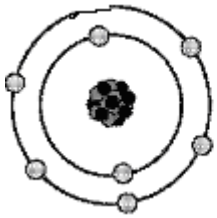
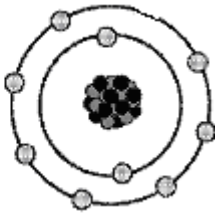
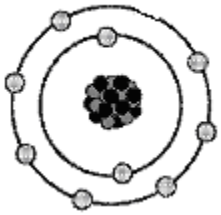
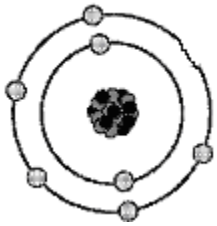
South Carolina Physical Science Practice EOC Exam **Do Not Write On This Test!**

STD 2

1. Use the diagrams below to answer the following question:

Diagram 1	**Diagram 2**	**Diagram 3**	**Diagram 4**
			
7 protons 7 neutrons 7 electrons	9 protons 9 neutrons 9 electrons	9 protons 8 neutrons 9 electrons	8 protons 8 neutrons 7 electrons

7

2. Which of the diagrams above represent atoms of the same element?

A. 1 and 2 are the same element.
B. 1 and 4 are the same element.
C. 2 and 3 are the same element.
D. 3 and 4 are the same element

3. Which of the symbols below best represents an isotope that contains 8 protons, 7 neutrons, and 8 electrons?

A. $^{15}_{8}O$

B $^{16}_{7}O$

C. $^{8}_{7}O$

D. $^{7}_{8}O$

4. What do elements in the same Group in the periodic table have in common?

A. the number of energy levels
B. the number of protons in the nucleus
C. the number of electrons in all of the energy levels
D. the number of electrons in the outside energy level

5. Determine the number of each subatomic particle in $^{27}_{13}Al$.

A. 13-protons, 27-neutrons, and 14-electrons
B. 14-protons, 13-neutrons, and 14-electrons
C. 13 protons, 14-neutrons, and 14-electrons
D. 13-protons, 14-neutrons, and 13-electrons

Use the Periodic Table of the Elements to answer the following question.

6. What is calcium **most** likely to do when it reacts with another element?

A. Lose two electrons to become an ion with a 2- charge.
B. Gain two electrons to become an ion with a 2+ charge.
C. Lose two electrons to become an ion with a 2+ charge.
D. Lose two protons to become an ion with a 2- charge.

7. Nuclear fusion and nuclear fission are processes which involve changes in the nuclei of atoms. Which of the following statements is **TRUE** concerning these processes?

A. Both of these processes occur naturally on Earth.
B. Mass is converted into energy during both of these processes.
C. Fission is the type of nuclear reaction that occurs on the sun.
D. Fusion occurs when a large nucleus splits into two or more smaller nuclei.

8. Which of the following is a benefit of using nuclear energy as an alternative energy source?

A. No greenhouse gasses are produced.
B. It warms surrounding bodies of water.
C. The waste products are easily disposed of.
D. There has never been a release of radiation.

STD 3

9. A chemistry student determined the density of water. She then froze the water and measured the density again and found that the density had decreased.

From this experiment the best conclusion about density is that it is a physical property because _____ .

A. the substance was still water even though the density changed
B. the change from liquid water to ice produced a change in energy
C. the color of the liquid and the color of the solid remained the same
D. the temperature of the water remained the same during the phase change

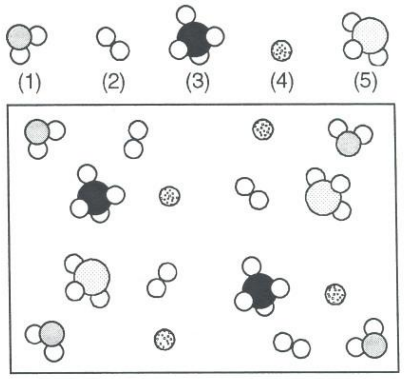
10. The table below lists physical properties of four elements.

Material	Melting Point	Boiling point
Metal A	1083^{o} C	2567^{o} C
Metal B	1455^{o} C	2732^{o} C
Nonmetal A	1064^{o} C	2808^{o} C
Nonmetal B	1519^{o} C	4444^{o} C

Which material would be **best** to use to make an electric wire that could be used under high temperature conditions?

