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**Quiz Standard 7 Answer Key**

|  |  |
| --- | --- |
| Teacher Name: | Quiz Generated On: 04-29-2016 |

**1)** The method of heat transfer by which the sun warms the earth is

|  |  |
| --- | --- |
| A) | conduction |

|  |  |
| --- | --- |
| B) | convection |

|  |  |
| --- | --- |
| **C)** | **radiation** |

|  |  |
| --- | --- |
| D) | solaration |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Radiation** is the method of heat transfer by which the sun warms the earth. Light rays travel from the sun through space to the earth. The other methods need a medium to travel through.

**2)** The process by which hot and cold air are transferred in the atmosphere is

|  |  |
| --- | --- |
| A) | conduction. |

|  |  |
| --- | --- |
| **B)** | **convection.** |

|  |  |
| --- | --- |
| C) | insulation. |

|  |  |
| --- | --- |
| D) | radiation. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The process by which hot and cold air are transferred in the atmosphere is **convection**. The hot air is less dense and rises; it then cools, condenses and becomes more dense and falls back down.

**3)** When gasoline is burned in a car engine, \_\_\_\_\_\_\_\_ energy is converted into \_\_\_\_\_\_\_\_\_ energy.

|  |  |
| --- | --- |
| A) | heat, chemical |

|  |  |
| --- | --- |
| B) | chemical, potential |

|  |  |
| --- | --- |
| C) | mechanical, chemical |

|  |  |
| --- | --- |
| **D)** | **chemical, mechanical** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
When gasoline is burned in the engine of a car, **chemical** energy is converted into **mechanical** energy. The chemical energy is stored. The mechanical is what runs the motor.

**4)** Which example involves the transformation of chemical energy directly into light energy?

|  |  |
| --- | --- |
| A) | a wind mill |

|  |  |
| --- | --- |
| **B)** | **a glow stick** |

|  |  |
| --- | --- |
| C) | photosynthesis |

|  |  |
| --- | --- |
| D) | a hydroelectric dam |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**A glow stick** involves the transformation of chemical energy into light energy. The chemical energy is stored.

**5)** Which statement best summarizes the law of conservation of energy?

|  |  |
| --- | --- |
| A) | When work is done, energy is lost. |

|  |  |
| --- | --- |
| B) | Heat flows from a warm body to a cold body. |

|  |  |
| --- | --- |
| **C)** | **If energy disappears in one form, it must reappear in another.** |

|  |  |
| --- | --- |
| D) | The fewer the number of valence electrons, the better the insulator. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct answer is ***if energy disappears in one form, it must reappear in another.***. The law of conservation of energy states that energy cannot be created nor destroyed but only change in form.

**6)**



A generator converts mechanical energy into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.

|  |  |
| --- | --- |
| A) | chemical |

|  |  |
| --- | --- |
| **B)** | **electrical** |

|  |  |
| --- | --- |
| C) | light |

|  |  |
| --- | --- |
| D) | sound |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
A generator converts mechanical energy into **electrical** energy. Consider all those generators on sale in home improvement stores. The generators are used by people and businesses to provide electricity when the power goes out. They run on gasoline which fuels a motor, mechanical energy.

**7)** On Halloween, you take a glow stick, crack the capsule inside and shake it until it glows. This is an example of light energy being created from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.

|  |  |
| --- | --- |
| **A)** | **chemical** |

|  |  |
| --- | --- |
| B) | mechanical |

|  |  |
| --- | --- |
| C) | solution |

|  |  |
| --- | --- |
| D) | thermal |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Glowsticks are a good example of **chemical** potential energy being transformed into light energy. When the new bonds are formed by the products of the chemical reaction in the glowstick, energy is released in the form of light.

**8)** An example of mechanical energy being converted into heat energy is

|  |  |
| --- | --- |
| A) | the sun. |

|  |  |
| --- | --- |
| B) | a generator. |

|  |  |
| --- | --- |
| C) | a Snickers bar. |

|  |  |
| --- | --- |
| **D)** | **rubbing your hands together.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Mechanical energy is created by the motion of things, even **your hands**. Once they rub together, your hands get warmer - heat energy.

**9)** Which is an example of electrical energy being converted into light energy?

|  |  |
| --- | --- |
| A) | the sun |

|  |  |
| --- | --- |
| **B)** | **a light bulb** |

|  |  |
| --- | --- |
| C) | a solar panel |

|  |  |
| --- | --- |
| D) | a glowstick at Halloween |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**A light bulb** gets plugged into the wall socket and uses electricity to heat a filament and create light. The sun's light comes from nuclear energy, a glowstick from chemical energy, and a solar panel converts light energy to electricity.

**10)** A solar powered car converts \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.

|  |  |
| --- | --- |
| A) | light, chemical |

|  |  |
| --- | --- |
| **B)** | **light, mechanical** |

|  |  |
| --- | --- |
| C) | mechanical, light |

|  |  |
| --- | --- |
| D) | electrical, mechanical |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
A solar powered car would use **light**energy from the sun to make **mechanical** energy in running the car. Right now, these cars are only experimental, but with gas prices going higher, we might see them on the road soon.

**11)** Your hands get warm by a fire because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_energy is converted into heat energy.

|  |  |
| --- | --- |
| **A)** | **chemical** |

|  |  |
| --- | --- |
| B) | electrical |

|  |  |
| --- | --- |
| C) | mechanical |

|  |  |
| --- | --- |
| D) | nuclear |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The wood of the fire releases energy from **chemical** bonds when it combines with oxygen in the burning process. This energy is transferred to heat and your hands feel happy.

**12)** Microwave ovens heat food through the process of

|  |  |
| --- | --- |
| A) | conduction. |

|  |  |
| --- | --- |
| B) | convection. |

|  |  |
| --- | --- |
| **C)** | **radiation.** |

|  |  |
| --- | --- |
| D) | stratification. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Microwave **radiation**is the main means of cooking foods in these microwave ovens. Microwave radiation is light (that you can not see) essentially vibrating the water molecules. The faster they vibrate, the hotter the food.

**13)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_ currents are responsible for circulating hot and cold air in the atmosphere and causing local weather systems.

|  |  |
| --- | --- |
| A) | Oceanic |

|  |  |
| --- | --- |
| B) | Radiation |

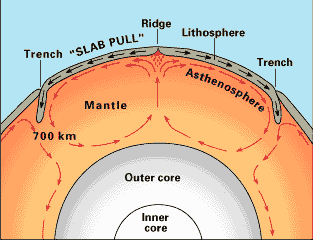
|  |  |
| --- | --- |
| C) | Conduction |

|  |  |
| --- | --- |
| **D)** | **Convection** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Convection currents** are when hot air rises because of its density to be replaced by the cold, denser air that is falling down from the atmosphere. This cyclical pattern gives rise to distinct weather patterns.

**14)**



What is the main method of heat transfer from the core to the crust of Earth?

|  |  |
| --- | --- |
| A) | conduction |

|  |  |
| --- | --- |
| **B)** | **convection** |

|  |  |
| --- | --- |
| C) | insulation |

|  |  |
| --- | --- |
| D) | radiation |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Convection** currents raise the less dense hot material from the center to the cool crust and material from the cool (dense) crust settles down to the core to be heated again.

**15)** The specific heat of iron is 0.11

|  |
| --- |
| cal |
| (g°C) |

. A cafeteria fork made of iron has a mass of 20 grams. How much heat energy is needed to raise the temperature of this fork from 25°C to 75°C?

|  |  |
| --- | --- |
| A) | 0.044 calories |

|  |  |
| --- | --- |
| B) | 0.275 calories |

|  |  |
| --- | --- |
| **C)** | **110 calories** |

|  |  |
| --- | --- |
| D) | 9090.9 calories |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The amount is **110 cal**. To calculate, multiply the specific heat of the substance (.11) by the mass (20 g) by the number of degrees you want it to increase (50°C). The product is 110 calories.

**16)** Raising 100 grams of water from 40 to 60 °C (the specific heat capacity of water is 1

|  |
| --- |
| cal |
| g |

) requires the addition of

|  |  |
| --- | --- |
| A) | 120 calories. |

|  |  |
| --- | --- |
| B) | 1500 calories. |

|  |  |
| --- | --- |
| **C)** | **2000 calories.** |

|  |  |
| --- | --- |
| D) | 2400 calories. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The amount of heat required is **2000 calories**. Specific heat x mass x change in temp. (1)x(100)x(20) = 2000 calories

**17)**

|  |
| --- |
| q = m x C x ΔT  C = specific heat capacity  specific heat of water = 1 cal/g |

If 200 grams of water is to be heated from 24.0° C to 100.0° C to make a cup of tea, how much heat must be added?

|  |  |
| --- | --- |
| A) | 76 calories |

|  |  |
| --- | --- |
| B) | 276 calories |

|  |  |
| --- | --- |
| **C)** | **15200 calories** |

|  |  |
| --- | --- |
| D) | 20000 calories |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The amount of heat that needs to be added is **15,200 calories.** The equation is   
  
  
  
heat = (1)(200)(76) which is 15200 calories.

**18)** When ironing clothes, the primary method of heat transfer is

|  |  |
| --- | --- |
| **A)** | **conduction.** |

|  |  |
| --- | --- |
| B) | convection. |

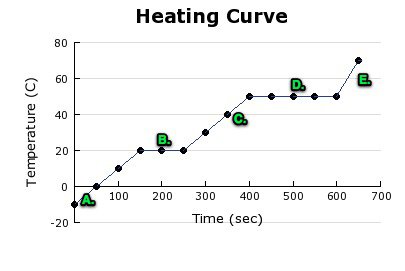
|  |  |
| --- | --- |
| C) | insulation. |

|  |  |
| --- | --- |
| D) | radiation. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**conduction** is when heat is transferred directly from one solid to another through the collision of molecules.

**19)**



Consider the heating curve of a substance. At what location does melting occur?

|  |  |
| --- | --- |
| A) | A. |

|  |  |
| --- | --- |
| **B)** | **B.** |

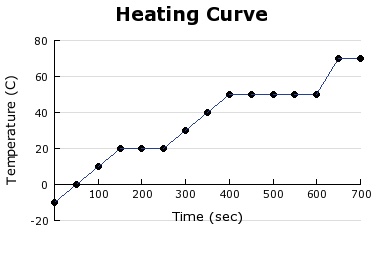
|  |  |
| --- | --- |
| C) | C. |

|  |  |
| --- | --- |
| D) | D. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Location **B.** is the plateau for melting.

**20)**



As temperature rises from 25°C to 60°C, the material \_\_\_\_\_\_\_ heat and its kinetic energy \_\_\_\_\_\_\_\_\_ as the material goes through vaporization to become a gas.

|  |  |
| --- | --- |
| **A)** | **absorbs, increases** |

|  |  |
| --- | --- |
| B) | releases, does not change |

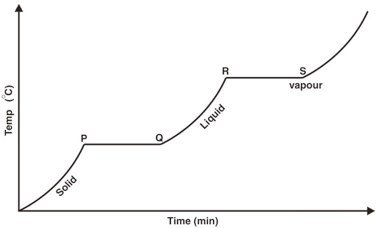
|  |  |
| --- | --- |
| C) | multiplies its, is divided |

|  |  |
| --- | --- |
| D) | remains the same, decreases |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**absorbs, increases**  
As temperature rises from 25°C to 60°C, the material absorbs heat and its kinetic energy increases as the material goes through vaporization to become a gas.

**21)**



It is generally seen that, when a substance absorbs heat energy, its heating curve shows two plateaus. Which phenomenon is indicated by these plateaus?

|  |  |
| --- | --- |
| A) | melting |

|  |  |
| --- | --- |
| B) | boiling |

|  |  |
| --- | --- |
| **C)** | **phase change** |

|  |  |
| --- | --- |
| D) | crystallization |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
At the melting or boiling point, a substance absorbs heat to undergo **phase change**. In this process, the temperature remains constant and the energy of the system increases. The plateau region indicates the process of phase change of the substance.

**22)**

|  |  |
| --- | --- |
| **Substance** | **Specific Heat (J kg-1 K-1)** |
| Aluminum | 900 |
| Copper | 390 |
| Brass | 380 |
| Silver | 230 |
| Platinum | 130 |

You are walking on a beach and find a mystery piece of metal. You take it back to your lab and measure its mass to be 0.5 kg. In order to heat the metal 1 degree K, you must add 115 J of heat. Identify the metal. q =mCΔT

|  |  |
| --- | --- |
| A) | Brass |

|  |  |
| --- | --- |
| B) | Copper |

|  |  |
| --- | --- |
| C) | Platinum |

|  |  |
| --- | --- |
| **D)** | **Silver** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
You have found 0.5 kg of **silver!** 115 J / 0.5 kg = 230 J kg-1.

**23)**

|  |  |
| --- | --- |
| **Substance** | **Specific Heat (J kg-1 K-1)** |
| Aluminum | 900 |
| Copper | 390 |
| Brass | 380 |
| Silver | 230 |
| Platinum | 130 |

How many Joules of heat would be required to heat 0.5 kg of aluminum by 2K?

|  |  |
| --- | --- |
| A) | 300 J |

|  |  |
| --- | --- |
| B) | 450 J |

|  |  |
| --- | --- |
| **C)** | **900 J** |

|  |  |
| --- | --- |
| D) | 1800 J |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
It would require **900 J**. 900 J kg-1K-1 x 0.5 kg x 2 K = **900 J**

**24)**

|  |  |
| --- | --- |
| **Substance** | **Specific Heat (J kg-1 K-1)** |
| Aluminum | 900 |
| Copper | 390 |
| Brass | 380 |
| Silver | 230 |
| Platinum | 130 |

If 130 J of energy were added to 1 kg of each of these samples, which would experience the GREATEST temperature increase?

|  |  |
| --- | --- |
| A) | Aluminum |

|  |  |
| --- | --- |
| B) | Brass |

|  |  |
| --- | --- |
| C) | Copper |

|  |  |
| --- | --- |
| **D)** | **Platinum** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Platinum** would experience the greatest temperature increase because it has the lowest specific heat value.

**25)**

|  |  |
| --- | --- |
| **Substance** | **Specific Heat (J kg-1 K-1)** |
| Aluminum | 900 |
| Copper | 390 |
| Brass | 380 |
| Silver | 230 |
| Platinum | 130 |

Which sample of copper would demonstrate the GREATEST increase in temperature if 500 J of energy were added to the sample?

|  |  |
| --- | --- |
| **A)** | **0.5 kg** |

|  |  |
| --- | --- |
| B) | 1.0 kg |

|  |  |
| --- | --- |
| C) | 1.5 kg |

|  |  |
| --- | --- |
| D) | 2.0 kg |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The **0.5 kg** would demonstrate the greatest increase in temperature because it is the smallest sample size in mass. Specific heat capacity is the amount of heat required to change the temperature of 1 kg of a substance by 1 K.

**26)** During the day, the temperature of the sand in a desert rises as the sand is heated by the sun. After the sun sets, the sand cools. What happens to the heat energy in the sand as it cools?

|  |  |
| --- | --- |
| A) | It is destroyed. |

|  |  |
| --- | --- |
| B) | It is used by the sand to do work. |

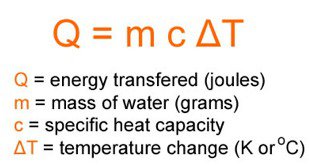
|  |  |
| --- | --- |
| C) | It goes back into the sun, completing the cycle. |

|  |  |
| --- | --- |
| **D)** | **It is transferred to the air via the process of radiation.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The heat leaves the sand as it cools, but energy is never destroyed. **It is transferred to the air via the process of radiation**. While heat energy can be used indirectly to do work (for example, by boiling water, which then does the work) heat cannot be directly turned into work.

**27)**



|  |
| --- |
| Heat gained or lost is mass times specific heat times change in temperature. |

The specific heat of Aluminum is 0.9 J/g K. The specific heat of Copper is 0.39 J/g K. If samples of equal mass of both Aluminum and Copper are heated up to 100°C and then dropped in a cold water bath. Compare the heat lost by the two samples.

|  |  |
| --- | --- |
| A) | There is not enough information to conclude anything. |

|  |  |
| --- | --- |
| B) | The copper loses a little more than twice the heat of the Aluminum. |

|  |  |
| --- | --- |
| **C)** | **The Aluminum loses a little more than twice the heat of the Copper.** |

|  |  |
| --- | --- |
| D) | The heat lost is the same because the temperature change is the same. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Since specific heat is part of the equation. A smaller specific heat will create a smaller heat gain or loss. **The Aluminum loses a little more than twice the heat of the Copper.**

**28)**

|  |  |
| --- | --- |
| **Substance** | **Specific Heat Capacity J/Kgo C** |
| Ammonia | 4700 |
| Ethanol | 2440 |
| Gasoline | 2220 |
| Water | 4186 |

500 ml of four different liquids are heated to 50oC. According to the specific heat data, which liquid will cool to 35oC in the shortest amount of time?

|  |  |
| --- | --- |
| A) | ammonia |

|  |  |
| --- | --- |
| B) | ethanol |

|  |  |
| --- | --- |
| **C)** | **gasoline** |

|  |  |
| --- | --- |
| D) | water |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct answer is **gasoline**. Specific heat is the measure of the heat energy required to increase or decrease the temperature of a substance by a certain temperature interval. Gasoline has the lowest specific heat; that means it takes less energy to lower or raise the temperature of gasoline compared to the other three liquids.

**29)**

|  |  |
| --- | --- |
| **Substance** | **Specific Heat (J kg-1 K-1)** |
| Aluminum | 900 |
| Copper | 390 |
| Brass | 380 |
| Silver | 230 |
| Platinum | 130 |

Five metal samples, with equal masses, are heated to 200oC. Each solid is dropped into a beaker containing 200 ml 15oC water. Which metal will cool the fastest?

|  |  |
| --- | --- |
| A) | aluminum |

|  |  |
| --- | --- |
| B) | copper |

|  |  |
| --- | --- |
| C) | gold |

|  |  |
| --- | --- |
| **D)** | **platinum** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct answer is **platinum**. Specific heat is the measure of the heat energy required to increase or decrease the temperature of a substance by a certain temperature interval. Platinum has the lowest specific heat; that means it takes less energy to lower or raise the temperature of platinum compared to the other four solids.

**30)** Conduction occurs more easily between solids and liquids. This is because the particles in gases are

|  |  |
| --- | --- |
| **A)** | **further apart and move faster.** |

|  |  |
| --- | --- |
| B) | closer together and move faster. |

|  |  |
| --- | --- |
| C) | further apart and move more slowly. |

|  |  |
| --- | --- |
| D) | closer together and move more slowly. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Gases do not transfer heat as easily through conduction because their particles are **further apart and move faster**. Close proximity of molecules in a substance helps facilitate the transfer of heat.

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**Quiz Standard 8 Answer Key**

|  |  |
| --- | --- |
| Teacher Name: | Quiz Generated On: 04-29-2016 |

**1)** Barbie sits on one end of a see-saw and Ken sits on the other. Barbie goes up in the air and Ken stays down on the ground. In order for Ken to make Barbie move down, he should

|  |  |
| --- | --- |
| A) | stand on the board. |

|  |  |
| --- | --- |
| B) | push down on the board. |

|  |  |
| --- | --- |
| **C)** | **move towards the center.** |

|  |  |
| --- | --- |
| D) | move away from the center. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Moving toward the center** would make Barbie move up by applying less torque (since Torque = Weight x distance to pivot point) to the fulcrum of the see-saw.

**2)** Which car is accelerating?

|  |  |
| --- | --- |
| A) | a car that is unmoving |

|  |  |
| --- | --- |
| **B)** | **a car that rounds a curve at a constant speed** |

|  |  |
| --- | --- |
| C) | a car that travels in straight line at a constant speed |

|  |  |
| --- | --- |
| D) | a car that is set to a constant speed of 60 miles per hour |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**A car that rounds a curve at a constant speed** is accelerating. Changing direction is accelerating.

**3)** Newton's second law states that F = m x a (Force is mass times acceleration). Which example would have the GREATEST acceleration?

|  |  |
| --- | --- |
| **A)** | **a 10 kg ball thrown with a 50 Newton force** |

|  |  |
| --- | --- |
| B) | a 1 kg ball thrown with a 0.5 Newton force |

|  |  |
| --- | --- |
| C) | a 50 kg student launched by a 100 Newton catapult |

|  |  |
| --- | --- |
| D) | a 500 kg car accelerated by 1000 Newtons from the engine |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**A 10 kg ball thrown with a 50 Newton force** would have the greatest acceleration. If F=ma, a=F/m, so the greatest force acting on the smallest mass (5 m/s2); b is 0.5 m/s2, and c and d are 2.0 m/s2.

**4)** The acceleration of an object would increase if there was an increase in the

|  |  |
| --- | --- |
| A) | mass of the object. |

|  |  |
| --- | --- |
| **B)** | **force on the object.** |

|  |  |
| --- | --- |
| C) | inertia of the object. |

|  |  |
| --- | --- |
| D) | friction on the object. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The acceleration of an object would increase if there was an increase in the **force on the object**. This is a great example of Newton's Second Law, F=MA.

**5)** Mechanical advantage is a measure of how much a machine multiplies the input

|  |  |
| --- | --- |
| A) | efficiency. |

|  |  |
| --- | --- |
| **B)** | **force.** |

|  |  |
| --- | --- |
| C) | power. |

|  |  |
| --- | --- |
| D) | work. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Mechanical Advantage is a measure of how much a machine increases your effort (input)**force**. A high MA means a small input force is multiplied to a large output force, at the expense of a greater distance.

**6)**

|  |
| --- |
| A cup of coffee sits on the dashboard of an automobile. The car goes around a sharp curve. Even though you hold the cup still, coffee still splashes out. |

This can best be explained due to

|  |  |
| --- | --- |
| A) | density. |

|  |  |
| --- | --- |
| B) | friction. |

|  |  |
| --- | --- |
| C) | gravity. |

|  |  |
| --- | --- |
| **D)** | **inertia.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
This can best be explained due to **inertia**. The coffee continues in a straight path out of the cup.

**7)** If Shane and Susan both push on a box with a force of 25N, but in opposite directions, what will happen to the box?

|  |  |
| --- | --- |
| **A)** | **The box will not move.** |

|  |  |
| --- | --- |
| B) | The box will slide toward Shane. |

|  |  |
| --- | --- |
| C) | The box will slide toward Susan. |

|  |  |
| --- | --- |
| D) | The box will be perpendicular to both Shane and Susan. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
If Shane and Susan apply equal, yet opposite forces, **the box will not move**. The forces will cancel each other out and become balanced.

**8)** In the middle of science class, you have a great idea. Being on the fourth floor, you get a friend to watch out the window of the third, second and first floors just beneath you. You have all your friends on a conference call on your cell phone and tell them to let you know when they see a book you drop out your window pass by their window. Which statement is true of the amount of time it takes to pass by each window?

|  |  |
| --- | --- |
| A) | the time interval between floors is the same |

|  |  |
| --- | --- |
| **B)** | **the time interval between floors becomes less each time** |

|  |  |
| --- | --- |
| C) | the time interval between floors becomes more each time |

|  |  |
| --- | --- |
| D) | the time interval between floors becomes infinitely long |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**The time interval between floors becomes less each time.** Because gravity is accelerating the book, the velocity increases between each floor. This means that the same distance will be covered in less time.   
  
By the way, your book is not a good thing to throw out the window.

**9)** You own a high speed digital camera that can take a picture every 0.5 seconds. You decide to take a picture every 0.5 seconds of your physics teacher as she drops a watermelon off the top of the school. After you develop and analyze the pictures, you realize that the distance the watermelon falls from the teacher in each new picture is

|  |  |
| --- | --- |
| A) | the same in each picture. |

|  |  |
| --- | --- |
| B) | gradually less in each picture. |

|  |  |
| --- | --- |
| **C)** | **gradually more in each picture.** |

|  |  |
| --- | --- |
| D) | proportional to the mass of the watermelon. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The distance the watermelon travels is **gradually more in each picture**. This is because gravity causes the watermelon to accelerate as it falls. This means that the velocity becomes greater every half of a second, and, therefore, the distance the melon falls is greater each time.

**10)** Assuming the downward direction to be positive, the acceleration of gravity is about 10

|  |
| --- |
| m |
| s2 |

. This means that

|  |  |
| --- | --- |
| A) | the distance of a falling body increases by 10 m every second. |

|  |  |
| --- | --- |
| B) | the time of a falling body is reduced by one second every 10 m. |

|  |  |  |  |
| --- | --- | --- | --- |
| **C)** | **the velocity of a falling body increases by 10**   |  | | --- | | m | | s |   **every second.** |

|  |  |  |  |
| --- | --- | --- | --- |
| D) | the velocity of a falling body increases by 1   |  | | --- | | m | | s |    every 10 seconds. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Look at the units of acceleration, [[m/s2]], this is the same as 10 m/s/s. This shows a velocity (10

|  |
| --- |
| m |
| s |

) per unit time (1 s). This means that **the velocity of a falling body increases by 10**

|  |
| --- |
| m |
| s |

**every second.**

**11)** Mass is measured in \_\_\_\_\_\_\_\_\_\_\_\_, and weight is measured in \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |
| --- | --- |
| A) | kilograms, grams |

|  |  |
| --- | --- |
| B) | grams, kilograms |

|  |  |
| --- | --- |
| C) | newtons, kilograms |

|  |  |
| --- | --- |
| **D)** | **kilograms, newtons** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The metric unit of mass is the **kilogram** and the metric unit of weight is the **newton**. To convert between the two, the mass can be multiplied by the acceleration due to gravity.

**12)** Calculate the amount of work done if you use a 100N force to push a 50kg box 5m across the kitchen floor.

|  |  |
| --- | --- |
| A) | 250 J |

|  |  |
| --- | --- |
| **B)** | **500 J** |

|  |  |
| --- | --- |
| C) | 5000 J |

|  |  |
| --- | --- |
| D) | 50,000 J |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Work is force times distance. It does not matter what the mass of the object is. In this case the answer is the force applied (100N) x the distance you apply it over (5m) = **500 J**.

**13)** Which statement is true about your mass?

|  |  |
| --- | --- |
| A) | You would have less mass on the moon. |

|  |  |
| --- | --- |
| B) | You would have less mass on the Earth. |

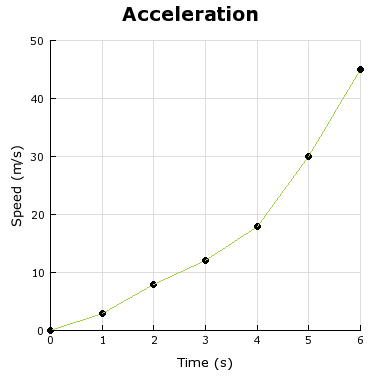
|  |  |
| --- | --- |
| C) | Your would have more mass on the Earth. |

|  |  |
| --- | --- |
| **D)** | **You would have the same mass on the Earth and moon.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**You would have the same mass on the Earth and moon.** Mass is the amount of matter in the object...that doesn't change just because the gravitational pull does.

**14)**



The graph shows the acceleration of a racehorse taking off from a starting gate. By how much did the horse's speed increase between 4 seconds and 6 seconds?

|  |  |
| --- | --- |
| A) | 20 m/s |

|  |  |
| --- | --- |
| **B)** | **27 m/s** |

|  |  |
| --- | --- |
| C) | 45 m/s |

|  |  |
| --- | --- |
| D) | 65 m/s |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Subtracting the Y intercepts from times 6 sec and 4 sec gives 45 m/s - 18 m/s = **27 m/s**

**15)** In which situation is the acceleration of the car negative?

|  |  |
| --- | --- |
| A) | The velocity of a car was 75 km/h over 4 hours. |

|  |  |
| --- | --- |
| **B)** | **The velocity of a car reduced from 50 km/h to 35 km/h over one minute.** |

|  |  |
| --- | --- |
| C) | The velocity of a car increased from 40 km/h to 75 km/h over 15 minutes. |

|  |  |
| --- | --- |
| D) | The velocity of a car was 45 km/h at 2:00 pm and at 4:00 pm the velocity of the car was 85 km/h. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The situtation in which the acceleration of the car is negative is **the velocity of a car reduced from 50 km/h to 35 km/h over one minute.** A negative acceleration means a velocity that has decreased over time, the only one in which this is true is the first statement.

**16)**

|  |
| --- |
| A car traveled at a constant velocity of 70 mph from noon to 2:00 pm. At 3:00 pm the velocity of the car was 80 mph; and finally at 4:30 pm the velocity of the car was 40 mph. |

Which statement accurately describes the acceleration of the car?

|  |  |
| --- | --- |
| A) | The car had a positive acceleration the entire time. |

|  |  |
| --- | --- |
| B) | The car had a negative acceleration from noon to 2:00 pm. |

|  |  |
| --- | --- |
| C) | The acceleration of the car from 3:00 pm to 4:30 pm was zero |

|  |  |
| --- | --- |
| **D)** | **The car had a positive acceleration between 2:00 pm and 3:00 pm.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**The car had a positive acceleration between 2:00 pm and 3:00 pm.** The other statements were all incorrect; from noon to 2:00 pm the acceleration was zero, from 2:00 pm to 3:00 pm the acceleration was positive, and from 3:00 pm to 4:30 pm the acceleration was negative.

**17)** You are sitting in a car that isn't moving; suddenly, the car quickly accelerates. Your body seems to be pushed back against the seat. Which word best explains why your body seemed to be pushed backward against the seat?

|  |  |
| --- | --- |
| A) | newton |

|  |  |
| --- | --- |
| B) | vector |

|  |  |
| --- | --- |
| **C)** | **inertia** |

|  |  |
| --- | --- |
| D) | gravity |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct term is **inertia.** Inertia is the tendency of an object to remain at rest or an object in motion to remain in motion. Your body was at rest when the car accelerated, it wanted to stay still, but it met the seat which forced forward with the car.

**18)** A 62 kg box is lifted 12 meters off the ground. How much work was done?

|  |  |
| --- | --- |
| A) | 5.17 J |

|  |  |
| --- | --- |
| B) | 72.91 J |

|  |  |
| --- | --- |
| C) | 744.0 J |

|  |  |
| --- | --- |
| **D)** | **7291.2 J** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct amount of work is **7291.2 N-m.** In order to find the work, you must first find the force of the object by multiplying the mass by the acceleration due to gravity and then multiply by the distance it was moved.

**19)** Why does a raindrop accelerate as it falls to the earth?

|  |  |
| --- | --- |
| A) | because it gains mass during its travel |

|  |  |
| --- | --- |
| **B)** | **because the force of the earth pulls on the drop** |

|  |  |
| --- | --- |
| C) | because it gets further from the cloud where it started |

|  |  |
| --- | --- |
| D) | because fewer forces are present to slow it down as it drops |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
A raindrop accelerates **because the force of the earth pulls on the drop**. This force is the attraction between the earth and the raindrop, its weight due to gravity.

**20)** The planet Jupiter has an acceleration due to gravity that is approximately 2.4 times as much as the earth (23.2

|  |
| --- |
| m |
| s2 |

). Which of these statements is true regarding if you were to travel to Jupiter and land on its surface?

|  |  |
| --- | --- |
| A) | Your mass would increase by a factor of 2.4. |

|  |  |
| --- | --- |
| B) | Your mass would decrease by a factor of 2.4. |

|  |  |
| --- | --- |
| **C)** | **Your weight would increase by a factor of 2.4.** |

|  |  |
| --- | --- |
| D) | Your weight would decrease by a factor of 2.4. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
On Jupiter, **your weight would increase by a factor of 2.4.** Weight is a product of mass and gravity. Mass does not change dependent upon location.

**21)**



What is the primary mechanical advantage of using the simple machine seen in the image?

|  |  |
| --- | --- |
| A) | You can apply a large force and have it penetrate over a very long distance. |

|  |  |
| --- | --- |
| B) | You can apply a long distance and have it convert into a very short distance. |

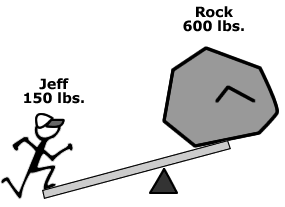
|  |  |
| --- | --- |
| C) | You can apply a short distance and have it multiplied to penetrate a large distance. |

|  |  |
| --- | --- |
| **D)** | **You can apply a small force to penetrate something that normally requires a large force.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The screw is essentially a simple machine that consists of an inclined plane wound around a piece of metal. The screw allows **you to apply a small force to penetrate something that normally requires a large force.** This is done by applying it over a large distance.

**22)**



Jeff is a landscaping contractor and lifts a rock weighing 600 pounds by wedging a board under the rock. Jeff weighs 150 pounds and puts all of his weight on the lever. How much mechanical advantage did the lever provide to Jeff in lifting the rock?

|  |  |
| --- | --- |
| A) | 0 |

|  |  |
| --- | --- |
| B) | 2 |

|  |  |
| --- | --- |
| **C)** | **4** |

|  |  |
| --- | --- |
| D) | 8 |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The mechanical advantage of the lever would be **4.** To solve you would divide the resistance force by the effort force or

|  |
| --- |
| 600 lbs. |
| 150 lbs |

.

**23)** A bicycle rider sees a car up ahead, and slows down to avoid a collision. He starts off traveling at 15

|  |
| --- |
| m |
| s |

 and slows down to 5

|  |
| --- |
| m |
| s |

in 7.5 s. Find the acceleration of the bike rider.

|  |  |  |  |
| --- | --- | --- | --- |
| A) | -75   |  | | --- | | m | | s2 | |

|  |  |  |  |
| --- | --- | --- | --- |
| B) | -2   |  | | --- | | m | | s2 | |

|  |  |  |  |
| --- | --- | --- | --- |
| **C)** | **-1.33**   |  | | --- | | m | | s2 | |

|  |  |  |  |
| --- | --- | --- | --- |
| D) | -0.667   |  | | --- | | m | | s2 | |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
To determine the acceleration, plug the appropriate values into the equation a =

|  |
| --- |
| (vf - vi) |
| t |

, where vf =

|  |
| --- |
| 5 m |
| s |

, vi = 15

|  |
| --- |
| m |
| s |

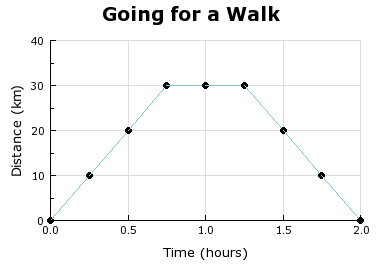
 and t = 7.5s. This gives a =

|  |
| --- |
| (5 m/s - 15 m/s) |
| 7.5 s |

 = **-1.33**

|  |
| --- |
| m |
| s2 |

**24)**



John and Caroline go out for a walk one day. This graph represents their distance from home.   
  
