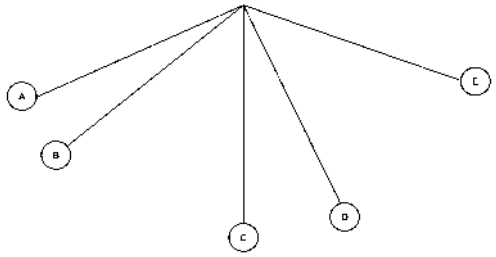
**Name: _____ Date: _____ Period: ____**
**P. Sci. Unit 4 (Ch. 15 & 16) Energy Review**

*Show ALL calculations on a separate piece of paper.*

## Chapter 15

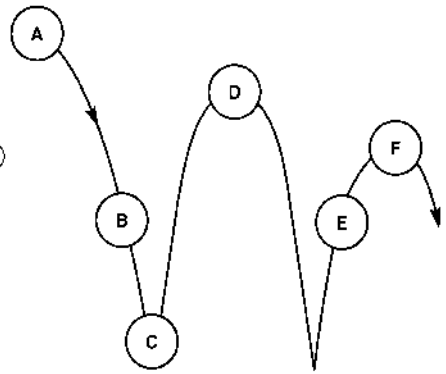
1. Define work:
2. Define energy:
3. Energy is measured in _____.
4. Give an example for each of the following types of energy
   a. Kinetic _____
   b. Gravitational Potential _____
   c. Elastic Potential _____
   d. Chemical Potential _____
   e. Mechanical _____
   f. Thermal _____
   g. Nuclear _____
   h. Electromagnetic _____
   i. Electrical _____
5. Energy in the form of motion is _____ energy.
6. A rock at the edge of a cliff has _____ energy because of its position.
7. Energy that is stored is _____ energy.
8. Energy stored in food you eat is _____energy
9. _____ energy is the total potential and kinetic energy in a system.
10. _____ energy is stored in a stretched rubber band.
11. A book sitting on a shelf has _____ energy.
12. Gravitational potential energy depends on _____, _____, and _____
13. The primary source of the sun's energy is _____.
14. A pendulum is swinging back and forth, starting at point A and ending at point E as shown in the image below. At what point(s) is the pendulum's:
    a. Kinetic energy decreasing ___
    b. Kinetic energy increasing ___
    c. Kinetic energy the HIGHEST __
    d. Kinetic energy the LOWEST __
    e. Potential energy decreasing ___
    f. Potential energy increasing ___
    g. Potential energy the HIGHEST _
    h. Potential energy the LOWEST _




15. The law of conservation of energy states that: ____
16. Increasing the speed of an object (increases / decreases / does not affect) its potential energy.
17. The SI unit for energy is the _____.
18. A bus engine transfers chemical potential energy into _____energy so that the bus moves.
19. According to the Law of Conservation of Energy, the total amount of energy in the universe _____.
20. On a swing your potential and kinetic energies change, but your _____ _____ energy does not.
21. When you move your hand or foot, your body has converted potential energy into _____ energy.

**Problems**

22. What is the gravitational potential energy of a 55 kg box that is 8.0 m above the ground?
23. A medicine ball has a mass of 5 kg and is thrown with a speed of 2 m/s. What is its kinetic energy?
24. An object has a kinetic energy of 810 J after falling a certain distance. If the mass of the object is 20 kg, what is the speed of the object at this time?
25. A ball has 100 J of potential energy when it is on a shelf.
    a. Explain what happens to the potential energy and the kinetic energy as the ball falls.
    b. Find the amount of kinetic energy the ball has at the instant it hits the floor.
26. An 18-kg bicycle carrying a 62-kg girl is traveling at a speed of 7 m/s. What is the kinetic energy of the girl and bicycle?
27. A 90-kg ceiling light is suspended 4 m above the floor. What is its gravitational potential energy?
28. Using the image to the right label the points where :




a. ___ Potential energy is the greatest.
b. ___ Kinetic energy is the greatest.
c. ___ Where BOTH are present.

**Chapter 16**

29. What is related to the average kinetic energy of the particles in that object?
30. As the temperature of mercury inside the thermometer increases, its volume _____.
31. Energy is transferred as heat from a substance at (low / high) temperature to a substance at (low / high) temperature.
32. Heating by convection can occur through (solids / liquids / gases).
33. _____ is the only method of energy **transfer** that can take place in a vacuum.
34. _____ is the only method of energy **transfer** that takes place in a fluid.
35. _____ is the only method of energy **transfer** that requires contact of the objects.
36. Heat is the transfer of thermal energy because of a _____ difference.
37. A good insulator is a _____ conductor.

**Specific Heats at 25K**

| 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 |

38. 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.

39. Using the table, determine which substance can absorb the most energy in a temperature increase of 1K. _____
40. Which substance has a specific heat approximately 10 times greater than the specific heat of silver? _____
41. The temperature of 1.5 kg of ethanol is 37 K. What will the final temperature be if 80,000 J of energy as heat is added to the ethanol?
42. 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?
43. What is –175ºC on the Kelvin scale? _____
44. As the kinetic energy of the molecules in a substance increases, the _____ increases.
45. The transfer of energy by the movement of fluids or gases with different temperatures is called _____.
46. Energy from the sun reaches Earth by _____.
47. Convection currents rise in air because _____.
48. Which method of energy transfer does not involve movement of matter? __
49. How much heat energy will cause the temperature of 7 kg of iron to increase its temperature by 15 K? The specific heat of iron is 449 J/kg·K.

50. A cold-blooded reptile basks on a warm rock in the sun. Its body is warmed by _____.
51. 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?

52. How many **kilojoules** of heat must be transferred to a 670-g aluminum pan to raise its temperature from 32°C to 250°C? The specific heat of aluminum is 0.96 J/g·°C.

53. _____ is a measure of the average kinetic energy of all the particles within an object.
54. The energy transferred between the particles of two objects because of the temperature difference between the two objects is called _____.
55. _____ is the energy transfer as heat between particles as they collide within a substance or between two objects in contact.
56. _____ is the transfer of energy by the movement of fluids with different temperatures.
57. The movement of a gas or liquid due to expansion and contraction caused by temperature differences within the fluid is called a _____.
58. The transfer of energy as waves moving through space is called ____
59. A(n) _____ is a material through which energy can be easily transferred as heat.
60. A(n) _____ is a material that is a poor energy conductor.
61. Define specific heat: