ZERO Chapter 7 Reading Questions Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Science began to encounter zero in thermodynamics with the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ possible temperature, a \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ which swallowed suns, and in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and its bizarre source of energy.

2. How cold is absolute zero?

3. Thermodynamics led to the science of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which allows us to predict the way matter behaves.

4. As you raise the temperature of a gas, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ goes up.

5. Light was once thought to be composed of little \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and then it seemed to be made of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of electric and magnetic fields. The higher the frequency, the more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it has, while the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is smaller.

6. What was the “ultraviolet catastrophe”?

7. This catastrophe lead to the field of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, where the universe is filled with an infinite amount of energy called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.

8. Planck, in desperation, hypothesized that molecules vibrate only at certain discrete energy levels called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ was the scientist that brought it into the mainstream of science.

9. Einstein solved the previous quandary and called the new packets of energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It turns out that light has both a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nature and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nature.

10. Heisenberg’s uncertainty principle states that we can’t accurately know both the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a particle, only one or the other. This is because the act of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ destroys some of the information we are trying to gather.

11. What are Einstein’s two assumptions in his theory of relativity?

12. Einstein concluded that the flow of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ changes depending on the observer’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

13. The problem with space travel is there is nothing to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ against. That is why rockets bring their own fuel to use as a push. Physicists think that future space travel may use \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy as an alternative “fuel”.