Which statement accurately describes their walk?

|  |  |
| --- | --- |
| A) | They walked quickly, then they were still, then they walked slowly. |

|  |  |
| --- | --- |
| B) | They walked forward fast, then they were still, then they walked backwards slow. |

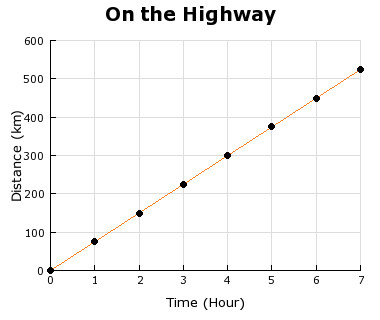
|  |  |
| --- | --- |
| **C)** | **They walked in one direction, then they were still, then they walked in the opposite direction.** |

|  |  |
| --- | --- |
| D) | They walked faster and faster until they walked at a constant rate, then they walked slower and slower. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**They walked in one direction, then they were still, then they walked in the opposite direction.** During the first part of the trip, they travel 30 km in 0.75 hours at a constant rate. Then, they are still for 1 hour. Finally, they travel 30 km in 0.75 hours, but in the opposite direction.

**25)**



The graph represents the distance a car travels over time while on the highway. Which statement about the car's trip is accurate?

|  |  |
| --- | --- |
| A) | The car does not move over time. |

|  |  |
| --- | --- |
| **B)** | **The car travels at a constant velocity.** |

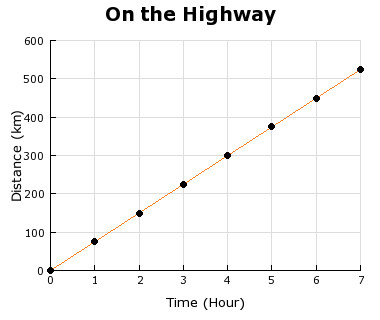
|  |  |
| --- | --- |
| C) | The car's velocity increases constantly over time. |

|  |  |
| --- | --- |
| D) | The car's velocity decreases constantly over time. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**The car travels at a constant velocity.** This can be determined because the distance and time are constantly changing. And, the slope of the graph remains the same over time.

**26)**



The graph represents the distance a car travels over time while on the highway. What is the average velocity of the car?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 28   |  | | --- | | km | | hr | |

|  |  |  |  |
| --- | --- | --- | --- |
| B) | 50   |  | | --- | | km | | hr | |

|  |  |  |  |
| --- | --- | --- | --- |
| **C)** | **75**   |  | | --- | | km | | hr | |

|  |  |  |  |
| --- | --- | --- | --- |
| D) | 100   |  | | --- | | km | | hr | |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**75**

|  |
| --- |
| km |
| hr |

 The easiest place to determine this is the two points (0,0) and (4,300). Over 4 seconds, the distance goes from 0 to 300 km. V =

|  |
| --- |
| (300-0) |
| (4-0) |

 =

|  |
| --- |
| 300 |
| 4 |

.

**27)** What is the relationship between the weight of a cellphone and its mass (0.26 kg)?

|  |  |
| --- | --- |
| A) | The weight is the mass multiplied by ten. |

|  |  |
| --- | --- |
| B) | The weight is the mass divided by the acceleration due to gravity. |

|  |  |
| --- | --- |
| C) | The weight and mass are independent of one another and solely dependent upon location. |

|  |  |
| --- | --- |
| **D)** | **The weight is the product of the mass and acceleration due to gravity, wherever it is located.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**The weight is the product of the mass and acceleration due to gravity, wherever it is located.** That is why the formula W=mg is used to determine weight. g, acceleration due to gravity, changes depending upon location.

**28)** At 25°C, sound can travel 100 meters across a football field in 0.29 seconds. Determine the velocity of these sound waves in the direction they travel across the field.

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 0.0029   |  | | --- | | m | | s | |

|  |  |  |  |
| --- | --- | --- | --- |
| B) | 29   |  | | --- | | m | | s | |

|  |  |  |  |
| --- | --- | --- | --- |
| **C)** | **345**   |  | | --- | | m | | s | |

|  |  |  |  |
| --- | --- | --- | --- |
| D) | 34,500   |  | | --- | | m | | s | |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
At this temperature, sound travels at **345**

|  |
| --- |
| m |
| s |

. This can be determined by dividing the distance (100m) by the time (0.29s).

**29)**



Two platoons line up for a tug of war. If both platoons have the same number of participants on a team, what other factor is critical to either platoon's win?

|  |  |
| --- | --- |
| A) | age of men |

|  |  |
| --- | --- |
| B) | height of men |

|  |  |
| --- | --- |
| **C)** | **total mass of the team** |

|  |  |
| --- | --- |
| D) | condition of the ground |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Critical to either platoon's success is the **total mass of the team.** The greater the mass, the more force required to move the team.

**30)**

**Acceleration due to Gravity**

|  |  |
| --- | --- |
| **Time (s)** | **Velocity (m/s)** |
| 0 | 0 |
| 1 | 9.8 |
| 2 | 19.6 |
| 3 | 29.4 |
| 4 | 39.2 |

To test Newton's law of gravity, Ben and Jerry climbed the football stadium at school and dropped an egg from the very top of the bleachers. Their egg drop data can be seen in the table.  
  
  
According to this data, what conclusion can the boys make regarding Newton's law of gravity?

|  |  |
| --- | --- |
| A) | No conclusion can be drawn from the data. |

|  |  |
| --- | --- |
| B) | The acceleration due to gravity is not constant. |

|  |  |
| --- | --- |
| C) | The acceleration due to gravity of 9.8 m/s/s is refuted. |

|  |  |
| --- | --- |
| **D)** | **The acceleration due to gravity of 9.8 m/s/s is supported.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
According to the data table, **the acceleration due to gravity of 9.8 m/s/s is supported.** Each time interval indicates an increase of 9.8 m/s. In other words, if the acceleration is 9.8 m/s/s after one second, then after 4 seconds, the acceleration is 4 X 9.8 m/s/s or 39.2 m/s/s.

**31)**

http://usatestprep.com/modules/gallery/files/1/107/107.jpg

In the science lab, this piece of equipment is used to measure the force of gravity on an object or its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in units called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |
| --- | --- |
| A) | mass; grams |

|  |  |
| --- | --- |
| B) | height; meters |

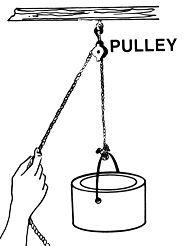
|  |  |
| --- | --- |
| C) | volume; liters |

|  |  |
| --- | --- |
| **D)** | **weight; Newtons** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
In science lab, a spring scale is used to measure **weight in units called Newtons.** Although you and I measure our weight in pounds, the correct SI unit is Newtons.

**32)**



How does a single fixed pulley, like the one seen here, help you do work?

|  |  |
| --- | --- |
| **A)** | **changes the direction of the force** |

|  |  |
| --- | --- |
| B) | increases the amount of applied force |

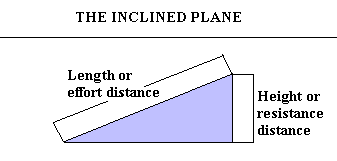
|  |  |
| --- | --- |
| C) | decreases the amount of applied force |

|  |  |
| --- | --- |
| D) | allows you to pull the rope a shorter distance |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
A single fixed pulley does not decrease the amount of effort force. Instead it **changes the direction of the force.** You pull down and the weight moves up.

**33)**



How can you **decrease** the effort force needed to push a weight to the top of the ramp?

|  |  |
| --- | --- |
| A) | cover the surface with carpet |

|  |  |
| --- | --- |
| **B)** | **increase the length of the ramp** |

|  |  |
| --- | --- |
| C) | increase the height of the ramp |

|  |  |
| --- | --- |
| D) | decrease the length of the ramp |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
You can decrease the effort force needed to push a weight up the ramp if you **increase the length of the ramp.** You could also decrease the height of the ramp.

**34)**

|  |
| --- |
| A person is on a raft. The person exerts a force on the raft, causing the raft to move. The person also moves in the opposite direction. |

Which statement BEST explains why the person and the raft moved in opposite directions?

|  |  |
| --- | --- |
| A) | second law of motion |

|  |  |
| --- | --- |
| **B)** | **action and reaction forces** |

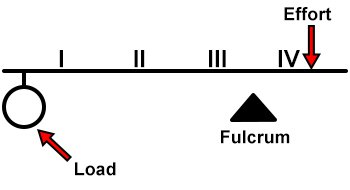
|  |  |
| --- | --- |
| C) | person wanted the raft to move |

|  |  |
| --- | --- |
| D) | force is the product of mass and acceleration |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct answer is **action and reaction forces** The action force is the person pushing on the raft. The reaction force is the raft pushing back, causing the person to move in the opposite direction of the raft.

**35)**



Where should the fulcrum be located in this lever to get the greatest mechanical advantage?

|  |  |
| --- | --- |
| A) | at position II, because the effort arm and the load arm should have equal lengths |

|  |  |
| --- | --- |
| B) | at position IV, because the effort should be applied as close to the fulcrum as possible |

|  |  |
| --- | --- |
| **C)** | **at position I, because the length of the effort arm should be greater than the length of the load arm** |

|  |  |
| --- | --- |
| D) | at position III, because the length of the load arm should be greater than the length of the effort arm |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Mechanical advantage is the ratio of the length of the effort arm to the length of the load arm. So to get the greatest mechanical advantage the fulcrum should be placed **at position I, because the length of the effort arm should be greater than the length of the load arm**.

**36)** On earth you have a mass of 70 kg and a weight of approximately 700 N. The planet Mars has an acceleration due to gravity that is approximately 0.38 times as much as the earth (3.7

|  |
| --- |
| m |
| s2 |

). Which statement would be true if you were on Mars?

|  |  |
| --- | --- |
| A) | Your mass would be 26.6 kg. |

|  |  |
| --- | --- |
| **B)** | **Your weight would be 266 N.** |

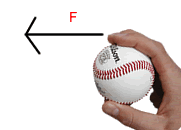
|  |  |
| --- | --- |
| C) | Your weight would be 1842 N. |

|  |  |
| --- | --- |
| D) | Your mass would be 184.2 kg. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
On Mars, your weight would decrease by a factor of 0.38 and be **266 N.** Weight is a product of mass and gravity. Mass does not change dependent upon location.

**37)**



When Jackson throws a baseball in a straight path, what two forces cause the ball to eventually stop moving?

|  |  |
| --- | --- |
| **A)** | **gravity and friction** |

|  |  |
| --- | --- |
| B) | mass and ground force |

|  |  |
| --- | --- |
| C) | wind resistance and mass |

|  |  |
| --- | --- |
| D) | negative acceleration and gravity |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**gravity and friction** Gravity pulls the ball toward the ground, then friction between the ground and the ball cause it to stop rolling.

**38)** In which situation is the object experiencing unbalanced forces?

|  |  |
| --- | --- |
| A) | A box resting on a horizontal floor. |

|  |  |
| --- | --- |
| **B)** | **A car slowing as it reaches a traffic light.** |

|  |  |
| --- | --- |
| C) | A car with its cruise control set to 30 km/h. |

|  |  |
| --- | --- |
| D) | A penny at terminal velocity after falling off of a building. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct answer is **A car slowing as it reaches a traffic light.** The car's velocity changes, therefore it experiences unbalanced forces.

**39)** A box experiences a force of 2 N to the left and 3 N to the right. Which is true of the box's motion?

|  |  |
| --- | --- |
| A) | The box will slow down. |

|  |  |
| --- | --- |
| B) | The box's velocity will be 1 m/s. |

|  |  |
| --- | --- |
| C) | The box's velocity will not change. |

|  |  |
| --- | --- |
| **D)** | **The box will experience acceleration.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct answer is **The box will experience acceleration.** The box experiences unbalanced forces and will, therefore, accelerate. We don't have enough information to know whether the box will slow down or speed up or to know know how fast the box will travel.

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**Quiz Standard 9 Answer Key**

|  |  |
| --- | --- |
| Teacher Name: | Quiz Generated On: 04-29-2016 |

**1)**

|  |
| --- |
| AM Radio Waves Ultraviolet Light X Rays Visible Light |

What is true for ALL of the examples of electromagnetic waves?

|  |  |
| --- | --- |
| **A)** | **They all move at the same speed in a vacuum.** |

|  |  |
| --- | --- |
| B) | They all have the same wavelength. |

|  |  |
| --- | --- |
| C) | They all have the same frequency. |

|  |  |
| --- | --- |
| D) | They all have the same energy. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**All of these** types of electromagnetic radiation travel the same speed. They are all forms of light, and travel at the speed of light.

**2)** Sound waves travel fastest through

|  |  |
| --- | --- |
| A) | air. |

|  |  |
| --- | --- |
| **B)** | **steel.** |

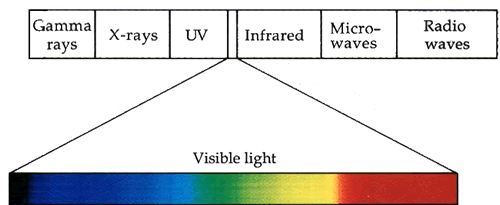
|  |  |
| --- | --- |
| C) | water. |

|  |  |
| --- | --- |
| D) | a vacuum. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Sound travels faster through denser material. Therefore, sound would travel fastest through **steel**.

**3)**



The picture lists light waves from left to right in order of highest to lowest energy. Which region of the electromagnetic spectrum has the longest wavelength?

|  |  |
| --- | --- |
| A) | UV |

|  |  |
| --- | --- |
| B) | Gamma Rays |

|  |  |
| --- | --- |
| **C)** | **Radio Waves** |

|  |  |
| --- | --- |
| D) | Visible Light |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Radio waves** have the lowest energy, lowest frequency and, due to the inverse relationship, the longest wavelengths.

**4)** Which of these waves can NOT travel through the vacuum of space?

|  |  |
| --- | --- |
| A) | microwaves |

|  |  |
| --- | --- |
| B) | radio waves |

|  |  |
| --- | --- |
| C) | light waves |

|  |  |
| --- | --- |
| **D)** | **sound waves** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Sound waves** can not travel through the vacuum of space. Sound needs particles to transmit its energy through. Space is a vacuum, with no particles in it. All of the others are light.

**5)** Sound waves are transferred by the compression of particles. The closer the particles are to one another, the faster the energy is transferred. Therefore, sound energy directly depends upon the \_\_\_\_\_\_\_\_\_ of the medium.

|  |  |
| --- | --- |
| **A)** | **density** |

|  |  |
| --- | --- |
| B) | mass |

|  |  |
| --- | --- |
| C) | pressure |

|  |  |
| --- | --- |
| D) | volume |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Therefore, sound energy directly depends upon the **density** of the medium. Density is a measure of particle closeness.

**6)** Which type of wave can be transmitted through the vacuum of space

|  |  |
| --- | --- |
| A) | sound waves |

|  |  |
| --- | --- |
| **B)** | **radio waves** |

|  |  |
| --- | --- |
| C) | pressure waves |

|  |  |
| --- | --- |
| D) | compression waves |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Radio waves** can be transmitted through the vacuum of space. Only electromagnetic radiation may be passed through a vacuum.

**7)** A train whistle is at a higher pitch (note) as it approaches you and then drops to a lower pitch as it moves away. This effect is called

|  |  |
| --- | --- |
| A) | the Eiffel effect. |

|  |  |
| --- | --- |
| **B)** | **the Doppler effect.** |

|  |  |
| --- | --- |
| C) | the genesis effect. |

|  |  |
| --- | --- |
| D) | the electromagnetic spectrum. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**The Doppler effect** is a change in pitch caused by either the observer, the sound producer, or both moving.

**8)** Ocean waves move up and down in circles, but transmit \_\_\_\_\_\_\_\_\_\_\_\_ horizontally toward the shore.

|  |  |
| --- | --- |
| A) | amplitude |

|  |  |
| --- | --- |
| **B)** | **energy** |

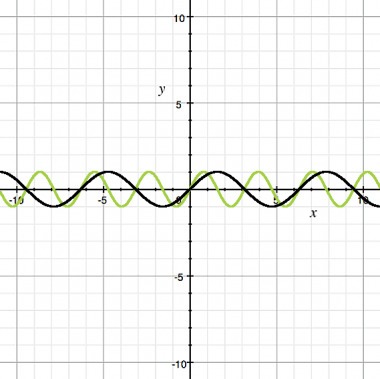
|  |  |
| --- | --- |
| C) | frequencies |

|  |  |
| --- | --- |
| D) | wavelengths |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The answer is **energy**. The energy is carried perpendicular to the movement of the ocean waves.

**9)**



Identify the characteristic of the transverse wave that halved from wave **A (black)** to wave **B (green)**.

|  |  |
| --- | --- |
| A) | amplitude |

|  |  |
| --- | --- |
| B) | crest |

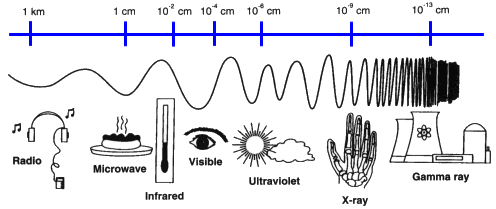
|  |  |
| --- | --- |
| C) | trough |

|  |  |
| --- | --- |
| **D)** | **wavelength** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The **wavelength**halved from wave A to wave B. Wavelength is the distance between corresponding peaks or troughs.

**10)**



According to the electromagnetic spectrum, Gamma rays have the shortest wavelength. Therefore, Gamma rays have \_\_\_\_\_\_\_\_\_\_\_\_\_\_ frequency.

|  |  |
| --- | --- |
| A) | a random |

|  |  |
| --- | --- |
| B) | the lowest |

|  |  |
| --- | --- |
| **C)** | **the highest** |

|  |  |
| --- | --- |
| D) | an undetermined |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Wavelength and frequency are inversely proportional. This means that as one goes up, the other goes down. So, if the wavelength of the gamma ray is shortest, the frequency must be **the highest**.

**11)** While watching a recent science fiction movie, one Klingon spaceship blows up a Droid spaceship with a laser gun. The Klingon crew watches out the port window and covers their ears to muffle the noise from the explosion. Scientifically, this scene is inaccurate because

|  |  |
| --- | --- |
| A) | light can not reflect off objects in the vacuum of space. |

|  |  |
| --- | --- |
| B) | they would not be able to see anything outside the window. |

|  |  |
| --- | --- |
| C) | lasers can not be transmitted through the vacuum of space. |

|  |  |
| --- | --- |
| **D)** | **the sound of the explosion would not be transmitted back to their ship.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Light, including lasers, can be transmitted easily through space. Sound, however, needs a medium to be transmitted, therefore, **the sound of the explosion would not be transmitted back to their ship.**

**12)** When light enters a pair of glasses, it \_\_\_\_\_\_\_\_\_\_\_\_\_\_ when it hits the glass.

|  |  |
| --- | --- |
| A) | conducts |

|  |  |
| --- | --- |
| B) | diffracts |

|  |  |
| --- | --- |
| C) | reflects |

|  |  |
| --- | --- |
| **D)** | **refracts** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
When light enters glass, it bends or **refracts** because it slows down. This is caused by the interaction of the light with the glass particles.

**13)**



On a beautiful fall day we see the trees' image in the pond. We can see the trees in the pond because of what property of light?

|  |  |
| --- | --- |
| A) | absorption |

|  |  |
| --- | --- |
| B) | diffraction |

|  |  |
| --- | --- |
| **C)** | **reflection** |

|  |  |
| --- | --- |
| D) | refraction |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
We see the trees' image as a **reflection** in the pond water.

**14)** An echo is an example of sound wave

|  |  |
| --- | --- |
| A) | diffraction. |

|  |  |
| --- | --- |
| B) | interference. |

|  |  |
| --- | --- |
| **C)** | **reflection.** |

|  |  |
| --- | --- |
| D) | refraction. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
An echo is the bouncing back of a sound wave off of a surface, this is **reflection**.

**15)** In a light interference pattern, alternate dark and bright fringes are seen. Why are the bright fringes formed?

|  |  |
| --- | --- |
| A) | no interference |

|  |  |
| --- | --- |
| B) | too much interference |

|  |  |
| --- | --- |
| C) | destructive interference |

|  |  |
| --- | --- |
| **D)** | **constructive interference** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Light emitted from two coherent sources traveling in a medium experiences **constructive interference.** This results in the production of bright fringes.

**16)** Your teacher walks outside the classroom to have a conversation with the principal. Unknown to the teacher, while she is outside the room, the sound waves are transmitted around the edge of the door and spread out on the other side and you can hear the conversation. This is due to sound wave

|  |  |
| --- | --- |
| A) | absorption. |

|  |  |
| --- | --- |
| **B)** | **diffraction.** |

|  |  |
| --- | --- |
| C) | interference. |

|  |  |
| --- | --- |
| D) | reflection. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Diffraction** is the spreading out of waves as they go around a corner or through an opening. In this case, the sound waves diffract after they go through the opening around the door jamb.

**17)** In which medium would sound travel the fastest?

|  |  |
| --- | --- |
| A) | across a room |

|  |  |
| --- | --- |
| B) | in a swimming pool |

|  |  |
| --- | --- |
| C) | through outer space |

|  |  |
| --- | --- |
| **D)** | **through a railroad track** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The denser the medium, the faster sound waves will travel through it. This is because sound needs particles to travel and the closer the particles, the faster the sound can be transferred from one part to the next. In this case, the densest substance listed is an iron rail **through a railroad track**. This is why you sometimes see people put their "ear to the rail" to listen for approaching trains.

**18)** According to the Doppler Effect, which statement is true about a sound as it approaches you and then moves away.

|  |  |
| --- | --- |
| **A)** | **As the source approaches you, the sound waves are compressed so the pitch of the noise increases.** |

|  |  |
| --- | --- |
| B) | The pitch of the sound remains the same the entire time, regardless of the direction of the source. |

|  |  |
| --- | --- |
| C) | As the source moves away from you the sound waves are compressed so the pitch of the noise increases. |

|  |  |
| --- | --- |
| D) | As the source approaches you, the sound waves are stretched relative to the individual so the pitch of the noise decreases. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**As the source approaches you, the sound waves are compressed so the pitch of the noise increases.** It is all relative to the individual, as the sound gets closer, the waves get closer and closer making the pitch appear higher to an individual.

**19)** Why does the sound of something moving away from you seem to change to a lower and lower pitch?

|  |  |
| --- | --- |
| A) | As the source moves away, the increased distance creates more interference; so the pitch drops. |

|  |  |
| --- | --- |
| B) | As the source moves away, the frequency of the sound waves is being compressed, so the pitch drops. |

|  |  |
| --- | --- |
| C) | As the source moves away, the sound waves speed up to reach the observer; this causes the pitch to drop. |

|  |  |
| --- | --- |
| **D)** | **As the source moves away, the sound waves stretches out relative to the person standing still; so the pitch drops.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**As the source moves away, the sound waves stretches out relative to the person standing still; so the pitch drops.** Even though the sound waves are being emitted at the same frequency, the distance is not constant; so as the object gets farther and farther away, there appears to be more time between waves to the individual standing still; so the pitch, or frequency, lowers.

**20)** What type of waves move energy forward, but the source moves up and down?

|  |  |
| --- | --- |
| A) | medium waves |

|  |  |
| --- | --- |
| B) | particle waves |

|  |  |
| --- | --- |
| **C)** | **transverse waves** |

|  |  |
| --- | --- |
| D) | longitudinal waves |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct answer is **transverse waves.** Longitudinal waves move the energy forward and the source also moves parallel to the energy. The other two are made up waves.

**21)** Light waves

|  |  |
| --- | --- |
| **A)** | **do not require a medium.** |

|  |  |
| --- | --- |
| B) | can not travel in a vacuum. |

|  |  |
| --- | --- |
| C) | are not electromagnetic radiation. |

|  |  |
| --- | --- |
| D) | do not travel in straight lines from the source. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Light waves **do not require a medium.** Light waves are electromagnetic radiation and do not require a medium so they can travel through a medium.

**22)** Why does light refract when it encounters the glass in a lens?

|  |  |
| --- | --- |
| A) | because it speeds up, which causes it to bend |

|  |  |
| --- | --- |
| **B)** | **because it slows down, which causes it to bend** |

|  |  |
| --- | --- |
| C) | because it hits a dense medium, which causes it to bounce off |

|  |  |
| --- | --- |
| D) | because it gets absorbed, which causes it to lessen in intensity |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Light hits the glass in a lens **because it slows down, which causes it to bend**. The material of a lens is more optically dense than the air it is traveling from.

**23)** In what way are all sound waves and light waves similar?

|  |  |
| --- | --- |
| **A)** | **They both transmit energy.** |

|  |  |
| --- | --- |
| B) | They both require a medium for transmission. |

|  |  |
| --- | --- |
| C) | Neither of them require a medium for transmission. |

|  |  |
| --- | --- |
| D) | They both transmit matter without transmitting energy. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Both sound and light waves **transmit energy.** All waves are a disturbance that move through space and time transferring energy.

**24)** All waves carry

|  |  |
| --- | --- |
| **A)** | **energy.** |

|  |  |
| --- | --- |
| B) | light. |

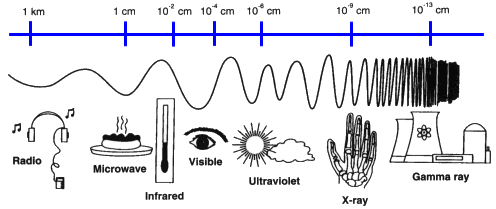
|  |  |
| --- | --- |
| C) | matter. |

|  |  |
| --- | --- |
| D) | particles. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
All waves carry **energy.** Waves are a disturbance that moves through space and time transferring energy.

**25)**



Visible light represents a very small portion of the electromagnetic spectrum. Radiation to the left in the image, such as microwaves, has a longer wavelength than visible light. Radiation to the right has a shorter wavelength than is observable.  
  
Which radiation has a higher frequency than visible light?

|  |  |
| --- | --- |
| **A)** | **X-Rays** |

|  |  |
| --- | --- |
| B) | Infrared light |

|  |  |
| --- | --- |
| C) | microwave radiation |

|  |  |
| --- | --- |
| D) | the frequency of all radiation is the same |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**X-Rays** have a shorter wavelength and, hence, a higher frequency than visible light. So do all other types of radiation to the right of visible light on the spectrum.

**26)** In old western movies, cowboys often would put their ear to a train track to listen for an oncoming train. What benefit would this method provide over listening for a train by listening for sound through the air?

|  |  |
| --- | --- |
| A) | The sound would be louder. |

|  |  |
| --- | --- |
| B) | The sound would be undistorted. |

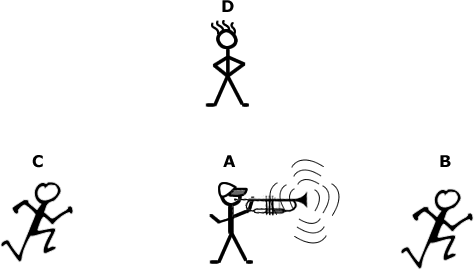
|  |  |
| --- | --- |
| **C)** | **The sound would reach him sooner.** |

|  |  |
| --- | --- |
| D) | The sound would higher in frequency. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**The sound would reach him sooner.** A train track is made of steel. This is a dense material that transmits pressure waves (sound) much faster than air.

**27)**



Trumpeter A holds a B-flat note on the trumpet for a long time. Person C is running towards the trumpeter at a constant velocity. Person B is running away from the trumpeter at the same rate. Person D is standing still the whole time.  
  
Which person hears a frequency that is lower than the B-flat?

|  |  |
| --- | --- |
| A) | Person A |

|  |  |
| --- | --- |
| **B)** | **Person B** |

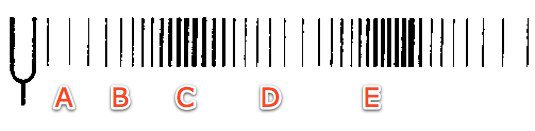
|  |  |
| --- | --- |
| C) | Person C |

|  |  |
| --- | --- |
| D) | Person D |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Person B** hears a note that is lower than a B-flat. This is because as the runner is going away from the stationary trumpeter, the sound waves become elongated, or stretched out. This increases the wavelength and decreases the frequency.

**28)**



Which area of this sound wave represents a compression?

|  |  |
| --- | --- |
| A) |  |

|  |  |
| --- | --- |
| B) |  |

|  |  |
| --- | --- |
| **C)** |  |

|  |  |
| --- | --- |
| D) |  |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**C** represents a compression. This is the area where the density of the sound wave is highest.

**29)** Sound waves require a medium to travel through, such as a solid, liquid or gas because

|  |  |
| --- | --- |
| A) | waves cannot move through a vacuum. |

|  |  |
| --- | --- |
| B) | sound only works within certain pressures. |

|  |  |
| --- | --- |
| C) | waves only work within certain temperatures. |

|  |  |
| --- | --- |
| **D)** | **sound is molecules bumping into one another.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Sound is molecules bumping into one another.** They can’t bump without a medium, however.

**30)** Which two forms of energy travel in waves?

|  |  |
| --- | --- |
| **A)** | **light and sound** |

|  |  |
| --- | --- |
| B) | heat and electricity |

|  |  |
| --- | --- |
| C) | mechanical motion and light |

|  |  |
| --- | --- |
| D) | electricity and mechanical motion. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The two forms of energy that travel in waves are **light and sound**. Light travels as transverse waves; sound as compression waves.

**31)** You see lightning before you hear thunder because

|  |  |
| --- | --- |
| A) | light waves can travel through a vacuum. |

|  |  |
| --- | --- |
| B) | sound waves cannot travel through the air. |

|  |  |
| --- | --- |
| **C)** | **light waves travel faster than sound waves.** |

|  |  |
| --- | --- |
| D) | sound waves travel faster than light waves. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
You see lightning before you hear thunder because **light waves travel faster than sound waves.** Sound waves travel through air at the speed of approximately 1,100 feet per second; light waves travel through air and empty space at a speed of approximately 186,000 miles per second.

**32)** The hammering on a train track is often heard twice by workers farther down the track; first as the sound travels through the steel and second as the sound travels through the air. This suggests which graph is true?

|  |  |
| --- | --- |
| A) | http://usatestprep.com/modules/gallery/files/88/8843/8843.png |

|  |  |
| --- | --- |
| B) | http://usatestprep.com/modules/gallery/files/88/8844/8844.png |

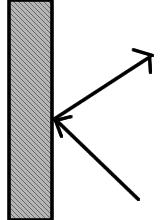
|  |  |
| --- | --- |
| C) | http://usatestprep.com/modules/gallery/files/88/8845/8845.png |

|  |  |
| --- | --- |
| **D)** | **http://usatestprep.com/modules/gallery/files/88/8846/8846.png** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The speed of sound in steel or any solid is faster than the speed of sound through air. This means the steel bar on the graph graph should be the larger of the two. This is true in graph **D.**

**33)**



You see an image of yourself in a mirror because light waves are

|  |  |
| --- | --- |
| A) | diffracted. |

|  |  |
| --- | --- |
| **B)** | **reflected back at you.** |

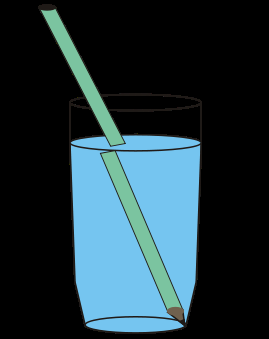
|  |  |
| --- | --- |
| C) | refracted through air. |

|  |  |
| --- | --- |
| D) | refracted to a focal point. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
You see an image of yourself in a mirror because light waves are **reflected back at you.** When a surface is bumpy, light waves are scattered and you cannot see a mirror image.

**34)**



Although you can see the pencil, it appears broken in the glass of water. This is because

|  |  |
| --- | --- |
| A) | electromagnetic waves cannot travel through solids. |

|  |  |
| --- | --- |
| **B)** | **electromagnetic waves travel at different speeds through different media.** |

|  |  |
| --- | --- |
| C) | electromagnetic waves compress more when they travel through denser media. |

|  |  |
| --- | --- |
| D) | electromagnetic waves get closer together when they go through dense media like glass. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
This is because **electromagnetic waves travel at different speeds through different media.** This is called refraction and it causes the pencil to appear broken or bent. Electromagnetic waves are not compression waves. The speed of electromagnetic waves is fastest in a vacuum; the waves slow as the medium becomes more dense.

**35)**



As the band passed by, the beating drums and trumpets made Billy feel like his body was beating with the music. He could hear the music and he could feel it!   
  
How would a scientist explain this to Billy?

|  |  |
| --- | --- |
| A) | Sound waves cannot travel through the air |

|  |  |
| --- | --- |
| **B)** | **Sound waves transmit energy through all forms of matter.** |

|  |  |
| --- | --- |
| C) | The marching causes the ground to move which Billy feels |

|  |  |
| --- | --- |
| D) | Sound waves are transmitted faster through gases than through solids. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Sound waves transmit energy through all forms of matter.** Sound waves do cause the air to vibrate, but they may also cause the ground as well as Billy to vibrate because sound waves can be transmitted through solids and liquids, not just air or gases.

**36)** If we compare and contrast electromagnetic waves with sound waves, all BUT one statement is true. That is

|  |  |
| --- | --- |
| A) | sound waves require a medium to travel while electromagnetic waves do not. |

|  |  |
| --- | --- |
| B) | electromagnetic waves can travel through the vacuum of space while sound waves cannot. |

|  |  |
| --- | --- |
| **C)** | **electromagnetic waves must have a medium in which to travel, but sound waves can travel anywhere.** |

|  |  |
| --- | --- |
| D) | sound waves must bounce off of matter in order to travel while electromagnetic waves do not require matter to be present. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Electromagnetic waves must have a medium in which to travel, but sound waves can travel anywhere.** Think of electromagnetic waves as two fields of force, one magnetic and at right angles to this an electric force field. These two fields are created and moving away from their source. They are complete in themselves and do not need to reach a target by influencing anything in between the source and target.

**37)** A sound wave can be used to shatter a wine glass. This can be explained by which of these?

|  |  |
| --- | --- |
| A) | Sound is a compression wave. |

|  |  |
| --- | --- |
| B) | The sound will interfere with the molecules in the glass. |

|  |  |
| --- | --- |
| **C)** | **The sound resonantes at the natural frequency of the glass.** |

|  |  |
| --- | --- |
| D) | If a sound is loud enough it will have enough energy to break the glass. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**The sound resonantes at the natural frequency of the glass.** This will Make the glass vibrate more and more until it shatters.

**38)** People working in nuclear plants wear special monitoring devices to track their exposure to radiation. Radioactive materials used in plants emit particles but they also emit high energy waves that are potentially lethal to human life. These waves are \_\_\_\_\_\_ waves.

|  |  |
| --- | --- |
| A) | UV |

|  |  |
| --- | --- |
| B) | beta |

|  |  |
| --- | --- |
| **C)** | **gamma** |

|  |  |
| --- | --- |
| D) | infra red |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
These are **gamma** waves. The higher the frequency of electromagnetic waves, the more likely the energy from the waves will cause damage to human cells, specifically DNA. Radioactive materials emit alpha or beta particles as well as gamma waves.

**39)** In any electromagnetic wave,

|  |  |
| --- | --- |
| A) | both the energy and the wave travel in the same direction. |

|  |  |
| --- | --- |
| B) | only the oscillating electric field component carries energy with it. |

|  |  |
| --- | --- |
| **C)** | **half the energy is carried by the electric field and half is carried by the magnetic field.** |

|  |  |
| --- | --- |
| D) | there is a third component, other than the electric and magnetic fields, that carries energy. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
In any electromagnetic wave, **half the energy is carried by the electric field and half is carried by the magnetic field**. Electromagnetic waves are self-propagating transverse oscillating waves of electric and magnetic fields.

**40)**



Boom! Boom! Boom! The car passed Steve's house and the blaring music from the car's radio rattled the windows. How would a scientist explain this to Steve?

|  |  |
| --- | --- |
| A) | Sound waves reflected off of the windows of the house. |

|  |  |
| --- | --- |
| B) | Sound waves transmit air particles that bounce off of the windows. |

|  |  |
| --- | --- |
| **C)** | **Sound energy travelled as waves and caused the windows to vibrate.** |

|  |  |
| --- | --- |
| D) | Sound energy travelled as particles and vibrated the window glass. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Sound energy travelled as waves and caused the windows to vibrate.**. All waves transmit energy. Sound waves are a type of mechanical wave and the wave energy caused the windows to vibrate.

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**Quiz Standard 10 Answer Key**

|  |  |
| --- | --- |
| Teacher Name: | Quiz Generated On: 04-29-2016 |

**1)** Which configuration would produce an electric current?

|  |  |
| --- | --- |
| **A)** | **Rotate a coil of copper wire between two magnets.** |

|  |  |
| --- | --- |
| B) | Connect a wire between a copper and zinc strip sitting in a beaker of water. |

|  |  |
| --- | --- |
| C) | Connect a wire to the (+) positive end of a battery and the other end to a light bulb. |

|  |  |
| --- | --- |
| D) | Connect a wire to the (-) negative end of a battery and the other end to a light bulb. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Rotating a coil of copper wire between two magnets** would produce an electric current. This is an example of electromagnetic induction.

**2)** The electrical conductivity of a substance depends on the ability of the \_\_\_\_ in it to move.

|  |  |
| --- | --- |
| **A)** | **electrons** |

|  |  |
| --- | --- |
| B) | neutrons |

|  |  |
| --- | --- |
| C) | protons |

|  |  |
| --- | --- |
| D) | quarks |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The conductivity of an object depends on the ability of the **electrons** in it to move. Protons and neutrons are not involved.

**3)** What process is the method by which a neutral object obtains an electrical charge?

|  |  |
| --- | --- |
| A) | convection |

|  |  |
| --- | --- |
| B) | discharge |

|  |  |
| --- | --- |
| **C)** | **induction** |

|  |  |
| --- | --- |
| D) | radiation |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Induction** is a method for a neutral object to gain a charge. It requires bringing a charged object close to the neutral object. The neutral object then becomes oppositely charged.

**4)** A circuit contains three light bulbs in parallel. After observation, a fourth light bulb is added, also in parallel. How does the intensity of the four light bulb circuit compare with the intensity of the three light bulb circuit?

|  |  |
| --- | --- |
| A) | It is lower in intensity. |

|  |  |
| --- | --- |
| B) | It is higher in intensity. |

|  |  |
| --- | --- |
| **C)** | **It has the same intensity.** |

|  |  |
| --- | --- |
| D) | The circuit is not operational. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
As more light bulbs are added in a parallel circuit, the intensity of the light bulbs in this circuit would **remain constant**. The luminosity of the bulb depends on the voltage through each, which stays the same in a parallel circuit. Amperage or current drops.

**5)** Pretend you are an electron in a copper wire which is being used to connect a battery to a flashlight bulb. Because this circuit uses a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ current, you as the electron in the wire will

|  |  |
| --- | --- |
| A) | alternating, move first one way then the other. |

|  |  |
| --- | --- |
| B) | direct, move first one way then the other. |

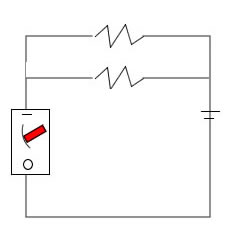
|  |  |
| --- | --- |
| C) | alternating, move only in one direction. |

|  |  |
| --- | --- |
| **D)** | **direct, move only in one direction.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Direct, move only in one direction** is correct because current from dry cell batteries, like those in flashlights, only moves in one direction.

**6)**



Examine the circuit. Pretend you are an electron flowing through this circuit and you are with a group of other electrons. Suddenly you come to the ‘fork in the road’ and you and some of the other electrons are temporarily separated. A short while later you are back together with the other electrons. This type of circuit is called a(n) \_\_\_\_\_\_\_\_\_\_\_\_ circuit.

|  |  |
| --- | --- |
| A) | closed |

|  |  |
| --- | --- |
| B) | open |

|  |  |
| --- | --- |
| **C)** | **parallel** |

|  |  |
| --- | --- |
| D) | series |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
A **Parallel** circuit has a completed flow of electrons through two or more branches separately in the circuit. It is not in series because the resistors do not follow each other on the same path, and it is not open because the switch is on (closed) and electrons are flowing.

**7)**

|  |
| --- |
| During physical science, Ms. Greene challenged her students to produce an energy transformation. James and Jill wrapped a 4-inch nail with a coil of fifty turns of wire. They connected one end of the coil to one terminal of a knife switch. They connected the other terminal of the knife switch to the battery. Finally, they connected the end of the coil to the other terminal of the battery.   James held the tip of a 1-inch nail near the flat end of the 4-inch nail. Jill closed the knife switch quickly and then opened it. The 1-inch nail was pulled toward the 4-inch nail. |

What is the BEST explanation of why the nail moved?

|  |  |
| --- | --- |
| A) | Electrical energy was converted to mechanical energy in the 1-inch nail. |

|  |  |
| --- | --- |
| **B)** | **The 4-inch nail became an electromagnet and the magnetic force attracted the 1-inch nail.** |

|  |  |
| --- | --- |
| C) | The electric current in the 4-inch nail was converted to mechanical energy in the 1-inch nail. |

|  |  |
| --- | --- |
| D) | The 4-inch nail had a positive charge and the 1-inch nail had a negative charge. Opposites attracted. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**The 4-inch nail became an electromagnet and the magnetic force attracted the 1-inch nail.** The students created an electromagnet. Electricity generated a magnetic force; that in turn caused the nail to move, which is mechanical energy.

**8)** You rub a balloon on your head and it becomes negatively charged. The balloon will be MOST attracted to

|  |  |
| --- | --- |
| A) | a piece of metal. |

|  |  |
| --- | --- |
| **B)** | **positively charged hair.** |

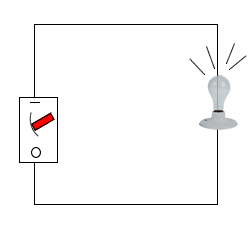
|  |  |
| --- | --- |
| C) | the neutrally charged wall. |

|  |  |
| --- | --- |
| D) | another negatively charged balloon. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
It will be attracted most to your **positively charged hair**. This is why it will make it stand on end. Unlike charges attract, like charges repel.

**9)**



In the image shown, the light bulb is on. In order for this to happen, the circuit must be

|  |  |
| --- | --- |
| **A)** | **closed.** |

|  |  |
| --- | --- |
| B) | open. |

|  |  |
| --- | --- |
| C) | parallel. |

|  |  |
| --- | --- |
| D) | series. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The circuit must be**closed**in order for the electricity to flow and the light bulb to be turned on. Otherwise, electrons can not make it around the loop.

**10)**

|  |
| --- |
| There is a single path for electrons. The current decreases when additional resistors are added. The current will be the same in each resistor. |

These statements BEST describe a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_ circuit.

|  |  |
| --- | --- |
| A) | closed |

|  |  |
| --- | --- |
| B) | open |

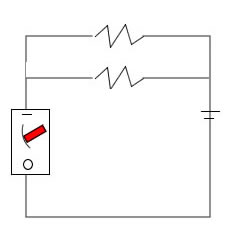
|  |  |
| --- | --- |
| C) | parallel |

|  |  |
| --- | --- |
| **D)** | **series** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The statements all describe a **series** circuit.

**11)**



The voltage in each path is the same.  
There is more than one path for electrons to reach resistors.  
The total current in a circuit will increase when a path is added.  
  
These statements are all true for \_\_\_\_\_\_\_\_\_\_\_ circuits.

|  |  |
| --- | --- |
| A) | closed |

|  |  |
| --- | --- |
| B) | open |

|  |  |
| --- | --- |
| **C)** | **parallel** |

|  |  |
| --- | --- |
| D) | series |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
These statements are true for **parallel** circuits.

**12)** Why might an electromagnet be used to pick up old cars in junk yards?

|  |  |
| --- | --- |
| A) | Electromagnets are inexpensive and easily create revenue. |

|  |  |
| --- | --- |
| **B)** | **Electromagnets are powerful and can be turned on and off easily.** |

|  |  |
| --- | --- |
| C) | Electromagnets are easy to operate and can be run by cheap labor. |

|  |  |
| --- | --- |
| D) | Electromagnets are versatile and can pick up any metallic objects in the yard. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Electromagnets are powerful and can be turned on and off easily.** They are quite expensive and only pick up cars of iron or steel.

**13)** All of the following use an electric motor, EXCEPT

|  |  |
| --- | --- |
| **A)** | **radio.** |

|  |  |
| --- | --- |
| B) | blender. |

|  |  |
| --- | --- |
| C) | hair dryer. |

|  |  |
| --- | --- |
| D) | electric fan. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Any appliance that you can think of that spins around is generally run by an electric motor. In this case, the **radio**does not have a motor in it. It does, however, have an electromagnet in it.

**14)** After turning off the television, you approach it. As you get close, but not touching it, the hairs on your arm start to stand up. This is an excellent example of static charge built up by

|  |  |
| --- | --- |
| A) | conduction. |

|  |  |
| --- | --- |
| B) | convection. |

|  |  |
| --- | --- |
| C) | friction. |

|  |  |
| --- | --- |
| **D)** | **induction.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
This is static build up by **induction**. In this case, the charge from the television screen has attracted the opposite charge on your body.

**15)** Which is an example of gaining a static charge by conduction?

|  |  |
| --- | --- |
| A) | Rubbing a balloon against your hair. |

|  |  |
| --- | --- |
| B) | Shuffling your shoes across a carpet. |

|  |  |
| --- | --- |
| C) | Bringing a charged rod near an electroscope. |

|  |  |
| --- | --- |
| **D)** | **Touching your car on a cold day and getting a shock.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Touching your car on a cold day and getting a shock.** This is a good example of static charge by conduction. The electrons move easily from the charged metal of your car to you.

**16)**

|  |
| --- |
| Lightning is an example of static electricity. In a thunder cloud, moisture causes the cloud to get heavier and move closer to the earth. As it does, the cloud rubs the atmosphere and removes electrons. The bottom of the cloud becomes negatively charged and the top becomes positively charged. The electrons on the earth are repelled by the negatively charged bottom of the cloud. A discharge can occur between the bottom of the cloud and the earth. This discharge is seen as lightning. |

A lightning bolt is created through the process of

|  |  |
| --- | --- |
| A) | conduction. |

|  |  |
| --- | --- |
| B) | friction. |

|  |  |
| --- | --- |
| **C)** | **induction.** |

|  |  |
| --- | --- |
| D) | radiation. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The lightning bolt is created by **induction.** Because the earth and the bottom of the cloud do not touch, this is induction. The negatively charged cloud bottom induces the charge on the earth.

**17)** In each case, a charged rod, made of the dense rubber ebonite, comes close or is in contact with the top of an electroscope. The ball on top of the electroscope is directly connected to the two metal leaves suspended in the flask.  
  
Which image represents a gaining of a charge on the leaves of the electroscope by conduction?

|  |  |
| --- | --- |
| A) | http://usatestprep.com/modules/gallery/files/124/12426/12426.jpg |

|  |  |
| --- | --- |
| B) | http://usatestprep.com/modules/gallery/files/124/12427/12427.jpg |

|  |  |
| --- | --- |
| C) | http://usatestprep.com/modules/gallery/files/124/12428/12428.jpg |

|  |  |
| --- | --- |
| **D)** | **http://usatestprep.com/modules/gallery/files/124/12429/12429.jpg** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**D** represents a charge gained by conduction. In this case, the rod is touching the electroscope and the leaves are charged similarly because they are repelling each other.

**18)** Static charges can be applied to neutral objects by friction, induction or conduction. What do all of these methods utilize to create this charge?

|  |  |
| --- | --- |
| A) | protons |

|  |  |
| --- | --- |
| **B)** | **electrons** |

|  |  |
| --- | --- |
| C) | heat energy |

|  |  |
| --- | --- |
| D) | magnetic domains |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
All of these methods transfer **electrons**. Electrons carry negative charges. The lack of electrons results in a positive charge.

**19)** Mike wants to negatively charge a small rubber ball. Which of these methods would successfully charge the ball?

|  |  |
| --- | --- |
| A) | heating the ball in boiling water |

|  |  |
| --- | --- |
| B) | running the ball over a strong magnet |

|  |  |
| --- | --- |
| **C)** | **rubbing the ball back and forth on carpet** |

|  |  |
| --- | --- |
| D) | dropping the ball from a tall bulding |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
To charge an object, electrons must be transferred. This can be done by friction, or **rubbing the ball back and forth on carpet**.

**20)** When an object gains or loses electrons, it becomes

|  |  |
| --- | --- |
| **A)** | **electrically charged.** |

|  |  |
| --- | --- |
| B) | electrically neutral. |

|  |  |
| --- | --- |
| C) | magnetically neutral. |

|  |  |
| --- | --- |
| D) | magnetically polarized. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Electrons have a negative charge. When objects gain them they become **negatively charged**. When they lose them, they become**positively charged**. This can happen by friction, induction or conduction.

**21)** Sal and Marie were experimenting with bar magnets in science class, picking up chains of paper clips. Where should they expect the magnetic force of the bar magnet to be the strongest and pick up the most paper clips?

|  |  |
| --- | --- |
| **A)** | **at both Poles** |

|  |  |
| --- | --- |
| B) | at the South Pole |

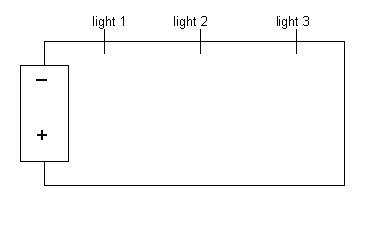
|  |  |
| --- | --- |
| C) | at the North Pole |

|  |  |
| --- | --- |
| D) | in the center of the bar magnet |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
A bar magnet will be the strongest and pick up the most paper clips at each end or **at both Poles.** The magnetic force field is strongest in the corners of the Poles and weakest along the surface in the middle of the magnet.

**22)**



One disadvantage of this type of circuit is that

|  |  |
| --- | --- |
| A) | the addition of new light bulbs decreases resistance. |

|  |  |
| --- | --- |
| **B)** | **as more lights are added to the circuit, the voltage to each decreases.** |

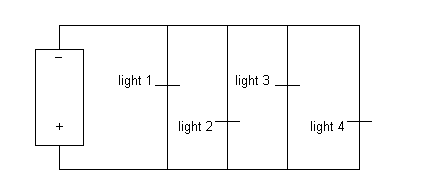
|  |  |
| --- | --- |
| C) | as more lights are added to the circuit, the current to each increases. |

|  |  |
| --- | --- |
| D) | when the current to one light is turned on, the current to the other lights turns off. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
One problem with this type of circuit, known as a series circuit, is that **as more lights are added to the circuit, the voltage of each one decreases.**

**23)**



One advantage to using this form of circuit is that

|  |  |
| --- | --- |
| **A)** | **voltage available to each light remains constant regardless of the number of lights that are on.** |

|  |  |
| --- | --- |
| B) | current drawn from the battery remains constant regardless of the number of lights that are on. |

|  |  |
| --- | --- |
| C) | resistance along the circuit remains constant regardless of the number of lights that are on. |

|  |  |
| --- | --- |
| D) | current drawn from the battery decreases as more lights are turned on. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
Unlike a series circuit, this type of circuit allows current and resistance to act independently for each loop so that **voltage available to each light remains constant regardless of the number of lights that are on.**

**24)** Turning a magnet very quickly would be BEST used to create

|  |  |
| --- | --- |
| A) | radiation. |

|  |  |
| --- | --- |
| B) | light waves. |

|  |  |
| --- | --- |
| **C)** | **an electric current.** |

|  |  |
| --- | --- |
| D) | a convection current. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The reason that electric motors have magnets inside them is because they are essentially generators in reverse. They use electricity to turn a magnet, which then produces useful motion. A turning magnet will produce **an electric current** if placed near wires.

**25)** Which graph BEST represents the relationship between the electric current and the rate at which a magnet is turning inside an electric generator?

|  |  |
| --- | --- |
| A) | http://usatestprep.com/modules/gallery/files/144/14493/14493.jpg |

|  |  |
| --- | --- |
| **B)** | **http://usatestprep.com/modules/gallery/files/144/14494/14494.jpg** |

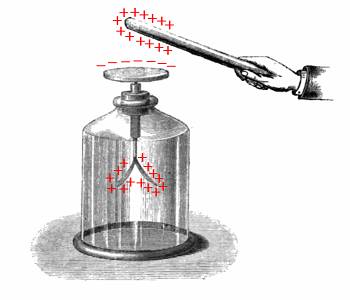
|  |  |
| --- | --- |
| C) | http://usatestprep.com/modules/gallery/files/144/14495/14495.jpg |

|  |  |
| --- | --- |
| D) | http://usatestprep.com/modules/gallery/files/144/14496/14496.jpg |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
As an electrical generator spins faster, it creates more current as is shown by graph **B.**

**26)**



During induction, a positively charged rod is brought near to but not touching the electroscope. The presence of the charged object above the plate of the electroscope induces charges to move down into the gold leaves, giving the electroscope an overall positive charge. The positive leaves repel. The same process occurs when a negative rod is brought close to the electroscope. This time, the negative charges flow through the electroscope to the leaves. The leaves, once again, repel. Whether the charge is positive or negative, in each case, the experiment shows that

|  |  |
| --- | --- |
| **A)** | **like charges repel.** |

|  |  |
| --- | --- |
| B) | opposite charges repel. |

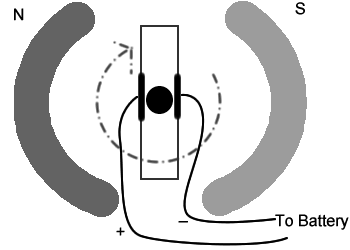
|  |  |
| --- | --- |
| C) | friction produces current. |

|  |  |
| --- | --- |
| D) | electrons produce a current. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
This experiment illustrates an important principle in electrostatics and that is **like charges repel.** The same principle applies to magnetism; like poles repel.

**27)**



In this electric motor, an electric current causes the coil to rotate, changing

|  |  |
| --- | --- |
| A) | magnetic energy to electrical energy. |

|  |  |
| --- | --- |
| B) | electrical energy to a magnetic force. |

|  |  |
| --- | --- |
| C) | potential energy to electrical energy. |

|  |  |
| --- | --- |
| **D)** | **electrical energy to mechanical energy.** |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
A simple motor changes **electrical energy to mechanical energy.** It contains an electromagnet that rotates between the poles of a magnet. The coil of the electromagnet is connected to a battery or other source of electric current. When an electric current flows through the wire in the electromagnet, a magnetic field is  
produced in the coil. Like poles of the magnets repel and unlike poles of the magnets attract. This causes the coil to rotate and changes **electrical energy to mechanical energy.**

**28)** Donna is attempting to make an electromagnet to pick up old nails in and around her driveway. Which of these materials would be best to use for the core in order to make the strongest electromagnet to pick up the most nails?

|  |  |
| --- | --- |
| A) | water |

|  |  |
| --- | --- |
| **B)** | **iron nail** |

|  |  |
| --- | --- |
| C) | wooden stake |

|  |  |
| --- | --- |
| D) | plastic tube |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The best material to use for the core of a electromagnet is **iron.** Iron, nickel, cobalt and some of the rare earths metals exhibit a unique magnetic behavior which is called ferromagnetism, or the ability to hold a magnetic field.

**29)**



What is produced by moving a permanent magnet through a coil of copper wire?

|  |  |
| --- | --- |
| **A)** | **electricity** |

|  |  |
| --- | --- |
| B) | electromagnet |

|  |  |
| --- | --- |
| C) | light |

|  |  |
| --- | --- |
| D) | radiation |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
**Electricity**is produced by turning a magnet through a coil of wire. This causes current to flow through the wire. This device is called a generator.

**30)** A strand of 10 lights is plugged into an outlet. How can you determine if the lights are connected in series or parallel?

|  |  |
| --- | --- |
| A) | Unscrew one light. If the other lights stay on, it's a series circuit. |

|  |  |
| --- | --- |
| B) | Unplug the strand. If the first light stays on, it's a series circuit. |

|  |  |
| --- | --- |
| **C)** | **Unscrew one light. If the other lights turn off, it's a series circuit.** |

|  |  |
| --- | --- |
| D) | Cut the strand in half. If the plugged in half stays on, it's a series circuit. |

|  |  |
| --- | --- |
| E) | None of the above |

**Explanation:**  
The correct answer is **Unscrew one light. If the other lights turn off, it's a series circuit.** Series circuits only provide one path for the flow of electricity. Removing a light removes that path.