

18. In the United States, high-grade geothermal resources are concentrated in the
- Pacific Northwest
 - western states
 - upper Midwest
 - Southeast
19. The most important environmental effect of hydroelectric energy is
- the visual eyesore of dams
 - the effect on fish and wildlife habitat
 - noise
 - air pollution
20. Ethanol is primarily used as a
- gasoline additive
 - cattle feed
 - fertilizer
 - pesticide

CHAPTER QUESTIONS AND PROBLEMS

- What are two products of burning fossil fuels?
- What are diagenesis and catagenesis?
- What is true about the mass of reactants and the mass of products in all chemical reactions such as combustion?
- Why is water vapor considered to be a greenhouse gas?
- What substance has the highest binding energy per nucleon?
- What is deuterium and where is it found?
- Why is a potential fusion reactor inherently safer than a fission reactor?
- What is ITER and where will it be constructed?
- What is the inertial fusion project?
- How is the solar spectrum changed as it passes through the atmosphere?
- Assume a 6-foot by 3-foot solar panel is oriented so that it has a maximum solar insolation of $1,000 \text{ W/m}^2$. What is the peak power delivered to the panel ($3.048 \text{ feet} = 1 \text{ meter}$)?
- What is the inverse square law in physics?
- Show that the solar constant of $1,368 \text{ W/m}^2$ is equal to $32.8 \text{ kWh/m}^2/\text{day}$.
- Compare the positive and negative environmental impacts of solar and wind energy.
- What are geothermal heat pumps?
- What is the purpose of a barrage dam?
- What are two ways to obtain energy from tides?
- Summarize the important benefits and negative impacts of large dams.
- What are the positive and negative environmental impacts of using ethanol as a gasoline supplement?
- In addition to ethanol, what are other uses for biofuels?

FOR DISCUSSION

What renewable resources are the best fit for the area you live in?

ANSWERS TO CHECKUPS

Section 1-1 Checkup

- Fossil fuels formed from decaying plant and animal matter that was primarily formed over millions of years.
- Methane is a primary constituent of natural gas; its chemical formula is CH_4 .
- The categories for coal are based on energy content and are anthracite, bituminous, sub-bituminous, and lignite.
- Oil is used in the manufacture of lubricants, waxes, solvents, asphalt, hydraulic fluid, and vinyl.
- Greenhouse gases are gases that contribute to global warming by absorbing short wavelength infrared energy and reradiating it at longer wavelengths.
- Burning fossil fuels puts carbon dioxide, a greenhouse gas, in the air. Depending on the specific fuel, pollutants include

sulfur, nitrous oxides, benzene, and others, which contribute to acid rain. Coal also produces a large amount of fly ash that creates a disposal problem. Other concerns include obtaining and transporting fossil fuels and safety issues.

- Safety hazards exist for workers, particularly in the coal industry, and for the public in the form of air pollution. Transporting fuels can create hazards in the form of spills, such as the infamous oil spill by the *Exxon Valdez*.

Section 1-2 Checkup

- A chain reaction is a self-sustaining reaction used in fission reactors to continue the process.
- Normal uranium will not have a chain reaction. Enrichment separates useable ^{235}U , which can be used as a fuel from regular uranium.