Unit 8: Homework

1. True or false? The National Appliance Conservation Act established energy-efficiency standards for all new appliances.

2. True or false? Photovoltaics generate electricity by using hydrogen gas as a fuel.

3. True or false? Solar thermal electric facilities heat water using sunlight.

4. True or false? Active heating and cooling systems employ solar reflectors.

5. True or false? Biomass is organic matter such as wood or crop wastes.

6. True or false? Hydroelectric power is a nonrenewable resource that uses hydrogen gas.

7. True or false? The Earth harbors an enormous amount of heat or geothermal energy.

8. True or false? In Iceland, 65% of the homes are heated by the Earth's heat.

9. True or false? Hydrogen is a nonrenewable fuel that is not a good choice to replace petroleum fuels.

10. True or false? Geopressurized zones are aquifers that are trapped by impermeable rock strata and heated by underlying magma.

11. True or false? Geothermal energy is heavily concentrated in a so called ring of fire encircling the Aral Sea.

12. True or false? Wind energy is clean, abundant, and fairly inexpensive energy.

13. True or false? Biomass supplies about 50% of the world's energy.

14. True or false? Earth-sheltered houses are partly or entirely underground to take advantage of the insulative properties of the soil.

15. True or false? Over one-fourth of the energy consumed in the United States is used in transportation.

16. True or false? A “feebate” is a tax paid by those who buy gas-guzzling cars and a rebate given to those who purchase energy-efficient autos.

17. True or false? Hot-rock zones are regions where bedrock is heated by magma.

18. True or false? Ethanol and methane are two fuels that can be produced from biomass.

19. True or false? Passive solar homes are kept warm by residual heat that radiates from heat-absorbent materials (thermal mass).

20. True or false? Photovoltaic cells are made of silicon and other materials.

Fill in the Blank

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21. Planting _____ trees around homes can reduce summer cooling costs.

22. In industrial _____, waste heat from one process is captured and used in another.

23. Huge cuts in energy demand can be made by applying energy _____ measures.

24. About one-third of the energy consumed in the U.S. is consumed in _____.

25. The National Appliance Conservation Act was passed by Congress in _____.

26. _____ planning requires power companies to select the least costly way of providing electricity.

27. Well-designed passive systems can provide ___% of a home's space heating.

28. Solar energy is considered a _____ energy source.

29. The earth-_____ house is built partly or entirely underground to take advantage of the insulative properties of soil.

30. Active heating and cooling systems employ solar _____.

31. _____ provide a way of generating electricity from sunlight.

32. Solar _____ electric facilities heat water using sunlight.

33. _____ solar energy stores heat in thermal mass.

Answer: Passive

34. _____ are produced by solar energy and can be used to generate electricity.

35. _____ is organic matter such as wood or crop wastes that can be burned or converted into gaseous or liquid fuels.

36. Biomass supplies about ___% of the world's energy.

37. Unlike fossil fuels, biomass does not pollute the atmosphere with _____ dioxide.

38. _____ power is a renewable resource usually tapped by damming streams and rivers.

39. _____ convection zones are places where magma intrudes into the Earth's crust and heats rock that contains large amounts of groundwater.

40. _____ zones are aquifers that are trapped by impermeable rock strata and heated by underlying magma.

Multiple Choice

41. When waste heat from one process is captured and used in another this is called:

A) dovetailing

B) codependency

C) cogeneration

D) heat exchange

E) counter current exchange

42. The World Resources Institute estimates that the world could meet 90% of its new energy needs between 1987 and 2020 by:

A) using solar power.

B) increasing use of coal.

C) using geothermal energy.

D) building more nuclear power plants.

E) using energy more efficiently.

43. About ___% of all delivered energy is needed as heat.

A) 18

B) 28

C) 38

D) 48

E) 58

44. Solar energy from the sun is expected to last some _____ billion years.

A) 1

B) 2

C) 3

D) 4

E) 5

45. The average automobile in the U.S. gets ____ miles per gallon of gasoline.

A) 20

B) 28

C) 38

D) 48

E) 58

46. Over one fourth of the energy in the U.S. is consumed in:

A) automobiles

B) buildings

C) industry

D) government

E) transportation

47. Which of the following responses would promote energy efficiency?

A) education

B) taxes on fossil fuels

C) feedback systems

D) government-mandated efficiency programs

E) all of the above

48. Least-cost planning is used by many states to encourage efficiency in which of the following areas:

A) transportation

B) sewage disposal

C) power generation

D) construction

E) landfill management

49. Flat plate collectors are used in:

A) passive solar homes

B) earth-sheltered homes

C) active solar homes

D) log homes

E) concrete

50. This type of home uses sunlight to heat water and produce steam to generate electricity:

A) passive solar

B) earth-sheltered

C) solar thermal electric

D) wind powered

E) solar retrofit

51. The National Appliance Conservation Act:

A) Established energy efficiency standards for all new appliances.

B) Regulates the disposal of ozone depleting chemicals from appliances.

C) Orders states to dispose of appliances properly.

D) Requires labeling of all appliances with warnings about environmental hazards.

E) Specifies what must be done by companies to comply with ozone regulations.

