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EOC Review

1. What is the best definition of a hypothesis?
 - A an experimental question
 - B a random, detailed guess
 - C an educated prediction
 - D a single, important observation

2. If a scientific experiment yields results that are inconsistent with the expectations of the hypothesis, what should the scientist do with the hypothesis?
 - A accept it
 - B accept it with reservations
 - C reject it
 - D test it again until the results support it

3. An experiment tests the effect of particle size on the speed of a chemical reaction. In this case, particle size is the
 - A independent variable
 - B dependent variable
 - C control
 - D constant

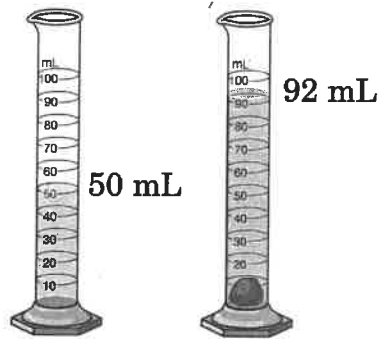
4. In the experimental data below, which variable is the constant?

Salt Concentration and Boiling Point

| Solution | Boiling Point Trial 1 | Boiling Point Trial 2 | Boiling Point Trial 3 |
|--------------------------------|-----------------------|-----------------------|-----------------------|
| 1 L water | 100°C | 100°C | 100°C |
| 1 L water + 1 tablespoon salt | 102.1°C | 101.9°C | 101.6°C |
| 1 L water + 2 tablespoons salt | 103.5°C | 103.4°C | 103.4°C |

- A amount of water
- B amount of salt
- C boiling point
- D time of day
5. A scientist is increasing the concentration of reactants in a chemical reaction in order to find out how they affect the rate of the reaction. In this experiment, what is the rate of the reaction?
- A hypothesis
- B independent variable
- C dependent variable
- D conclusion

6. There is a problem with the diagram below showing two graduated cylinders of water being used to determine the volume of an irregular rock. What should be the approximate level of water in the second cylinder based on the size of the rock?



- A 50 mL
B 60 mL
C 70 mL
D 80 mL
7. The thermometer in a water bath reads 50.36°C . A heating device increases the temperature by 25.5°C . Which one of the following correctly shows the final temperature based on the proper use of significant figures?
- A 75.8°C
B 75.86°C
C 75.9°C
D 76°C

8. A student practices archery during her physical education period. She hits the bull's-eye on her first try. Which term **best** describes her shot?
- A quantitative
B qualitative
C estimated
D accurate
9. Which graphic organizer would best show the 24 water temperature samples taken, one on the Atlantic Ocean side and one on the Pamlico Sound side, at 12 noon on the first day of each month at Ocracoke?
- A a line graph
B a scatter plot
C a bar graph
D a pie chart

10. A book has a mass of 6.2 kilograms. If there are 1,000 grams in 1 kilogram and 1,000 milligrams in 1 gram, calculate the mass of the book in milligrams using dimensional analysis.
- A 0.0000062 mg
 - B 0.0062 mg
 - C 6,200 mg
 - D 6,200,000 mg
11. Which one of the following should be used whenever an experiment results in the production of an irritating gas?
- A safety glasses or goggles
 - B a fire blanket
 - C a fume hood
 - D a spill kit
12. In the event that during a laboratory experiment caustic chemicals are spilled on a person, which one of the following should be used immediately?
- A a large beaker of liquid on the counter
 - B the safety shower
 - C the eyewash fountain
 - D a fire extinguisher
13. Which one of the following is an observation in an investigation?
- A Water is a good solvent for salt.
 - B 10 g of salt dissolved in 100 ml of water.
 - C Oil will probably not dissolve salt.
 - D Perform an experiment to see how much salt will dissolve in 100 ml of water.
14. How is a conclusion different from an observation?
- A Conclusions are descriptions; observations are explanations.
 - B Conclusions summarize observations; observations summarize explanations.
 - C Conclusions explain observations and accept or reject hypotheses; observations summarize results of experiments.
 - D Conclusions record results; observations try to understand results.

15. Which one of the following traits does not represent a scientific way of thinking?
- A curiosity
 - B intellectual honesty
 - C skepticism
 - D being uncritical
16. What should scientists do when they get a surprising result during one of their tests?
- A publish it immediately as a great new discovery
 - B try to explain its significance without further study
 - C ignore it because it could be an embarrassing mistake
 - D try more experiments to see if they can replicate the result
17. A scientist hypothesizes that high-carbon steel gets 100% harder after its temperature drops $1,000^{\circ}\text{C}$ in 1 second. Which batch of steel samples is **best** for the tests?
- A 4 samples of high-carbon steel identical in all respects
 - B 1 sample of high-carbon steel
 - C 2 samples of high-carbon steel, one at 20 g, one at 80 g
 - D 3 samples, each 20 g, varying in carbon content from low to medium to high
18. A scientific report states that its hypothesis was supported at the 95% confidence level but not at the 99% level. Which statement provides the **best** evaluation of this situation?
- A There is a 1% chance the hypothesis is wrong.
 - B There is a 5% chance the hypothesis is wrong.
 - C There is a 95% chance the hypothesis is wrong.
 - D There is a 99% chance the hypothesis is wrong.

