

Conceptual Physics Chapter 21 & 24 Study Guide – Thermodynamics

Essential Skills Questions:

1. Define temperature: _____
2. Use the properties of water to explain the differences between the Fahrenheit, Celsius and Kelvin scales:

3. Compare the Celsius and Kelvin scale with respect to absolute zero: _____

4. Define Heat: _____
5. Define Internal Energy? _____
6. Heat and Internal energy are both measured in _____
7. What is the difference between temperature, heat, and internal energy???
8. What is specific Heat capacity? _____
9. Why does water have a large specific heat capacity.? _____
10. Why does the sand change temperature so much while the ocean remains relatively the same temp? _____
11. If Reno, Nevada and Santa Cruz, California are about the same latitude, why is Santa Cruz typically much more even temperature, whereas Reno can get very cold in the winter and quite hot in the summer? _____
12. One way to state the First law of Thermodynamics is to say that “_____ can neither be _____ or _____”, which is basically a restatement of the Law of _____ of Energy.
13. What is the equation for computing the efficiency of heat engines? _____
14. Using the previous equation in order to increase efficiency you could either increase the _____ or decrease the _____.
15. What is the equation that we use for the work capabilities of a heat engine? _____
16. Write that equation as a sentence: _____

17. Work done on a system can increase the _____ and/or the _____.
18. Work is done to a system, can _____.
19. If a bicycle pump had NO FRICTION, would it get hot by pumping air? Explain why or why not. _____

20. If you put a chunk of hot gold into cold water, what would happen to the gold and what would happen to the water? _____
21. Define entropy? _____
22. Explain how entropy is related to the _____ Law of Thermodynamics: _____

23. What is the ideal efficiency of a heat engine that has a high temp of 3300J and a low of 300J? (show work) _____
24. How much work can be done by the same engine? _____
25. Would it be possible to convert all that heat into work? Why or why not? _____

26. Explain how the energy of gasoline changes as it is used with respect to entropy: _____

27. What does the book mean (p364) when it would say that the energy of the gasoline in the question above becomes less organized? _____

28. Use the “organization” of your bedroom as an example to help explain entropy: _____

29. Name one example from nature you could use as example of entropy and explain why it would be an example: _____

30. Show the proper equation and then solve for how many Joules of Heat energy are needed to raise the temperature of 2 kilograms of water from 25 degrees Celsius to 35 degrees Celsius: _____

31. What makes the “hero engine” spin? _____

32. If the water inside the hero engine is 100 degrees Celsius, how many Kelvins is that? _____
33. How did you find that answer? _____

STAR exam questions:

