



Raven, Berg, Hassenzahl: Environment, 7th Edition
Chapter 13 Renewable Energy

1. Biomass can be converted into which of the following liquid fuels:
 - a) methanol
 - b) ethanol
 - c) fossil fuels
 - d) diesel
 - e) both methanol and ethanol

Ans: e

Difficulty: Easy

Response:

Indirect Solar Energy; Biomass Energy; 13.2.1

2. Which of the following is *not* a form of energy technology that originates as solar energy?
 - a) nuclear energy
 - b) hydropower
 - c) wind power
 - d) photovoltaic solar cells
 - e) fossil fuels

Ans: a

Difficulty: Easy

Response:

Chapter Opener; 13.0

3. Which of the following is *not* a renewable source of energy?
 - a) wind
 - b) fossil fuels
 - c) direct solar
 - d) biomass
 - e) hydropower

Ans: b

Difficulty: Easy

Response:

Chapter Opener; 13.0



4. Energy produced from any source other than fossil fuel is called:
- a) conventional energy
 - b) alternative energy
 - c) renewable energy
 - d) nuclear energy
 - e) sustainable energy

Ans: b

Difficulty: Easy

Response:

Chapter Opener; 13.0

5. The amount of solar radiation hitting the Earth depends on:
- a) the amount of cloud cover
 - b) the distance from the equator
 - c) the time of day
 - d) the season of the year
 - e) all of these

Ans: e

Difficulty: Easy

Response:

Direct Solar Energy; Opener; 13.1

6. In the United States, solar radiation is greatest in:
- a) the southwest
 - b) the northeast
 - c) the northwest
 - d) the mid-west
 - e) Florida

Ans: a

Difficulty: Easy

Response:

Direct Solar Energy; Opener; 13.1

7. Which of the following is fuel that can be used in a fuel cell?
- a) hydrogen
 - b) coal
 - c) uranium
 - d) natural gas
 - e) petroleum

Ans: a

Difficulty: Easy

Response:

High and Low Technology Energy Solutions; Hydrogen and Fuel Cells; 13.4.1



8. All of the following materials are examples of biomass fuels except:
- a) wood
 - b) oil
 - c) animal waste
 - d) crop wastes
 - e) sawdust

Ans: b

Difficulty: Easy

Response:

Indirect Solar Energy; Biomass Energy; 13.2.1

9. Passive solar heating:
- a) cannot be used to heat buildings
 - b) is effective only in the summer
 - c) uses the sun's energy without machines
 - d) is a non-renewable resource
 - e) depends on x-rays

Ans: c

Difficulty: Easy

Response:

Direct Solar Energy; 13.1

10. Which of the following is part of a home designed with passive solar heating?
- a) south facing windows
 - b) mirrors and lenses
 - c) use of solar collectors on the roof
 - d) little insulation
 - e) a solar collector

Ans: a

Difficulty: Easy

Response:

Direct Solar Energy; Heating Buildings and Water; 13.1.1

11. of the following can be used to store the heat from passive solar heating?
- a) containers of water
 - b) reflective glass windows
 - c) solar panels
 - d) photovoltaic solar cells
 - e) wooden roof beams

Ans: a

Difficulty: Easy

Response:

Direct Solar Energy; 13.1



12. Which of the following renewable energy sources is *not* used to produce electricity?
- a) solar heating
 - b) geothermal
 - c) biomass conversion
 - d) photovoltaics
 - e) wind

Ans: a

Difficulty: Easy

Response:

Direct Solar Energy; 13.1

13. Which of the following does not involve solar energy?
- a) geothermal energy
 - b) photovoltaic cells
 - c) solar power towers
 - d) wind farms
 - e) solar thermal collectors

Ans: a

Difficulty: Easy

Response:

Direct Solar Energy; 13.1

14. In rural areas of developing countries, photovoltaic cells are used to:
- a) avoid the need to extend power lines
 - b) provide refrigeration for vaccines
 - c) grind grain
 - d) pump water
 - e) all of these

Ans: e

Difficulty: Easy

Response:

Direct Solar Energy; 13.1

15. The burning of biomass such as wood, is an example of:
- a) active solar heating
 - b) indirect use of solar energy
 - c) passive solar heating
 - d) using a non-renewable resource
 - e) none of these

Ans: b

Difficulty: Easy

Response:

Indirect Solar Energy; Biomass Energy; 13.2.1



16. Which of the following is a liquid fuel converted from biomass?

- a) charcoal
- b) hydrogen
- c) methanol
- d) propane
- e) methane

Ans: c

Difficulty: Easy

Response:

Indirect Solar Energy; Biomass Energy; 13.2.1

17. Growing crops specifically for alcohol production would probably result in:

- a) increased desertification
- b) increased soil erosion
- c) reduced food production
- d) increased pollution by fertilizers and pesticides
- e) all of these

Ans: e

Difficulty: Medium

Response:

Indirect Solar Energy; Biomass Energy; 13.2.1

18. A mixture of gases produced by biological decomposition of plant and animal matter is:

- a) ethanol
- b) hydrogen
- c) biogas
- d) methanol
- e) biomass

Ans: c

Difficulty: Easy

Response:

Indirect Solar Energy; Biomass Energy; 13.2.1

19. Which of the following is *not* a source of biomass energy?

- a) uranium
- b) wood
- c) peat
- d) animal dung
- e) charcoal

Ans: a

Difficulty: Easy

Response:

Indirect Solar Energy; Biomass Energy; 13.2.1

20. Which of the following is an example of a renewable energy source that uses the gravitational pull of the moon and sun as a power source?
- a) wind energy
 - b) tidal energy
 - c) hydropower
 - d) geothermal energy
 - e) ocean temperature gradients

Ans: b

Difficulty: Easy

Response:

Other Renewable Energy Sources; Tidal Energy; 13.3.2

21. Wind:
- a) is the result of the conversion of radiant energy into chemical energy
 - b) is used in Montana to generate most of the electricity used in that state
 - c) cannot be used to generate electricity
 - d) has been used to pump water, irrigate fields and grind grain for many hundreds of years
 - e) energy produces low levels of carbon dioxide and nitrogen oxides

Ans: d

Difficulty: Medium

Response:

Indirect Solar Energy; Wind Energy; 13.2.2

22. Which of the following is *not* a problem associated with hydropower?
- a) reservoir-induced seismicity
 - b) habitat destruction
 - c) flooding potential
 - d) increased soil erosion
 - e) disruption of fish spawning

Ans: d

Difficulty: Medium

Response:

Indirect Solar Energy; Hydropower; 13.2.3

23. Geothermal energy is a prominent energy source in:

- a) Ireland
- b) Northern Europe
- c) Iceland
- d) Australia
- e) Canada

Ans: c

Difficulty: Easy

Response:

Other Renewable Energy Sources; Geothermal Energy; 13.3.1

24. Collection devices mounted on a roof or in a field are components of what type of renewable energy system?

- a) biomass energy
- b) passive solar energy
- c) geothermal energy
- d) photovoltaics
- e) active solar energy

Ans: e

Difficulty: Easy

Response:

Direct Solar Energy; Heating Buildings and Water; 13.1.2

25. The most promising solution to our current and future energy needs is:

- a) wind farms
- b) geothermal energy
- c) direct and indirect solar power
- d) conservation and increased efficiency
- e) photovoltaic technology

Ans: d

Difficulty: Easy

Response:

High and Low Technology Energy Solutions; Opener; 13.4

26. Cogeneration:

- a) is a technology that has a poor future
- b) is a way of recycling heat that is produced as a by-product of electricity generation
- c) is responsible for increasing the energy efficiency of the Oswego power plant by nearly ten-fold
- d) is not presently feasible in small settings; instead cogeneration is only used in large projects
- e) involves the use of 175 - 200°F exhaust gases

Ans: b

Difficulty: Easy

Response:

High and Low Technology Energy Solutions; Energy-Efficient Technologies; 13.4.3

27. An energy efficiency partnership between the EPA, U.S. Department of Energy, and product manufacturers has created:

- a) The National Appliance Energy Conservation Act
- b) The Energy Star labeling program
- c) A cogeneration program for the U.S.
- d) The Wild and Scenic Rivers Act
- e) Unlimited renewable energy for consumers

Ans: b

Difficulty: Easy

Response:

High and Low Technology Energy Solutions; Energy-Efficient Technologies; 13.4.3

28. Which of the following represents an energy-saving improvement for homes?

- a) shading the south and west sides of the house with deciduous trees
- b) installing incandescent bulbs in all fixtures
- c) setting the thermostat on hot water heaters to a minimum of 175°F
- d) keeping appliances for as long as feasible to minimize the generation of waste and to reduce overall costs
- e) all of these

Ans: a

Difficulty: Medium

Response:

High and Low Technology Energy Solutions; Energy-Efficient Technologies; 13.4.3

29. Which of the following statements about geothermal energy is *false*?
- a) Geothermal energy is typically associated with volcanism.
 - b) Geothermal energy is used to heat greenhouses for the production of produce in Iceland.
 - c) The United States is the world's largest producers of geothermal electricity.
 - d) Experts argue whether geothermal energy is a renewable resource.
 - e) The most common environmental hazard associated with this resource is increasing levels of atmospheric CO₂.

