

Period 8 Exercise Answers

E.1 When in our classroom demonstration ammonium nitrate was dissolved in water, the temperature of the water decreased. This shows that

- a) an exothermic reaction occurred.
- b) an endothermic reaction occurred.
- c) the reaction used a catalyst.
- d) the ammonium nitrate was colder than the water.
- e) None of the above is correct.

E.1 = b

E.2 An exothermic reaction, such as that between carbon and oxygen, will not always begin when the chemicals are mixed. The molecules can be made to react by

- a) pumping the air out of the container.
- b) performing the reaction in the dark.
- c) lowering the specific heat of the oxygen.
- d) lowering the specific heat of the carbon.
- e) increasing the temperature.

E.2 = e

E.3 A certain chemical reaction involves both the making and breaking of chemical bonds. The energy involved in breaking existing chemical bonds is 15 joules. Ten joules of energy are released when new chemical bonds are made. This reaction is

- a) exothermic and releases 5 J of energy.
- b) exothermic and takes in 5 J of energy.
- c) endothermic and releases 5 J of energy.
- d) endothermic and takes in 5 J of energy.
- e) endothermic and releases 25 J of energy.

Since more energy is taken in to break the bonds (15 J) than is released when new bonds are made (10 J), the reaction is endothermic. The net energy taken in is $15 \text{ J} - 10 \text{ J} = 5 \text{ J}$

E.3 = d

E.4 Photosynthesis is a process by which plants

- a) move toward the source of sunlight.
- b) make carbon dioxide.
- c) make water.
- d) convert light into chemical energy.
- e) convert chemical energy into light.

E.4 = d

E.5 If you charge a battery such as the ones used in automobiles, you are

- a) filling each cell with water.
- b) violating the law of conservation of energy.
- c) causing the same chemical reaction to take place that normally takes place in the battery when it is producing an electric current.
- d) reversing the chemical reaction which normally takes place in the battery when it is producing an electric current.
- e) None of the above is correct.

E.5 = d

E.6 A catalyst

- a) is a type of plant.**
- b) is used up in a chemical reaction.**
- c) aids some chemical reactions.**
- d) will be broken up into hydrogen and oxygen when subjected to electrolysis.**
- e) is a type of phase change.**

A catalyst aids a chemical reaction by increasing the rate of the reaction or by reducing the activation energy needed to begin the reaction.

E.6 = c

E.7 To construct a chemical electric cell (battery) one needs

- a) two dissimilar electrodes and fuel oil.**
- b) two identical metal electrodes and an electrolyte.**
- c) one metal alloyed electrode and an electrolyte.**
- d) two dissimilar electrodes and an electrolyte.**
- e) None of the above is correct.**

E.7 = d

E.8 Iron can combine with oxygen in two ways: rust slowly at room temperature or burn rapidly if heated in an atmosphere of pure oxygen. Assume that the amounts of iron and oxygen that combine are the same in both reactions and that the same end product is produced. The energy released

- a) is greater when iron rusts slowly than when it burns rapidly.
- b) is greater when iron burns rapidly than when it rusts slowly.
- c) is the same in either reaction.
- d) can be changed by adding a catalyst.
- e) None of the above is true.

E.8 = c

E.9 A fuel cell is a device that converts

- a) electrical energy to mechanical energy.
- b) electrical energy to chemical energy.
- c) electrical energy to radiant energy.
- d) chemical energy to electrical energy.
- e) radiant energy to mechanical energy.

E.9 = d

Period 8 Answers

E.1 = b

E.2 = e

E.3 = d

E.4 = d

E.5 = d

E.6 = c

E.7 = d

E.8 = c

E.9 = d