Study Guide: Pressure, Density, And Heat

Definition:

1. Temperature
2. Heat
3. Internal Energy
4. Specific Heat
5. Carnot Efficiency
6. Heat engine
7. Refrigerator
8. Pressure
9. Gauge Pressure
10. Archimedes Principle
11. Density
12. Pascals’ Principle
13. Bernoulli’s Principle
14. Atmospheric Pressure
15. Buoyancy Force
16. Solid
17. Liquid
18. Gas
19. 1st Law of Thermodynamics
20. 2nd Law of Thermodynamics

Multiple Choice:

1. If an object sinks in water, what can you infer about the object (generally )?
   a. The object is metal
   b. The object is more dense than water
   c. The object is less dense than water
   d. The object just as dense as water

2. Where is an atom’s mass mostly located?
   a. The nucleus
   b. The outer rings
   c. Where the electrons roam
   d. Just outside the nucleus

3. What Scale is the measurement for Absolute Zero a direct measure of the average KE of the atoms?
   a. Celsius
   b. Fahrenheit
   c. Kelvin
   d. Littlewoodians

4. How much energy is required to heat up one kg of water 1 degree centigrade? (Specific Heat capacity of water : 4180 J/Kg °C)
   a. 5,000 Joules
   b. 8,421 Joules
   c. 4,180 joules
   d. 6,180 Joules
5. Objects normally do what when heated?
   a. Stay the same
   b. Contract
   c. Expand
   d. Warp

6. The sun transfers heat to the Earth by?
   a. Convection
   b. Conduction
   c. Radiation
   d. None of these

7. If heat is added to the system Q is?
   a. Positive
   b. Negative
   c. Unchanged
   d. None of these

8. Work is done by the system w is?
   a. Negative
   b. Positive
   c. Unknown
   d. Unchanged

9. When water heats up above 4 °C it expands, what happens when water is
   cooled below 4 °C?
   a. It expands
   b. Contracts
   c. Unchanged
   d. Turns to ice

10. If 100% of the energy from a light bulb is converted to heat (Thermal
    Pollution) is the second Law of Thermodynamics Violated
    a. Yes
    b. No
    c. Not enough info

Work Out Problems:

1. What is the pressure on a 45m² object is 900N of force is applied?
2. What is the gauge pressure at the bottom of a 4500 m tank? What is the
   force on the 1.2 by 1.2 m hatch at the bottom of the tank?

3. How much energy is required to heat 7Kg of Iron from 0 °C to its melting
   point
4. There is a 4m piece of Iron, what is the length of the iron after its cooled from room temperature to -20 °C

5. What is the equilibrium temperature of 10kg of water at 95 °C mixed with 5kg of water at 5 °C?

6. What is the Carnot efficiency of a heat engine working between the temperatures of 500 °C and 150 °C?

7. What is the buoyancy force on a 3kg piece of copper in water?

8. A heat engine produces 45,000 joules of work and produces 3000 joules of waste heat. How much heat is required to make the heat engine run, and what is the heat engines efficiency?

9. How big does an aquarium tank window need to be if they don’t want the pressure to exceed 35000 Pa given that the water applies 45,000,000 N?

10. What is the final temperature 5kg of water at 20 °C if 25,000 joules of heat is added?