Ans: e

Difficulty: Medium

Response:

Other Renewable Energy Sources; Geothermal Energy; 13.3.1

30. Utility companies:
- a) have no interest in solar power because it is universally available
 - b) cannot utilize solar power due to limitations of the current technology
 - c) cannot use photovoltaic cells because it would significantly increase their production of greenhouse gases
 - d) can purchase photovoltaic devices in small modular units to increase their power generating capacity
 - e) will not use photovoltaic cells because they will never be competitive with conventional energy sources

Ans: d

Difficulty: Medium

Response:

Direct Solar Energy; Photovoltaic Solar Cells; 13.1.4

31. Which of the following does *not* apply to wind power?
- a) it is a clean source of energy
 - b) it is most profitable in areas that have fairly continual winds
 - c) it is the least competitive of all forms of renewable energy, in terms of cost
 - d) it causes no air pollution
 - e) wind machines detract from the esthetics of the region

Ans: c

Difficulty: Medium

Response:

Indirect Solar Energy; Wind Energy; 13.2.2



32. Which of the following is *not* a disadvantage to using biomass as a source of energy?
- a) deforestation
 - b) air pollution
 - c) depletion of minerals in the soil
 - d) increased possibility of erosion
 - e) it is a non-renewable source of energy

Ans: e

Difficulty: Medium

Response:

Indirect Solar Energy; Biomass Energy; 13.2.1

33. The energy released in the burning of biomass fuels:
- a) originated as solar energy
 - b) was stored as chemical energy in plant tissues or animal waste products
 - c) was initially converted from solar energy to chemical energy by the process of photosynthesis
 - d) is one of the oldest fuels known to humans
 - e) all of these

Ans: e

Difficulty: Medium

Response:

Indirect Solar Energy; Biomass Energy; 13.2.1

34. The direct cause of air warming via passive solar heating is:
- a) infrared radiation
 - b) visible light
 - c) ultraviolet radiation
 - d) microwave radiation
 - e) double-paned glass

Ans: a

Difficulty: Medium

Response:

Direct Solar Energy; Heating Buildings and Water; 13.1.2

35. Photovoltaic cells:

- a) have become more economical to produce and use over the past 25 years
- b) are the most efficient means of converting solar energy to electricity
- c) are currently only used in urban areas of highly developed countries
- d) have only been adapted for use in small appliances
- e) generate electricity with minimal pollution, but unfortunately, require expensive maintenance

Ans: a

Difficulty: Medium

Response:

Direct Solar Energy; Photovoltaic Solar Cells; 13.1.4

36. Solar thermal energy systems are inherently more efficient than other solar technologies because:

- a) the technology involved is less expensive
- b) they can work at night and on cloudy days, as well as in full sunlight
- c) they concentrate the sun's energy
- d) they are dependent on circulating hot water
- e) both the technology involved is less expensive, and they can work at night and on cloudy days, as well as in full sunlight

Ans: c

Difficulty: Medium

Response:

Direct Solar Energy; Solar Thermal Electric Generation; 13.1.3

37. Many sun-tracking mirrors are used to focus sunlight on a central tower boiler to produce steam to drive generators. This best describes:

- a) active solar heating
- b) indirect solar energy
- c) passive solar heating
- d) photovoltaic solar cells
- e) solar power towers

Ans: e

Difficulty: Medium

Response:

Direct Solar Energy; Solar Thermal Electric Generation; 13.1.3

38. Which of the following is *not* among the potential adverse environmental impacts of generating geothermal energy?
- a) emission of gases such as hydrogen sulfide
 - b) water depletion
 - c) induced seismicity
 - d) increase in carbon dioxide emissions
 - e) land subsidence

Ans: d

Difficulty: Medium

Response:

Other Renewable Energy Sources; Geothermal Energy; 13.3.1

39. Potential locations for wind farms include:
- a) mountain passes
 - b) islands
 - c) coastal areas
 - d) grasslands
 - e) all of these

Ans: e

Difficulty: Easy

Response:

Indirect Solar Energy; Wind Energy; 13.2.2

40. The fact that solar systems only generate electricity during the day is typically not a problem because:
- a) many photovoltaic cells continue to generate electricity through the night
 - b) they currently do not produce much electricity on a global scale
 - c) demand for electricity is often highest during the day
 - d) the electricity can be used to power Stirling engines
 - e) they are often located in deserts

Ans: c

Difficulty: Medium

Response:

Direct Solar Energy; Solar Thermal Electricity Generation; 13.1.3

41. Photovoltaic solar cells are:
- a) single-celled organisms that are used to collect solar radiation, which they turn into heat
 - b) wafers of crystalline silicon treated with metals that absorb solar radiation and generate electricity
 - c) cheap to produce, but contribute to atmospheric pollution, including CO₂
 - d) highly efficient in converting solar energy to electricity
 - e) unable to function at all on rainy or cloudy days

Ans: b

Difficulty: Medium

Response:

Direct Solar Energy; Photovoltaic Solar Cells; 13.1.4

42. In cogeneration, steam used to turn the turbine also does all of the following *except*:
- a) heat buildings
 - b) cook food
 - c) operate machinery before its cooled
 - d) pumped back into boiler as water
 - e) all of these are true

Ans: e

Difficulty: Medium

Response:

High and Low Technology Energy Solutions; Energy-Efficient Technologies; 13.4.3

43. Which of the following does *not* apply to preparing food in a solar oven?
- a) is currently used in rural areas of Africa, Central America, India, and China
 - b) typically requires a technologically sophisticated oven that is initially quite expensive
 - c) can be used to boil, bake, and sauté foods
 - d) can reach temperatures of 350° F (177°C)
 - e) requires 2 to 4 hours to cook a full meal in average sunlight

Ans: b

Difficulty: Medium

Response:

Direct Solar Energy; Opener; 13.1

44. One unique aspect of solar energy as a source of global power is:
- a) it is currently the only renewable energy resource
 - b) it contributes to the greenhouse effect
 - c) it is dispersed over the Earth's entire surface rather than being concentrated in highly localized areas
 - d) solar radiation is more intense when the sun is low in the sky
 - e) it is not dependent on technology for collection or utilization

Ans: c

Difficulty: Medium

Response:

Direct Solar Energy; Opener; 13.1

45. Which of the following statements about hydropower is true?
- a) Dams have little or no impact on native aquatic organisms.
 - b) Hydropower generates approximately 39% of the world's electricity.
 - c) Dams are relatively inexpensive to build but are expensive to operate.
 - d) The Wild and Scenic Rivers Act fosters the hydroelectric development of U.S. waterways.
 - e) Humans downstream of a dam may be exposed to waterborne diseases if the dam breaks.

Ans: e

Difficulty: Medium

Response:

Indirect Solar Energy; Hydropower; 13.2.3

46. Which of the following statements about alternative energy sources is true?
- a) Humans now rely primarily on renewable forms of energy.
 - b) Renewable forms of energy are economically inexpensive.
 - c) The technology needed to utilize renewable energy has improved considerably in the last decade.
 - d) Worldwide use of renewables, such as geothermal and wind power, grew more slowly than use of fossil fuels.
 - e) It is predicted that the transition from fossil fuels to renewables will take another 100 – 200 years.

Ans: c

Difficulty: Medium

Response:

Chapter Opener; 13.0



47. The use of photovoltaic cells is limited by all of the following except:
- a) high cost
 - b) low efficiency
 - c) inability to directly generate electricity
 - d) cells incorporate hazardous materials
 - e) large output requires large areas of land

Ans: c

Difficulty: Medium

Response:

Direct Solar Energy; Photovoltaic Solar Cells; 13.1.4

48. Use of deciduous shade trees that block sunlight in summer but allow the sunlight in winter to warm up the building is an example of:
- a) solar pond technology
 - b) passive solar energy
 - c) geothermal energy
 - d) photovoltaics
 - e) biomass energy

Ans: b

Difficulty: Medium

Response:

Direct Solar Energy; Heating Buildings and Water; 13.1.2

49. The temperature of buildings can be altered by using an underground arrangement of pipes containing circulating fluids, which use the Earth as both a heat source and heat sink. This uses _____ technology.
- a) infrared radiation compartment
 - b) fuel cell
 - c) ocean thermal energy conversion (OTEC)
 - d) geothermal heat pump
 - e) photovoltaic solar cell

Ans: d

Difficulty: Medium

Response:

Other Renewable Energy Sources; Geothermal Energy; 13.3.1