52. Buildings designed to capture energy from the sun using interior walls and floors to provide space heat are using _____ heating.

A) active solar

B) passive solar

C) photovoltaic

D) solar thermal electric

E) solar retrofit

53. Electricity generated when sunlight strikes a solar panel is an example of:

A) passive solar

B) active solar

C) photovoltaics

D) solar thermal electric

E) solar retrofit

54. Earth-sheltered homes take advantage of the insulative properties of:

A) concrete

B) soil

C) tile

D) water

E) wood

55. Places where magma protrudes into the earth's crust and heats rock that contain large amounts of groundwater are called:

A) hydrothermal convection zones

B) geopressurized zones

C) hot-rock zones

D) thermal vents

E) hot springs

56. Homeowners can add solar greenhouses to existing conventional homes, this is called a _____ home.

A) passive solar

B) active solar .

C) earth-sheltered

D) solar retrofit

E) greenhouse

57. A primary element found in many photovoltaic panels is:

A) water

B) air

C) carbon

D) silicon

E) boron

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58. About ___% of the sun's energy striking the Earth is converted to wind.

A) 2

B) 10

C) 20

D) 40

E) 60

59. Which of the following responses is not one of the advantages of wind energy? Wind energy is:

A) cheap.

B) clean.

C) renewable.

D) cost-competitive with other forms of energy.

E) dependent on the availability of the wind.

60. The use of wood or crop wastes as a source of energy is called:

A) geothermal energy

B) biomass

C) synfuel

D) fossil fuels

E) hydrogen fuel

61. The molten rock beneath the Earth's crust is:

A) granite

B) bedrock

C) magma

D) plasma

E) molten iron

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62. Aquifers that are trapped by impermeable rock strata and heated by underlying magma are called:

A) hydrothermal convection zones

B) geopressurized zones

C) hot-rock zones

D) thermal vents

E) hot springs

63. Regions where bedrock is heated by magma are called:

A) hydrothermal convection zones

B) geopressurized zones

C) hot-rock zones

D) thermal vents

E) hot springs

64. Hydrogen gas has an advantage over fossil fuels since its oxidation does not release _____, the primary pollutant associated with global warming.

A) ozone

B) methane

C) carbon dioxide

D) chlorofluorocarbons

E) water

65. Which of the following is a personal action you can take to reduce energy use?

A) Turn down the thermostat on the hot water heater.

B) Insulate your walls and ceilings.

C) Heat only used areas.

D) Use energy-efficient appliances.

E) all of the above

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66. If you study the land use of electricity generating technologies you find that _____ uses less land than any other energy source.

A) coal (includes mining)

B) solar thermal electric

C) photovoltaics

D) wind energy

E) geothermal energy

67. When federal subsidies paid by taxpayers are included, the cost of U.S. oil is estimated to be about _____ a barrel compared to the market price of about $135 per barrel.

A) $25 to $50

B) $50 to $75

C) $150 to $250

D) $300 to $400

E) $400 to $500

68. Active solar heating and cooling systems use _____ mounted on rooftops.

A) wind machines

B) radiators

C) heat sinks

D) solar collectors

E) parabolic mirrors

69. Solar thermal electric systems use _____ to direct sunlight onto an oil-filled tube.

A) wind machines

B) radiators

C) heat sinks

D) solar collectors

E) parabolic aluminum reflectors

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70. When sunlight strikes a photovoltaic cell, _____ are ejected from silicon atoms and flow through electrical wires.

A) protons

B) neutrons

C) electrons

D) photons

E) gamma rays

71. Which of the following is a disadvantage of wind energy?

A) Wind does not blow all the time..

B) Individual windmills and wind farms are eyesores.

C) Large wind generators may be noisy.

D) Wind generators may impair television signals.

E) all of the above.

72. Biomass can help developed nations reduce their dependence on _____ energy resources.

A) solar

B) wind

C) geothermal

D) nonrenewable

E) hydroelectric

73. The world's leader in hydroelectric production is:

A) France

B) Brazil

C) United States

D) China

E) Italy

74. Which of the following would be good strategies for increasing hydropower today?

A) Build more dams and facilities.

B) Tear down old facilities and build more efficient ones.

C) Increase the capacity of existing facilities by adding more turbines.

D) Install turbines on dams built for flood control, recreation, and water supplies.

E) c and d above

75. Which of the following is a renewable resource?

A) solar energy

B) wind energy

C) hydroelectric power

D) geothermal energy

E) all of the above

76. In the United States, industries consume approximately ____% of the nation's energy.

A) 15

B) 33

C) 45

D) 65

E) 90

77. Renewable energy technologies employ more people than conventional technologies because they are:

A) more costly than conventional technologies.

B) more capital intensive.

C) more labor-intensive.

D) using cruder technology.

E) less reliable and require more maintenance.

78. According to Table 15-3, electricity from coal-fired power plants costs _____ cents per kilowatt-hour.

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A) 2-4

B) 5-7

C) 8-12

D) 15-20

E) 25 -30

79. Electricity from nuclear power plants costs _____ cents per kilowatt-hour.

A) 1 to 2

B) 5 to 7

C) 8 to 12

D) 15 to 20

E) 25 to 30