A. Metal A
B. Metal B
C. Nonmetal A
D. Nonmetal B

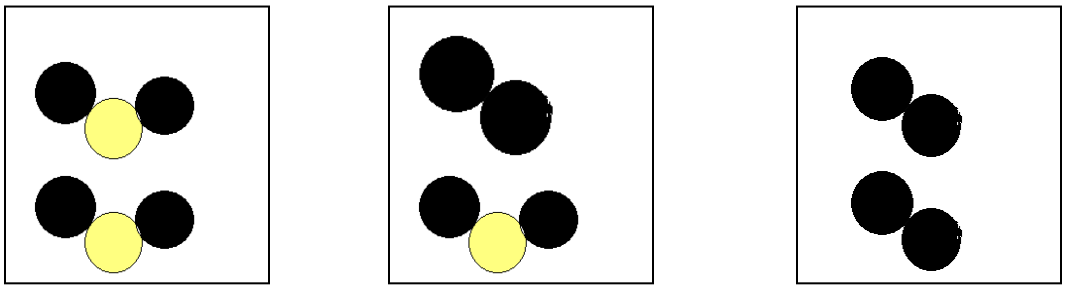
11. The diagram below represents a mixture of gases.



12. Which of the following represent **ALL** of the examples of molecules in the diagram?

A. 2.,4
B. 3,4,5
C. 1,3,5
D. 1,2,3,5

13. The diagrams below represent either pure substances or mixtures.



A B C

Which of the diagrams represent a pure substance?

A. A and B
B. A and C
C. A only
D. C only

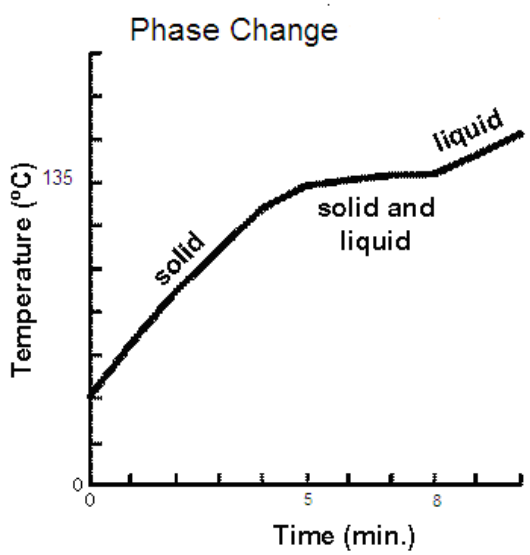
14. You are dissolving a solid in a liquid. Which statement below best describes what happens to the rate of dissolving when you **DECREASE** the temperature?

A. The rate increases because more collisions occur between solute and solvent.
B. The rate increases because fewer collisions occur between solute and solvent.
C. The rate decreases because more collisions occur between solute and solvent.
D. The rate decreases because fewer collisions occur between solute and solvent.

15. Which statement **best** describes a **difference** between molecules in the gas and plasma phase.

A. Molecules in the plasma phase are the most common in the universe.
B. Molecules in the plasma phase move throughout the entire container.
C. Molecules in the gas phase are usually positively or negatively charged.
D. Molecules in the gas phase can overcome the attractive forces between them.

16. The graph below depicts a substance that has undergone a phase change.



Why did the temperature change very little between minutes 5 and 8?

A. The heat applied was used to overcome the forces between the molecules.
B. The molecules of the substance were not moving very fast during that time.
C. The heat applied to the substance was used to break the molecules into atoms.
D. The substance must have been removed from the heat source during that time.

17. Which of the following is an acid?
A. NH_3
B. NaCl
C. NaOH
D. H_2SO_4

18. Students conducted tests of an unknown liquid. The results are shown in the table below.

Test	Unknown Liquid Results
Litmus Paper	Red → Red
Touch	Sticky
Reaction with Metal	Fizzed (*produced a gas)*

Based on the data the students collected the substance is most likely a(n) _____ .

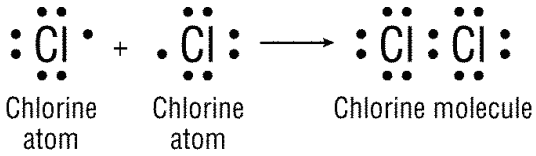
A. acidic solution
B. basic solution
C. salt solution
D. sugar solution

19. Use your periodic table to answer the following.

Magnesium forms bonds with nonmetals such as chlorine. Magnesium reacts in this manner because it tends to _____ .

A. gain two electrons to form a 2+ ion which is more stable
B. gain two electrons to form a 2+ ion which is less stable
C. lose two electrons to form a 2+ ion which is more stable
D. lose two electrons to form a 2+ ion which is less stable

20. The diagram below represents the formation of a chemical bond.



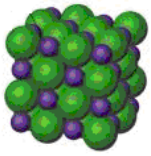
21. Which of the following statements best describes why a bond is formed between the atoms in the diagram?

.

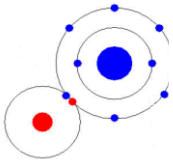
A. The individual atoms are more stable than the molecule.
B. Two covalent bonds are formed resulting in atoms that attract.
C. The atoms will share two electrons so that each will have a stable outside shell.
D. An electron is transferred from one chlorine atom to another forming an ionic bond.

Which of the following illustrates the structure of Sodium Chloride?

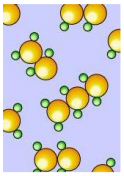
A.



B.



C.



D.

22. Use your periodic table to answer the following question.

Which combination of elements below will **most** likely result in the formation of a covalent bond?

A. Na and Cl
B. Ca and Cu
C. S and O
D. Mg and F

23. Using your periodic table answer the following question:

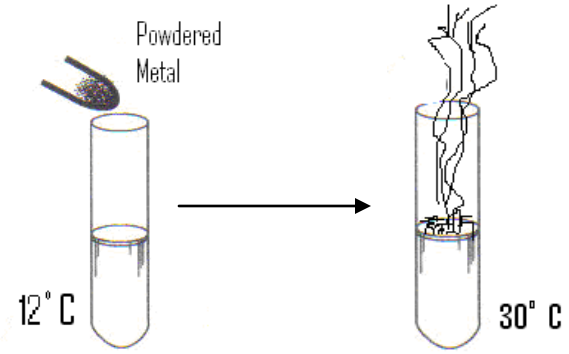
Which of the following represents the most likely formula for a compound formed between magnesium and iodine?

A. Mg_2I_2
B. MgI
C. Mg_2I
D. MgI_2

24. Which of the following is the **MOST** certain indication that a chemical change has occurred?

A. a color change
B. an energy transformation
C. a new gas molecule is formed
D. a change from a liquid to a gas

25. Powdered metal is poured into the test tube shown below containing an acidic solution.



The metal reacts and increases the temperature of the liquid. Which of the following statements best describes the illustrated reaction?

A. Energy was released during the endothermic chemical reaction
B. Energy was absorbed during the endothermic chemical reaction
C. Energy was released during the exothermic chemical reaction
D. Energy was absorbed during the exothermic chemical reaction

26. Which of the following is **LEAST** likely to be an evidence of a chemical change?

A. change in shape
B. evolution of a gas
C. change in temperature
D. formation of a precipitate

27. Balance the following reaction. Choose the answer which provides the correct coefficients for each reactant and product.

$$\_\_\_\_\_\ Fe + \_\_\_\_\_\ O_2 \rightarrow \_\_\_\_\_\ Fe_2O_3$$

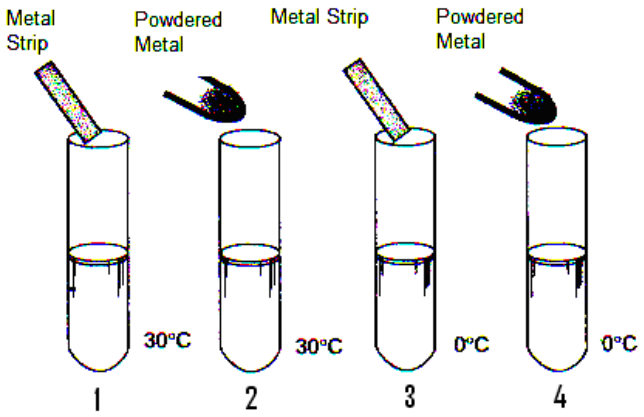
A. (4, 3, 2)
B. (2, 1, 1)
C. (1, 2, 3)
D. (2, 3, 1)

28. Use your periodic table to answer the following question.

Which of the following chemical equations is **NOT** balanced?

A. $Zn + 2\ HCl \rightarrow ZnCl_2 + H_2$
B. $MgS + 2\ HCl \rightarrow H_2S + MgCl_2$
C. $NaCl + BaI_2 \rightarrow 2NaI + BaCl_2$
D. $4Ca + H_2SO_4 \rightarrow 4CaSO_4 + H_2$

29. The diagram below shows four trials of equal masses of the same metal being dropped into acid solutions at two different temperatures**.**



Which test tube will have the fastest reaction rate?

A. 1, because it has high temperature and larger surface area.
B. 2, because it has high temperature and larger surface area.
C. 3, because it has low temperature and larger surface area.
D. 4, because it has low temperature and larger surface area.

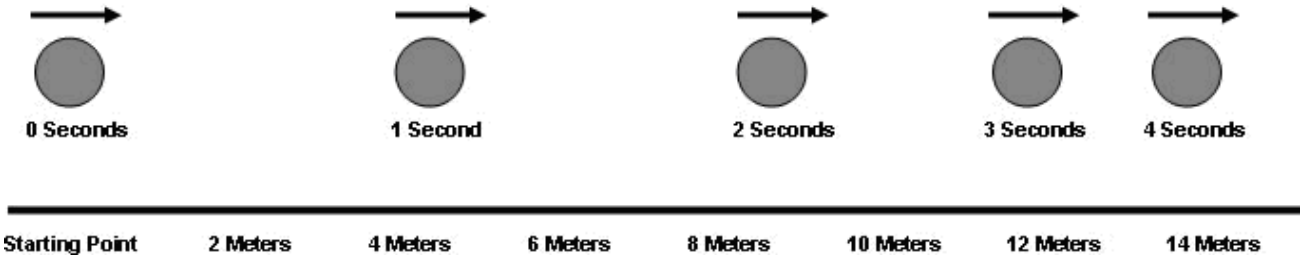
30. A race car traveled around a circular track at 50 km/h. Which of the following statements best describes the motion of the car as it traveled around the track?

A. The total displacement constantly increases because the car changes direction.
B. The total distance increases then decreases because the car changes direction.
C. The velocity changes because the car changes direction.
D. The speed changes because the car changes direction.

31. If your car travels for 10 seconds in one direction, at an average speed of 20 m/s, what distance will did your car travel?

A. 200 meters
B. 30 meters
C. 10 meters
D. 2 meters

32. The motion diagram below represents the position that a moving ball would be in at one second intervals.



The diagram above shows that the change in distance for each second is less as the ball moves from left to right. Which statement best describes this motion.

A. The velocity is decreasing so the acceleration is positive.
B. The velocity is decreasing so the acceleration is negative.
C. The velocity is increasing so the acceleration is increasing.
D. The velocity is increasing so the acceleration is decreasing.

33. What is the acceleration of a runner if her initial velocity is 2 m/s and her final velocity after 5 seconds is 12 m/s?

A. 2 m/s^2
B. 24 m/s^2
C. 30 m/s^2
D. 120 m/s^2

34. The motion diagram below represents the position that a falling ball would be in at one second intervals.

Why is the distance at time interval "D" greater than at any other time interval?

A. The ball had a greater velocity during time interval "D"
B. The ball had more time to fall in time interval "D".
C. The ball accelerated more during time interval "D".
D. The ball accelerated less during time interval "D"

35. What will happen if a net force is applied to a very massive object which is at rest?

A. The object will accelerate in the direction of the force.
B. The object will accelerate in the opposite direction as the force.
C. The object will remain at rest because it has a large amount of inertia.
D. The object will remain at rest because there is an equal and opposite force.

36. What is the acceleration of a 20 kg box that is pushed with a net force of 200 N?

A. 4000 m/s^2
B. 220 m/s^2
C. 180 m/s^2
D. 10 m/s^2

37. What would the weight of an object be if it has a mass of 10 kg?

A. 1.02 N
B. 9.80 N
C. 10 N
D. 98 N

38. The weight of any object would be less on the moon than on it would be on Earth. Since this true which of the following must also be true on the moon?