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EOC Review

1. Which one of the following statements *best* describes the definition of speed?
- A Speed is the same as velocity.
 - B Speed is the distance traveled.
 - C The distance traveled is not a factor in determining speed.
 - D Speed is the distance traveled per unit of time.

2. Use the table below to answer the following question.

Time-Velocity Data

| Time (s) | Velocity (m/s) |
|----------|----------------|
| 0 | 2 |
| 1 | 1.5 |
| 2 | 1 |
| 3 | 0.5 |
| 4 | 0 |

When the traffic light changed from green to yellow, the mathematics teacher stepped on the brake. The car came to a stop as the light turned red. What was his rate of acceleration?

- A -0.5 m/s^2
- B 0.5 m/s^2
- C -2 m/s^2
- D 1.5 m/s^2

3. A car travels 150 kilometers west in 3 hours. What is its average velocity?
- A 150 km/h
 - B 50 km/h
 - C 50 km/h west
 - D 150 km/h west
4. A sail boat leaves the dock and travels due west for 75 kilometers. The crew then brings the boat about and sails due east for 25 kilometers. What is the boat's final displacement from the dock?
- A 75 km west
 - B 50 km west
 - C 25 km east
 - D 100 km east
5. A motorcycle travels north a distance of 0.5 km in 5 seconds, reaching a final velocity of 1 km/s. Which mathematical expression would give the motorcycle's rate of acceleration?
- A $(1 \text{ km/s} - 0 \text{ km/s}) / 5\text{s}$
 - B $0.5 \text{ km} / 5\text{s}$
 - C $1 \text{ km/s}^2 / 5\text{s}$
 - D $(0.5 \text{ km}) (1 \text{ km/s}) / 5\text{s}$
6. Newton's first law of motion describes the tendency of objects in motion to continue in motion and objects at rest to remain at rest. What term is used to describe this behavior?
- A velocity
 - B acceleration
 - C displacement
 - D inertia

7. Four racing cars are equipped with equally powerful engines. Which one of the racing cars described below will accelerate the fastest as their engines provide the same net force?
- A the 1,000 kg racing car
 - B the 900 kg racing car
 - C the 800 kg race car
 - D the 700 kg race car
8. One student in a tug of war is pulling with a force of 21 N east. A second student is pulling with a force of 18 N west. What is the net force in the contest?

Time-Velocity Data

| Time (s) | Velocity (m/s) |
|----------|----------------|
| 0 | 2 |
| 1 | 1.5 |
| 2 | 1 |
| 3 | 0.5 |
| 4 | 0 |

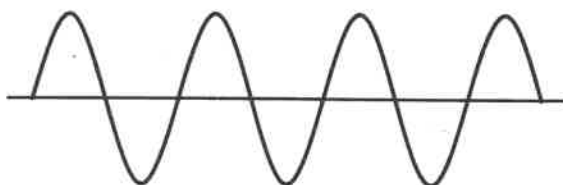
- A 39 N north
- B 3 N east
- C 3 N west
- D 3 N south

9. When an ice skater pushes the skate blade back against the ice, the skater glides forward. This is explained by which one of the following?
- A the law of inertia
 - B a body in motion tending to stay in motion
 - C every action having an equal and opposite reaction
 - D negative acceleration being equal to positive acceleration
10. What causes a rolling object to stop moving?
- A an opposing force such as friction
 - B the force of gravity
 - C the weight of the object
 - D the mass of the object

11. Which statement describes an object's velocity during freefall toward Earth?
- A An object travels at a constant velocity throughout the fall.
 - B An object's velocity increases as it falls.
 - C An object's velocity decreases as it falls.
 - D An object during freefall does not have a measurable velocity.
12. An acorn fell from the tree to the ground. The force of gravity creates a constant acceleration of 9.8 m/s^2 . What was the acorn's final velocity if it fell for 3 seconds?
- A 29.4 m/s
 - B 9.8 m/s
 - C 19.6 m/s
 - D 96.0 m/s
13. Which statement about the weight of an object is correct?
- A The force of gravity determines an object's weight.
 - B Weight is an unchanging measure of an object's mass.
 - C The weight and mass of an object are the same.
 - D An object's weight is not related to its mass.

