gained by the wagon.

D. The impulse exerted by the wagon on the child is larger than the momentum gained by the child.

E. None of these statements is correct.

2. Ice, which has a temperature of 0°C, is added to 500 g of water that has a temperature of 100°C. Ice is continually added to the system until it has all melted and no more ice will melt. What is the temperature of the water in the system?

A. 50°C

B. 25°C

C. 4.184°C

D. 1°C

E. 0°C

3. Two similar pith balls are very near to one another, and each is charged with 2 excess electrons. The angle q between q_1 and q_2 is 5.5°. One electron is removed from q_1 and placed on q_2 so that q_1 has 1 electron and q_2 has 3 electrons. The angle between the pith balls changes to 4°. Which of the following statements is correct?

I.The amount of electrostatic charge has decreased.

II.The electrostatic force between the pith balls has decreased.

III.Both the electrostatic charge and force have decreased.

A. I only

B. II only

C. I and III only

D. II and III only

E. I, II, and III

4. Complete the nuclear reaction below by selecting the answer choice that correctly completes the reaction.

$${}^{1}_{1}H + {}^{7}_{3}Li \rightarrow {}^{7}_{4}Be + ?$$

A. ${}^{1}_{1}H$

B. ${}^{1}_{0}n$

C. ${}^{0}_{-1}e$

D. α

E. Y

5. A stuntman drives a brand new 800kg sports car off a high cliff at 200 km/hour. At the exact moment that the car is driven off the cliff, an 800kg rock is dislodged and falls straight down toward the ground. Which of the following is a correct statement about the event?

A. The car hits the ground first.

B. The rock hits the ground first.

C. The car and the rock hit the ground at the same time.

D. The x velocities of the car and the rock equalize over a period of time.

E. The x accelerations of the car and the rock are different

6. A person standing 1.5 m in front of a plane flat mirror would see their image at a distance of

A. .75 m

B. 1.5 m

C. 2.25 m

D. 3 m

E. 6 m

7. A paperboy rides his bicycle down the street and throws the papers to houses as he rides by them. When a thrown paper leaves his hand, which of the following statements is NOT true about the paper?

A. Its velocity changes.

B. Its acceleration changes.

C. Its displacement changes.

D. Its position relative to the earth changes.

E. Its position relative to the paperboy changes.

8. A tugboat pulls on an 84,000N barge with a cable having a breaking strength of 15,000N. The maximum acceleration the tugboat can apply to the barge without the cable breaking is

A. .75 m/s^2

B. 1.0 m/s^2

C. 1.25 m/s^2

D. 1.5 m/s^2

E. 1.75 m/s^2

9. Two equal vectors V and V' are added together. All of the following are possible values for the magnitude of the resultant vector EXCEPT

A. 0

B. 1/4 V

C. 1/2 V

D. 2 V

E. 4 V

10. A 30N child can push open a 1000N door because

A. the torque the child exerts on the door is greater than the torque the door exerts on the child.

B. the lever arm through which the child's force is exerted is less than the lever arm through which the door's weight is exerted.

C. the door's center of gravity is located at the bottom hinge.

D. the door's center of gravity is located at the top hinge.

E. the door's center of gravity is located at the doorknob.

11. The kinetic energy a pendulum contains when it passes through its zero displacement may be decreased by

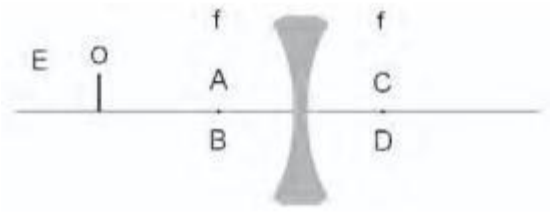
A. increasing the mass of the bob.

B. increasing the thickness of the string.

C. decreasing the length of the string.

D. increasing the length of the string.

E. decreasing the displacement of the



12.

An object (O) is placed in front of a convex lens as shown. Which of the positions best describes the location of the image?

A. Position A

B. Position B

C. Position C

D. Position D

E. Position E

13. During a lacrosse game, an attacking player shoots a low hard shot into the goal. The ball leaves the lacrosse stick and travels into the net very quickly. What happens as the ball flies toward the goal?

A. The horizontal acceleration of the ball increases.

B. The vertical acceleration of the ball increases.

C. The horizontal velocity of the ball is constant.

D. The vertical velocity of the ball is constant.

E. All the listed quantities are constant.

14. Einstein's theory of relativity is based on which of the following statements?

A. Mass and energy are equivalent.

B. The velocity of light is a constant.

C. Space and time are anomalies.

D. All particles have antiparticles.

E. Energy is infinite.

15. While a child flies a kite on a breezy day, a burst of wind causes the kite to fly in 1.6 m diameter circles in the sky every second. If the circular motion were converted to a straight down speed, how fast would the kite dive toward the ground?

A. 3.14 m/s

B. 5 m/s

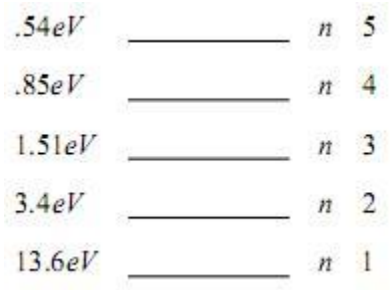
C. 6.28 m/s

D. 9.8 m/s

E. 15.7 m/s

SET 2

1. Question below relates to the following chart, which is a partial energy level diagram for the hydrogen electron.



The question relates to a hydrogen electron located at *E*-3. What is the emission energy when theelectron falls to *E*-2 from *E*-3?

A. ±.66*eV*

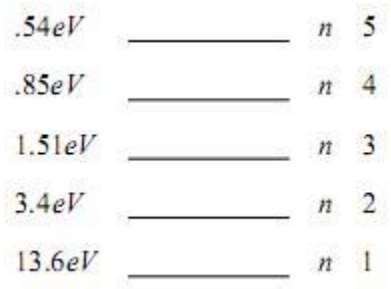
B. ±.966*eV*

C. ±1.89*eV*

D. ±10.2*eV*

E. ±12.09*eV*

2. Question below relates to the following chart, which is a partial energy level diagram for the hydrogen electron.



The question relates to a hydrogen electron located at *E*-3. What is the absorbed energy when theelectron jumps to *E*-5 from *E*-3?

A. ±.66*eV*

B. ±.966*eV*

C. ±1.89*eV*

D. ±10.2*eV*

E. ±12.09*eV*

3. Question below relates to the following chart, which is a partial energy level diagram for the hydrogen electron.

.54*eV*	_____	*n* 5
.85*eV*	_____	*n* 4
1.51*eV*	_____	*n* 3
3.4*eV*	_____	*n* 2
13.6*eV*	_____	*n* 1

The question relates to a hydrogen electron located at *E*-3. What is the emission energy when theelectron falls to *E*-1 from *E*-3?

A. ±.66*eV*

B. ±.966*eV*

C. ±1.89*eV*

D. ±10.2*eV*

E. ±12.09*eV*

4. A pendulum swings at a rate of .75 vibrations/second. The period of the vibrations would increase because…

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. Displacement from zero was increased

5. A pendulum swings at a rate of .75 vibrations/second. The frequency of the vibrations would decrease because…

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. Displacement from zero was increased

6. A pendulum swings at a rate of .75 vibrations/second. The velocity of the pendulum would increase because…

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. Displacement from zero was increased

7. A dog walks 120 m due east before turning and running 45 m west. He then turns and trots 40 m due north. After completing his journey, he is 85 m northeast of his home. When he hears his master call him, he runs directly home.

Which part of the trip is a negative vector?

A. The eastward leg

B. The westward leg

C. The northward leg

D. The distance from home

E. The distance to home

8. A dog walks 120 m due east before turning and running 45 m west. He then turns and trots 40 m due north. After completing his journey, he is 85 m northeast of his home. When he hears his master call him, he runs directly home.

Which part of the trip is an equilibrant?

A. The eastward leg

B. The westward leg

C. The northward leg

D. The distance from home

E. The distance to home

9. A dog walks 120 m due east before turning and running 45 m west. He then turns and trots 40 m due north. After completing his journey, he is 85 m northeast of his home. When he hears his master call him, he runs directly home.

Which part of the trip is the longest vector?

A. The eastward leg

B. The westward leg

C. The northward leg

D. The distance from home

E. The distance to home

10. The choices below give a description of the quantities listed above. Match the statement below with the quantity it describes above.

The number of wave crests passing a given point per unit of time.

A. Frequency

B. Amplitude

C. Wavelength

D. Velocity

E. Period

11. The choices below give a description of the quantities listed above. Match the statement below with the quantity it describes above.

The distance between two points or two consecutive waves.

A. Frequency

B. Amplitude

C. Wavelength

D. Velocity

E. Period

12. The choices below give a description of the quantities listed above. Match the statement below with the quantity it describes above.

The product of the frequency and the wavelength.

A. Frequency

B. Amplitude

C. Wavelength

D. Velocity

E. Period

13. A wooden crate is pushed across a concrete floor at 5 m/s and released. It slides to a stop after moving a short distance. The same crate is filled until it weighs twice as much as it did previously and again slid across the floor at 5 m/s and released. The stopping distance for the crate will be

A. 1/4 as far.

B. 1/2 as far.

C. the same distance.

D. twice as far.

E. four times as far.

14. A team of skydivers jumps from a plane and holds hands to form a flower-like design. As the skydivers begin their free fall, their velocity increases and their

A. acceleration increases.

B. acceleration decreases.

C. acceleration is constant.

D. acceleration is zero.

E. air resistance is reduced.

15. A professional golfer drives a golf ball 230 meters down the fairway. When the club head strikes the golf ball

A. the impact force on the golf ball is greatest

B. the impact force on the club head is greatest

C. the impact force is the same for both.

D. the impact force has no effect on the club

E. the impact force has no effect on the ball