Physical Science Unit 4 Energy ch. 15 – 16
Standard: SPS7 transformation and the flow of energy ID:A

Matching

fill in the blanks of the following energy transformations by using the types of energy below

a. mechanical
b. chemical
c. thermal
d. electrical
e. electromagnetic
f. nuclear

1. Photosynthesis = nuclear to electromagnetic to_____
2. running a lawn mower = chemical to thermal to _____
3. Running = chemical to_____
4. nuclear power plant = nuclear to_____ to electric
5. solar cells on a house = nuclear to electromagnetic to_____ to electric

Match the following descriptions with the types of energy transfer below

a. conduction
b. convection
c. radiation

6. occurs between a heating pad and your skin
7. Can occur between the sun and Mars
8. does not require matter
9. how food is heated in a pot on the stove
10. occurs in oceans

True/False *Indicate whether the statement is true (A) or false (B).*

11. Heat flows spontaneously from hot objects to cold objects.
12. A potholder keeps you from burning your hand when you pick up a hot pot - this means that a pot holder is a good conductor.
13. An 8oz glass of ice water has less thermal energy than a 8oz glass of warm water.
14. The type of thermal energy transfer that takes place in fluids is mostly convection.
15. A material that conducts thermal energy well is called a thermal insulator.

Multiple Choice *Identify the choice that best completes the statement or answers the question.*

16. A 13-kg sled is moving at a speed of 3 m/s. What is the kinetic energy of the sled?
    a. 39 J b. 117 J c. 19.5 J d. 15.5 J e. 58.5 J
17. The main difference between kinetic energy and potential energy is that
    a. although both energies involve motion, only kinetic involves position.
    b. kinetic energy involves position and potential energy involves motion.
    c. although both energies involve position, only potential involves motion.
    d. kinetic energy involves motion and potential energy involves position.

Specific Heat Table

Substance	c/J kg^{-1} K^{-1}	Substance	c/J kg^{-1} K^{-1}
Aluminium	900	Ice	2100
Iron/steel	450	Wood	1700
Copper	390	Nylon	1700
Brass	380	Rubber	1700
Zinc	380	Marble	880
Silver	230	Concrete	850
Mercury	140	Granite	840
Tungsten	135	Sand	800
Platinum	130	Glass	670
Lead	130	Carbon	500
Hydrogen	14000	Ethanol	2400
Air	718	Paraffin	2100
Nitrogen	1040	Water	4186
Steam	2000	Sea water	3900

18. Based on the specific heat table above, which of the following substances would make the best insulator?
a. Granite b. Concrete c. Sand d. Marble

19. Based on the specific heat table above, which substance has a specific heat of 390 c/J kg^{-1} K^{-1}?
a. Brass b. Iron c. Zinc d. Copper

20. Based on the specific heat table above, which of the following substances is the **best** thermal conductor?
a. Hydrogen b. Paraffin c. Air d. Glass

21. A 3.00 kg toy falls from a height of 10.0 m. What is its potential energy at the top of the fall?
a. 29.4 J b. 98.0 J c. 294 J d. 0.98 J

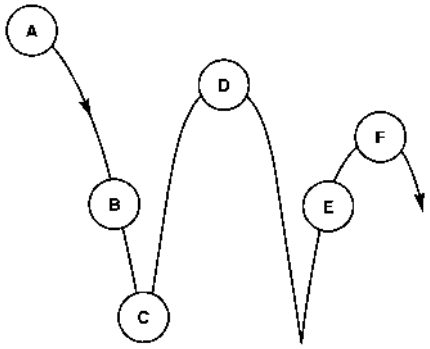

Figure 15-3

22. At what location in Figure 15-3 does the ball have the most gravitational potential energy?
a. C b. B c. E d. D e. A

23. Compare the gravitational potential energy of the ball at locations B and E, it is the same at both locations because
a. the height is the same.
b. the kinetic energy has increased
c. the ball is traveling at the same velocity
d. the potential energy has decreased

24. At what location in Figure 15-3 does the ball have the most kinetic energy?
a. E b. A c. B d. C e. D

25. How many kilojoules of heat must be transferred to a 480-g aluminum pizza pan to raise its temperature from 22°C to 234°C? The specific heat of aluminum in this temperature range is 0.96 J/g·°C.
a. 101,760 J b. 10,137.6 J c. 480.8 J d. 98,000 J

26. The energy of motion is called
    a. thermal energy. b. kinetic energy. c. work. d. potential energy.

27. A 0.002 kg coin, which has zero potential energy at rest, is dropped into a 10.0 m well. After the coin comes to a stop in the mud, what is its potential energy?
    a. –0.196 J b. 0.196 J c. 0.000 J d. 0.020 J

28. Which of the following energy forms is involved in winding a pocket watch?
    a. elastic potential energy
    b. gravitational potential energy
    c. Non-mechanical energy
    d. electrical energy

29. As the temperature of an object rises, so does the (SPS7)
    a. mass of the object.
    b. thermal energy of the object.
    c. potential energy of the object.
    d. specific heat of the object.

30. Matter is needed to transfer thermal energy by (SCSh5)
    a. conduction. b. convection. c. radiation. d. both a and b e. a, b, and c

31. Which of the following energy forms is involved in a pencil falling from a desk?
    a. elastic potential energy and kinetic energy
    b. Non-mechanical energy
    c. chemical potential energy
    d. gravitational potential energy

32. What is the kinetic energy of a 72.0-kg sky diver falling at a terminal velocity of 79.0 m/s?
    a. 2,844 J b. 5,688 J c. 11,376 J d. 224,676 J

33. Why is the gravitational potential energy of an object 1 meter above the moon's surface less than its potential energy 1 meter above Earth's surface?
    a. The object's mass is less on the moon.
    b. The object's weight is more on the moon.
    c. The object's acceleration due to gravity is less on the moon.
    d. both a and c

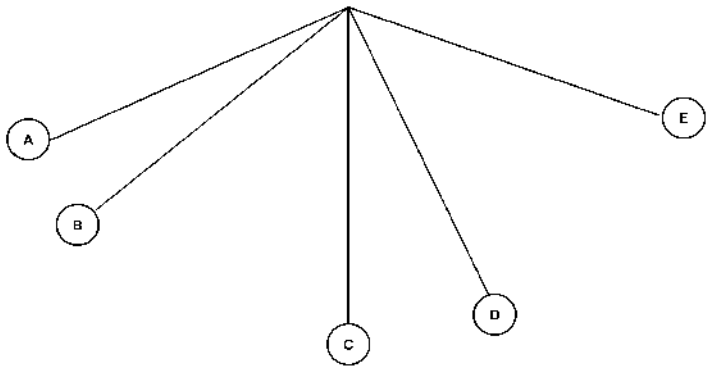

Figure 15-1

34. At what point(s) would the potential energy of the pendulum bob in Figure 15-1 be the greatest? (SPS7.a)
    a. B and D b. A c. A and E d. C and E e. C

35. In Figure 15-1, at what point would the Kinetic energy be the greatest?
    a. A b. E c. C d. B e. D

36. Work is a transfer of
    a. mass. b. motion. c. force. d. energy.

37. What property of an object is related to the average kinetic energy of the particles in that object? (SPS7)
    a. mass b. specific heat c. temperature d. conductivity

38. Heat is the transfer of thermal energy because of a __ difference.
    a. conduction b. specific heat c. radiation d. temperature e. convection

39. The transfer of energy as waves moving through space is called ___

a. specific heat b. convection c. thermal expansion d. conduction e. Radiation

Vocabulary:
Match the following words with the correct definition

40. A form of energy consisting of changing electric and magnetic fields

41. The process of changing energy from one form to another.

42. A temperature of 0 kelvins or 217.13 Celsius.

43. The amount of heat needed to raise the temperature of one gram of a material by one degress Celsius

44. The energy stored in atomic nuclei of radioisotopes.

a. Absolute Zero

b. Specific Heat

c. Electromagnetic energy

d. Nuclear Energy

e. Energy Conversion

Answer Section

MATCHING

1. ANS: B
2. ANS: A
3. ANS: A
4. ANS: C
5. ANS: B
6. ANS: A
7. ANS: C
8. ANS: C
9. ANS: A
10. ANS: B

TRUE/FALSE

11. ANS: T
12. ANS: F
13. ANS: F
14. ANS: T
15. ANS: F

MULTIPLE CHOICE

16. ANS: E
17. ANS: D
18. ANS: D
19. ANS: D
20. ANS: D
21. ANS: C
22. ANS: E
23. ANS: A
24. ANS: D
25. ANS: D
26. ANS: B
27. ANS: A
28. ANS: A
29. ANS: B STA: SPS7.
30. ANS: D STA: SCSh5.
31. ANS: D
32. ANS: D
33. ANS: C
34. ANS: C STA: SPS7.a
35. ANS: C
36. ANS: D
37. ANS: C STA: SPS7.
38. ANS: D
39. ANS: E