14. Marian planted pumpkin seeds in the spring. The pumpkin she grew weighed 3920 N. What was its mass?
- A 3920 kg
 - B 400 kg
 - C 400 N
 - D 1372 kg
15. If F equals force, m equals mass, and a_g equals acceleration due to gravity, which of the following equations is arranged to calculate an object's weight?
- A $m = F/a_g$
 - B $m = Fa_g$
 - C $F = ma_g$
 - D $F = m + a_g$
16. Which statement about the mass of an object is false?
- A Mass is the amount of matter in an object.
 - B Kilograms are units of mass.
 - C An object's mass does not change with location.
 - D An object's mass increases in stronger gravity fields.

1. How many complete wave cycles are illustrated in the wave shown below?



- A 4
B 3
C 8
D 7
2. What kind of waves transmit energy from the sun to Earth?
- A mechanical waves
B electromagnetic waves
C longitudinal waves
D sound waves
3. What is the frequency of a wave that has a wavelength of 350 m and a speed of 4830 m/s?
- A 4830 Hz
B 350 Hz
C 13.8 Hz
D 7.2×10^{-2} Hz
4. What statement describes a characteristic of transverse waves?
- A transfers matter from one place to another
B composed of rarefactions and compressions
C particles in the medium move perpendicular to the wave direction
D can only travel through a vacuum

5. List the colors of the visible spectrum in order from longest to shortest wavelength.
- A violet, green, blue, orange, yellow, red
 - B red, yellow, orange, green, blue, green
 - C blue, violet, green, yellow, red, orange
 - D red, orange, yellow, green, blue, violet
6. Which one of the following is a device that transforms chemical energy into light and thermal energy?
- A a blender
 - B a candle
 - C a hydroelectric dam
 - D a refrigerator
7. Which one of the following is *not* an example of work being done on an object?
- A A worker pushes a box up a hill.
 - B A mother holds a baby in her arms.
 - C An apple falls from a tree.
 - D A baseball is thrown into the air.
8. If a car engine uses 30 J of chemical energy from gasoline and it loses 18 J as thermal energy, how much chemical energy changed into mechanical energy?
- A 12 J
 - B 18 J
 - C 30 J
 - D 48 J

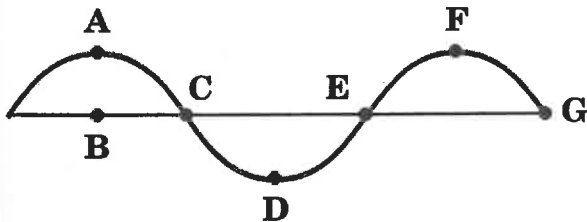
9. Observe the diagram below. What form of heat transfer is being used to transfer energy to the solar panel?



- A radiation
B conduction
C convection
D Energy is not being transferred.
10. Melissa drops a rubber ball from a height of 200 cm onto a smooth concrete pavement. She wants to know if it will obey the law of conservation of energy. Which one of the following results actually obeys the law?
- A The ball rebounds to a height of 300 cm.
B The ball rebounds to a height of 250 cm.
C The ball rebounds to a height of 205 cm.
D The ball rebounds to a height of 200 cm.
11. The ski lift carried Luis up a vertical distance of 1875 meters. What kind of energy did Luis gain from the ski lift?
- A potential energy
B kinetic energy
C mechanical energy
D electromagnetic energy
12. Mavis has taken a construction job during the summer vacation. She hoists a load weighing 10 N to a height of 10 meters in 25 seconds. How much power does she use to get the job done?
- A 4 watts
B 10 watts
C 25 watts
D 100 watts

13. Which of the following is correct?
- A A transverse wave always vibrates in the direction of its motion.
 - B A mechanical wave is able to travel through space.
 - C The energy carried by a longitudinal wave consists of compressions and rarefactions.
 - D Sound waves travel at the same speed in solid, liquid, and gaseous media.

Use the diagram of the wave shown below to answer questions 14, 15, and 16.



14. Which sequence of letters indicates the rest position or equilibrium point of the wave?
- A BCEG
 - B ACDE
 - C DEFG
 - D ACDE
15. Which letter indicates the trough of the wave?
- A A
 - B B
 - C C
 - D D
16. Which sequence of letters in the diagram of the wave indicates the amplitude of the wave?
- A AB
 - B BC
 - C CE
 - D AD

