Heat and Energy Test Answer key

Name: _____

Chapter 15

1. Energy (does / doesn't) have to involve motion.
2. Energy is measured in __joules__.
3. Energy in the form of motion is _kinetic_ energy.
4. A rock at the edge of a cliff has _potential_ energy because of its position.
5. Energy that is stored is _potential_ energy.
6. Energy stored in food you eat is _chemical potential_energy
7. _Mechanical_ energy is the total potential and kinetic energy in a system.
8. _Elastic_ energy is stored in a stretched rubber band.
9. A book sitting on a shelf has _gravitaional potential_energy.
10. Gravitational potential energy depends on the _mass of the object, the acceleration due to gravity and the height of the object_
11. The primary source of the sun's energy is _nuclear fusion_
12. A pendulum is swinging back and forth and has a kinetic energy of 400 J at a particular point in its path. Which of the following statements is **not** true?
    a) Both the kinetic and potential energy are decreasing
    b) When the kinetic energy is zero, the potential energy will be 400 J greater
    c) The minimum kinetic energy is zero
    d) The potential energy increases when the kinetic energy decreases
13. The law of conservation of energy states that energy can neither be created nor destroyed – only changed_
14. Increasing the speed of an object does not affect_ its potential energy
15. The SI unit for energy is the _joule_.
16. You can calculate kinetic energy by using the equation _KE = 1.2 m x v^2_.
17. You can calculate gravitational potential energy by using the equation _GPE = m x g (9.8 m/s^2) x h_.
18. A bus engine transfers chemical potential energy into _Kinetic energy_ so that the bus moves.
19. According to the law of conservation of energy, the total amount of energy in the universe _remains constant_.
20. On a swing your potential and kinetic energies change, but your _mechanical_ energy does not.
21. When you move your hand or foot, your body has converted potential energy into _kinetic_ energy.

Chapter 16

22. As the temperature of mercury inside the thermometer increases, its volume _increases_.
23. Energy is transferred as heat from a substance at _High_ temperature to a substance at __low_ temperature.
24. Heating by convection can occur through _liquids__, or _gasses_.
25. _Radiation_ is the only method of energy transfer that can take place in a vacuum.
26. A good insulator is a _poor_ conductor.

Specific Heats at 25°C

Substance	c (j/kg•K)	Substance	c (j/kg•K)
Water (liquid)	4186	Copper	385
Steam	1870	Gold	129
Ammonia (gas)	2060	Iron	449
Ethanol (liquid)	2440	Mercury	140
Aluminum	897	Lead	129
Carbon (graphite)	709	Silver	234

27. Does it take more energy as heat to raise the temperature of water by one degree than to raise the temperature of steam by the same amount? Explain. Yes, The specific heat of water is 4186 which is much higher than 1879 for steam – that means that more energy is needed to raise the temperature of water.
28. Using the table, determine which substance can absorb the most energy in a temperature increase of 1K Liquid water
29. Which substance has a specific heat approximately 10 times greater than the specific heat of silver? ethanol
30. 10 kg of a substance underwent a 3 K change in temperature when 11 500 J of energy as heat was added to the substance. What is the substance? copper
31. What is –175ºC on the Kelvin scale? 98 K
32. As the kinetic energy of the molecules in a substance increases, the _temperature of the substance increases._
33. The transfer of energy by the movement of fluids or gases with different temperatures is called _convection_
34. Energy from the sun reaches Earth by _radiation_

35. Convection currents rise in air because _cool air descends and hot air rises_
36. Which method of energy transfer does not involve movement of matter? Radiation
37. How much heat energy will cause the temperature of 7 kg of carbon to increase its temperature by 15 K? The specific heat is 449 J/kg•K. 4.7×10^4 J
38. A cold-blooded reptile basks on a warm rock in the sun. Its body is warmed by _radiation and conduction_
39. The temperature of a substance increases by 3 K when 1635 J is added to a 2 kg quantity of the substance. What is the specific heat of the substance? 272 J/kg•K
40. _Temperature_ is a measure of the average kinetic energy of all the particles within an object.
41. A(n) _thermometer_ is a device for measuring temperature
42. _Absolute zero_ is the temperature at which an object's energy is minimal.
43. The energy transferred between the particles of two objects because of the temperature difference between the two objects is called _heat_.
44. _Conduction_ is the energy transfer as heat between particles as they collide within a substance or between two objects in contact.
45. _Convection_ is the transfer of energy by the movement of fluids with different temperatures.
46. The movement of a gas or liquid due to expansion and contraction caused by temperature differences within the fluid is called a _convection current__.
47. __Radiation_ is the transfer of energy by electromagnetic waves.
48. A(n) __conductor_ is a material through which energy can be easily transferred as heat.
49. A(n) _insulator__ is a material that is a poor energy conductor.
50. __Specific heat_ is the amount of energy transferred as heat that will raise the temperature of 1 kg of a substance by 1 K.
51. A(n) _heating system_ is any device that transfers energy to a substance to raise the temperature of the substance.
52. A(n) __cooling system_ is a device that transfers energy out of an object to lower its temperature.