A. The mass of the object would be less.
B. The mass of the object would be more.
C. The acceleration due to gravity would be less.
D. The acceleration due to gravity would be more.

39. An investigation was to done to measure the force of gravity between the two objects in the situations described in the chart below.

.

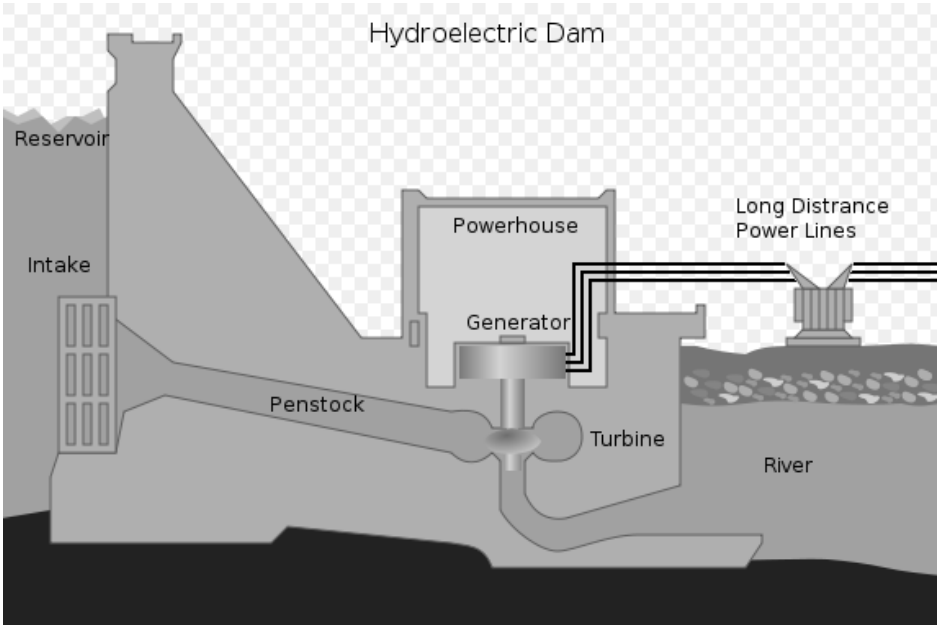
	Mass of Object 1 (Kg)	**Mass of Object 2 (Kg)**	**Distance Between the Objects (m)**
Trial 1	2 Kg	2 Kg	2 m
Trial 2	4 Kg	2 Kg	1 m
Trial 3	2 Kg	4 Kg	2 m
Trial 4	4 Kg	4 Kg	1 m

Which of the trials would result in the greatest force of gravity between the two objects?

A. Trial 1
B. Trial 2
C. Trial 3
D. Trial 4

STD 6

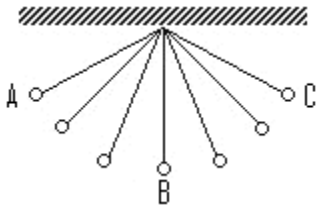
40. The diagram below illustrates a hydroelectric power plant.



Which sequence **BEST** describes the energy transformations from the water behind the dam to the turbine through the generator and into the power lines?

A. gravitational potential energy → heat energy → electrical energy
B. gravitational potential energy → kinetic mechanical energy → electrical energy
C. kinetic mechanical energy → heat energy → electrical energy
D. kinetic mechanical energy → gravitational potential energy → electrical energy

41. The diagram below represents a pendulum swinging from point A to point C.



Which of the following statements **BEST** describes the energy of the pendulum at point "B"?

A. The point of greatest kinetic energy is at "B" because it is the lowest point.
B. The point of greatest kinetic energy is at "B" because the velocity is greatest.
C. The point of greatest potential energy is at "B" because it is the lowest point.
D. The point of greatest potential energy is at "B" because the velocity is greatest.