17. Which one of these waves carries the most heat energy from the sun to Earth?
- A microwaves
 - B AM radio waves
 - C infrared waves
 - D ultraviolet waves
18. A bass drum is struck and sends out 100 vibrations in 5 seconds. What is the frequency of its sound waves in hertz?
- A 20 hertz
 - B 100 hertz
 - C 105 hertz
 - D 500 hertz
19. How long does a wave take to travel 2400 meters at the speed of light (3×10^8 m/s)?
- A 800 s
 - B 8.0×10^{-8} s
 - C 8.0×10^{-6} s
 - D 0.8×10^6 s
20. A lever lifts a load that weighs 1400 N to a height of 0.5 m. How much work is done?
- A 1400 joules
 - B 0.5 meters
 - C 700 newtons
 - D 700 joules

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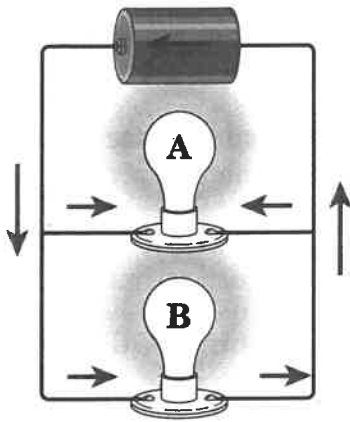
EOC Review

1. Which one of the following is a device that transforms mechanical energy into electrical energy?
 - A a blender
 - B a car engine
 - C a generator
 - D a refrigerator

2. Ohm's law is represented by which one of the following equations?
 - A $I = VR$
 - B $R = IV$
 - C $R = IV^2$
 - D $V = IR$

3. A balloon is rubbed with wool and then stuck to a wall. These actions are examples of
 - A charging an object by conduction and induction of a charge on an object.
 - B charging an object by induction and conduction of charge through an object.
 - C charging an object by friction and induction of a charge on an object.
 - D charging an object by friction and conduction of charge through an object.

Use the circuit diagram pictured below to answer questions 4 and 5



4. What kind of circuit is drawn in the diagram?
- A simple series circuit
 - B parallel circuit
 - C complex series circuit
 - D an open circuit
5. What is wrong with the circuit as it is drawn?
- A Direct current electrons cannot flow in opposite directions.
 - B The circuit is open, so it is impossible for any current to flow.
 - C Bulb B should not be lit.
 - D The circuit is using alternating current from the battery.
6. The electrical system in most homes is
- A direct current in simple series circuits.
 - B direct current in parallel circuits.
 - C alternating current in simple series circuits.
 - D alternating current in parallel circuits.
7. Which of the following is *not* an insulator?
- A copper
 - B wood
 - C pure water
 - D plastic

8. A simple circuit has a 9-volt battery and a 6-ohm resistor. What is the current?
- A 6 amps
 - B 3 amps
 - C 2 amps
 - D 1.5 amps
9. A 9-volt battery is attached to a circuit with two identical lights in parallel and a total current of 3 amps. What is the resistance of *each* light?
- A 1 ohm
 - B 1.5 ohms
 - C 3 ohms
 - D 6 ohms
10. In a parallel circuit that is powered by a battery, the current
- A alternates back and forth in two or more paths.
 - B alternates back and forth in its one path.
 - C flows in one direction in two or more paths.
 - D flows in one direction and follows only one path.
11. Which one of the following devices most likely does not use direct current?
- A flashlight
 - B television
 - C watch
 - D camera

12. An electric motor is a device that transforms
- A kinetic energy into potential energy.
 - B mechanical energy into electrical energy.
 - C electrical energy into mechanical energy.
 - D high voltage current into low voltage current.
13. An electromagnet becomes stronger when
- A its iron core is made thinner.
 - B the number of coils of wire around its iron core are decreased.
 - C a higher resistance wire material is used.
 - D a heavier iron core is used.
14. What is the current supplied by a 1.5 volt battery to a flashlight bulb which has a resistance of 3 ohms in a simple series circuit?
- A 4.5 amperes
 - B 2 amperes
 - C 1.5 amperes
 - D 0.5 amperes
15. The friction involved in rubbing a glass or plastic rod with silk, wool, or fur produces a static electric charge by transferring
- A electrons.
 - B protons.
 - C atoms.
 - D molecules.

16. A negatively charged plastic rod attracts neutral pieces of paper as a result of .
- A gravitation.
 - B conduction.
 - C induction.
 - D levitation.
17. The conduction of static electric charge from a negatively charged metal sphere to a neutral metal sphere depends on the two spheres
- A radiating electrons to each other.
 - B touching each other to allow electron flow between them.
 - C being well insulated from each other to avoid shock.
 - D being vigorously rubbed with a silk cloth.
18. If you bring the north pole of a magnet near the south pole of another magnet, what will happen?
- A They will attract each other.
 - B They will repel each other.
 - C They will do nothing.
 - D They will release a spark between them.
19. Which one of the following is not a voltage source?
- A battery
 - B gasoline
 - C solar cell
 - D generator