Chapter 8 Drill

Directions: Each of the questions or incomplete statements below is followed by four suggested answers or completions. Select the one that is best in each case. For answers and explanations, see Chapter 13.

1. A fuel's net energy yield is correctly defined as

   (A) how much of the fuel is left in the world
   (B) how much time it takes to extract and transport
   (C) a comparison between the amount of pollution the fuel generates and the amount of useful energy produced
   (D) a comparison between the costs of mining, processing, and transporting a fuel and the amount of useful energy the fuel generates

2. A regular light bulb has an efficiency rating of 3 percent. For every 1.00 joule of energy that bulb uses, the amount of useful energy produced is

   (A) 1.03 joules of light
   (B) 1.03 joules of heat
   (C) 0.97 joules of light
   (D) 0.03 joules of light

3. Methane gas and ethanol are two examples of biogases that are produced in which of the following processes?

   (A) The distillation of oil
   (B) The pressurization of natural gas
   (C) The anaerobic digestion of biomass
   (D) The catalytic reaction of coal and limestone

4. Hybrid car engines have which of the following types of motors?

   (A) Gasoline powered only
   (B) Natural gas powered only
   (C) Electric powered only
   (D) Gasoline- and electric-powered engines

5. All of the following are ways to increase energy efficiency EXCEPT

   (A) using low volume shower spray heads
   (B) insulating your home thoroughly
   (C) switching incandescent light bulbs to fluorescent bulbs
   (D) leaving room lights on

6. A typical coal-burning power plant uses 4,500 tons of coal per day. Each pound of coal produces 5,000 BTUs of electrical energy. How many BTUs are produced each day from this plant?

   (A) 4.5×10^{10}
   (B) 0.45×10^{10}
   (C) 11.5×10^{3}
   (D) 4.5×10^{8}

7. Which of the following produces the least amount of carbon dioxide while generating electricity?

   (A) Oil
   (B) Coal
   (C) Wind turbines
   (D) Wood

8. How much energy, in kWh, is used by a 100-watt computer running for 5 hours?

   (A) 500 kWh
   (B) 200 kWh
   (C) 50 kWh
   (D) 0.5 kWh

9. Photovoltaic cells produce electricity by

   (A) a system of mirrors that focuses sunlight onto a heat collection device
   (B) using the Sun's energy to create a flow of electrons in a material such as silicon
   (C) breaking down organic molecules and releasing energy
   (D) warming air, which spins a turbine

10. A sample of radioactive material has a half-life of 20 years. It has an activity of 2 curies. How many years does it take for the material to have an activity level of 0.25 curies?

    (A) 20 years
    (B) 40 years
    (C) 60 years
    (D) 80 years

11. The term *vampire appliances* correctly refers to appliances that

    (A) generate more power than they consume
    (B) consume electricity even when they are not operating
    (C) are EnergyStar rated
    (D) are programmed to turn themselves off at midnight each night

12. All nonrenewable resource power plants use heat to

    (A) make hot air that generates power
    (B) create powerful magnetic fields that make electricity
    (C) create powerful water jets that spin turbines
    (D) produce steam to turn electric generators

13. The acidity of a lake would most likely increase because of

    (A) the construction of a hydroelectric dam in the region
    (B) increased power generation at a local wind farm
    (C) overfishing by commercial fisherman
    (D) the burning of coal by nearby factories

Free-Response Question

1. Nuclear power plants have been described as being part of the solution to the problem of the United States' dependency on foreign energy. Currently, some 20 percent of the electricity produced in the United States is generated by nuclear power.

   (a) **Describe** the key parts of a nuclear power plant. **Describe** the roles of the following: core, fuel rods, coolant, and heat exchanger.
   (b) **Describe** TWO practical methods of dealing with the long-term storage of the highly radioactive wastes produced by a power plant.
   (c) **Describe** ONE positive impact that a nuclear power plant might have on air pollution.
   (d) Opponents of nuclear power plants point out the problems caused by thermal pollution of nearby rivers. **Describe** how the thermal pollution occurs and ONE method to reduce this problem.