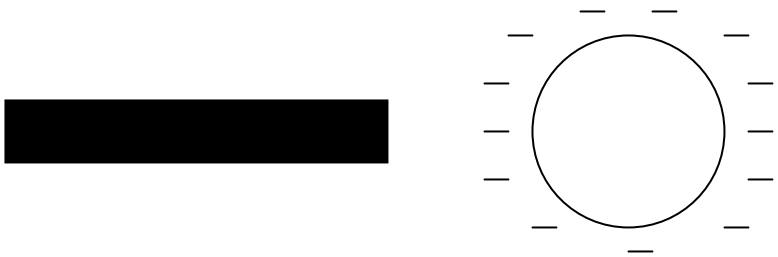
42. A book is pushed a distance of 2 meters across the floor. Which statement **BEST** describes the work done on the book?

A. The work done depends on the weight and the height of the book.
B. The work done on the book is equal to the potential energy gained.
C. There is work done because a force moves the book some distance.
D. There is work done because kinetic energy transforms to potential energy.

43. How high would you need to lift an object to do 35 Joules of work if it weighs 5 Newtons?

A. 7 meters
B. 30 meters
C. 40 meters
D. 175 meters

44. A metal rod is brought near a negatively charged shpere as shown in the diagram below.

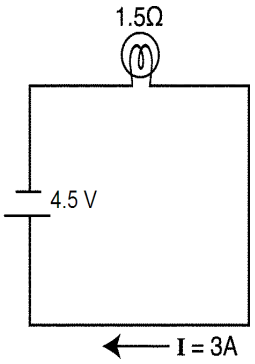


Metal Rod Negatively Charged Sphere

Which statement **BEST** describes what happens to the metal rod?

A. Electrons move in the rod leaving an induced positive charge.
B. Electrons move in the rod leaving an induced negative charge.
C. Protons move in the rod leaving an induced positive charge.
D. Protons move in the rod leaving an induced negative charge.

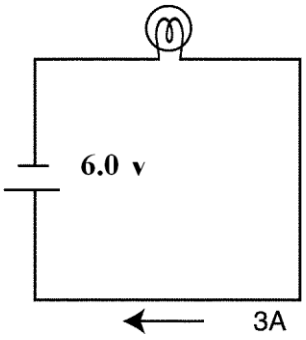
45. Use the circuit diagram below to answer the following question.



If the resistance in the circuit is increased, what will happen to the current and voltage?

A. The current will increase and the voltage will remain the same.
B. The current will decrease and the voltage will remain the same.
C. The voltage will decrease and the current will remain the same.
D. The voltage will increase and the current will remain the same.

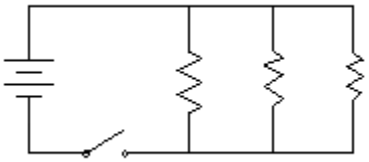
46. Use the diagram below to answer the following question.



What is the resistance in this circuit?

A. 2 Ω
B. 3 Ω
C. 9 Ω
D. 18 Ω

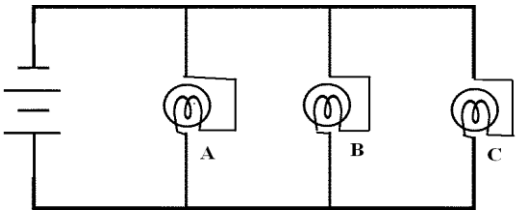
47. Use the diagram below to answer the following question.



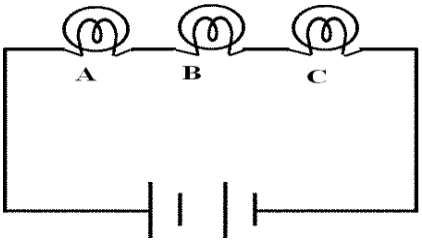
The circuit is best described as _____ .

A. resistors wired in series with a battery
B. resistors wired in parallel with a battery
C. resistors wired is series with a generator
D. resistors wired in parallel with a generator

48. Use the diagrams of the parallel circuit and a series circuit below to answer the following question.



Circuit 1



Circuit 2

If light bulb "A" is removed in **BOTH** circuits, what would you observe?

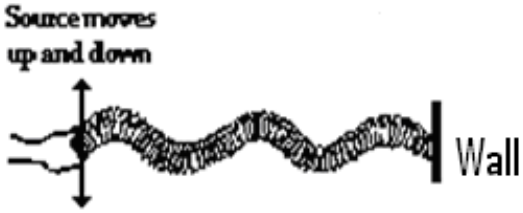
A. All remaining bulbs in both circuits would stay lit.
B. All remaining bulbs in both circuits would go out.
C. All remaining bulbs in circuit 1 **ONLY** would go out.
D. All remaining bulbs in circuit 2 **ONLY** would go out

49. Which of the following statements is true of **BOTH** AC and DC currents?

A. The current moves back and forth.
B. The current is produced by a battery.
C. The current moves in only one direction
D. The current moves towards the positive terminal.

50. Which of the following **BEST** describes an electric motor?
A. A device that uses a moving magnet field to create a current in a coil of wire.
B. A device that uses a current carrying wire to generate a moving magnetic field.
C. A device that uses an electromagnet to convert mechanical energy into electrical energy.
D. A device that uses an electromagnet to convert electrical energy into mechanical energy.

51. The wave shown in the illustration below is produced using a "Slinky" attached to the wall.



If the source of the wave moves up and down then the particles in the medium will be displaced in a direction that is _____.

A. parallel to the direction of the transfer of wave energy
B. in the opposite direction to the transfer of wave energy
C. independent of the direction of the transfer of wave energy
D. perpendicular to the direction of the transfer of wave energy

52. What type of mechanical waves is represented when particles in the medium move in a direction that is perpendicular to the direction that the wave energy moves?

A. light
B. longitudinal
C. ocean
D. transverse

53. If the frequency of a wave source is changed from 50 Hz to 25 Hz, all of the following characteristics of the wave will change **EXCEPT** the _____ .

A. frequency
B. period
C. velocity
D. wavelength

54. The speed of sound is about 340 m/s. If a tuba player plays a note with a wavelength of 2 meters, what is the frequency of that note?

A. 170 Hz
B. 338 Hz
C. 342 Hz
D. 680 Hz

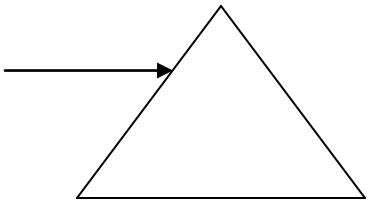
55. Which statement describes a difference between blue light and red light?

A. Blue light has a lower energy than red light.
B. Blue light has a higher frequency than red light.
C. Blue light has a longer wavelength than red light.
D. Blue light has a faster speed in a vacuum than red light.

56. Which statement **best** describes what happens to light when it enters a prism?

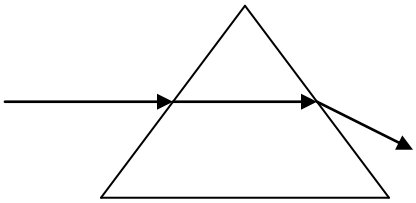
A. The light changes frequency
B. The light changes speed
C. The light is diffracted
D. The light is reflected

57. The drawing below shows a light ray shining on a prism.

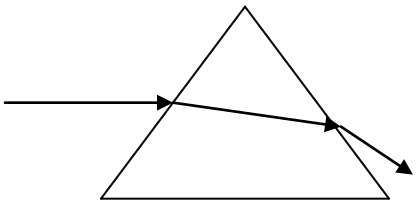


Which drawing best represents the path of the light ray as it passes through the prism?

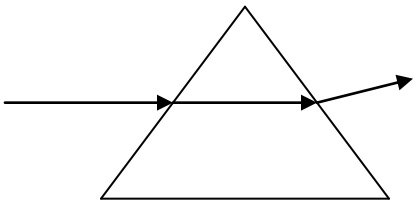
A.



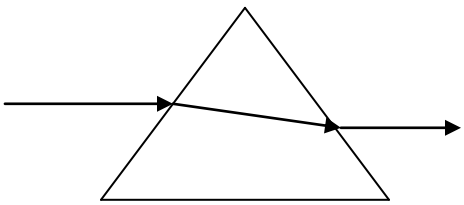
B.



C.



D.



58. A source of sound is moving toward an observer. Which of the following describes what the observer hears?

A. a sound that is louder than the sound the source is producing
B. a sound that is the same as the sound the source is producing
C. a sound with a pitch that is lower than the sound the source is producing
D. a sound with a pitch that is higher than the sound the source is producing