Chapter 8 Temperature, Heat, and Thermodynamics

8.1 Questions About Temperature and Heat

1) When you touch a cold piece of ice with your finger, energy flows
   A) from your finger to the ice.
   B) from the ice to your finger.
   C) actually, both ways.

Answer: A
Diff: 1
Topic: Temperature and Heat

2) Heat energy travels from an object with a high
   A) internal energy to an object with a lower internal energy.
   B) temperature to an object with a lower temperature.
   C) Both of these, for they say essentially say the same thing.
   D) None of the above choices are true.

Answer: B
Diff: 1
Topic: Temperature and Heat

3) Which of the following normally warms up fastest when heat is applied?
   A) water
   B) iron
   C) glass
   D) wood
   E) All of the above choices are equally true.

Answer: B
Diff: 1
Topic: Temperature and Heat

4) A substance that heats up relatively quickly has a
   A) high specific heat.
   B) low specific heat.
   C) high conductivity.
   D) low conductivity.

Answer: B
Diff: 1
Topic: Temperature and Heat

5) The fact that a thermometer "takes its own temperature" illustrates
   A) thermal equilibrium.
   B) energy conservation.
   C) the difference between heat and internal energy.
   D) the fact that molecules are constantly moving.

Answer: A
Diff: 1
Topic: Temperature and Heat

11) Before ice can form on a lake, all the water in the lake must be cooled to
A) zero degrees C.
B) 4 degrees C.
C) minus 32 degrees C.
D) None of the above are true. Ice can form at the surface regardless of the water temperature below.

Answer: B
Diff: 1
Topic: Temperature and Heat

12) Ice tends to form first at the
A) surface of bodies of water.
B) bottom of bodies of water.
C) surface or bottom depending on the water depth.

Answer: A
Diff: 1
Topic: Temperature and Heat

13) When an iron ring is heated, the hole becomes
A) smaller.
B) larger.
C) neither smaller nor larger.
D) either smaller or larger, depending on the ring thickness.

Answer: B
Diff: 1
Topic: Thermal Expansion

14) As a piece of metal with a hole in it cools, the diameter of the hole
A) increases.
B) decreases.
C) remains the same.

Answer: B
Diff: 1
Topic: Thermal Expansion

15) When we enlarge a photograph of an iron ring, the image of the hole becomes
A) smaller.
B) larger.
C) neither smaller nor larger.

Answer: B
Diff: 1
Topic: Thermal Expansion

20) Consider a closed, sealed can of air placed on a hot stove. The contained air undergoes an increase in
A) mass.
B) pressure.
C) temperature.
D) all of these.
E) two of these.

Answer: E
Diff: 1
Topic: Thermal Expansion

21) Consider a sample of ice at 0 degrees C. If the temperature is decreased, the volume of the ice
A) increases.
B) decreases.
C) stays the same.

Answer: B
Diff: 1
Topic: Thermal Expansion

22) Which of the following contracts most when the temperature is decreased? Equal volumes of
A) iron.
B) wood.
C) water.
D) helium.
E) All contract the same.

Answer: D
Diff: 1
Topic: Thermal Expansion

23) Which of the following contracts most when the temperature is increased? Equal volumes of
A) iron.
B) wood.
C) ice water.
D) helium.
E) None of these contract when heated.

Answer: C
Diff: 1
Topic: Thermal Expansion

24) Consider a sample of water at 0 degrees C. If the temperature is slightly increased, the volume of the water
A) increases.
B) decreases.
C) remains the same.

Answer: B
Diff: 1
Topic: Thermal Expansion

30) Room temperature on the Kelvin scale is about
A) 100 K.
B) 200 K.
C) 300 K.
D) 400 K.
E) more than 400 K.

Answer: C
Diff: 1
Topic: Temperature

31) Between 0 degrees Celsius and 8 degrees Celsius a red-dyed-water-in-glass thermometer would
A) be especially suitable.
B) always be wrong.
C) give ambiguous readings.
D) explode.
E) implode.

Answer: C
Diff: 2
Topic: Thermal Expansion

32) The white-hot sparks that strike your skin from a 4th-of-July-type sparkler don't harm you because
A) they have a low temperature.
B) the energy per molecule is very low.
C) the energy per molecule is high, but little energy is transferred because of the few molecules in the spark.

Answer: C
Diff: 2
Topic: Temperature and Heat

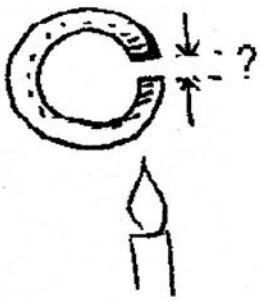
33) Some molecules are able to absorb large amounts of energy in the form of internal vibrations and rotations. Materials composed of such molecules have
A) low specific heats.
B) high specific heats.
C) none of the above

Answer: B
Diff: 2
Topic: Temperature and Heat

34) The fact that desert sand is very hot in the day and very cold at night is evidence that sand has
A) a low specific heat.
B) a high specific heat.
C) no specific heat.

Answer: A
Diff: 2
Topic: Temperature and Heat

Figure 8-A



40) Consider a metal ring with a gap cut in it. When the ring is heated, the gap
A) becomes narrower.
B) becomes wider.
C) retains its size.

Answer: B
Diff: 3
Topic: Thermal Expansion

8.2 Questions About Thermodynamics

1) The lowest temperature possible in nature is
A) 0 degrees C.
B) -273 degrees C.
C) 4 K.

Answer: B
Diff: 1
Topic: Thermodynamics

2) A volume of air has a temperature of 0 degrees Celsius. An equal volume of air that is twice as hot has a temperature of
A) 0 degrees C.
B) 64 degrees C.
C) 100 degrees C.
D) 273 degrees C.
E) None of the above choices are correct.

Answer: D
Diff: 1
Topic: Thermodynamics

3) To wholly convert a given amount of heat energy into mechanical energy is
A) possible using a steam engine.
B) possible using an atomic reactor.
C) possible using a simple machine.
D) impossible regardless of the technique used.

Answer: D
Diff: 2
Topic: Thermodynamics

10) One hundred joules of heat is added to a system that performs 60 joules of work. The internal energy change of the system is
A) 0 J.
B) 40 J.
C) 60 J.
D) 100 J.
E) None of the above choices are correct.

Answer: B
Diff: 2
Topic: Thermodynamics

11) Suppose you rapidly stir some raw eggs with an eggbeater. The temperature of the eggs will
A) increase.
B) decrease.
C) remain unchanged.

Answer: A
Diff: 2
Topic: Thermodynamics

12) Suppose the temperature of the input reservoir in a heat engine doesn't change. As the sink temperature is lowered, the efficiency of the engine
A) increases.
B) decreases.
C) stays the same.

Answer: A
Diff: 2
Topic: Thermodynamics

13) When mechanical work is done on a system, there can be an increase in
A) its internal energy.
B) its temperature.
C) both temperature and internal energy.
D) neither temperature or internal energy.

Answer: C
Diff: 2
Topic: Thermodynamics

14) When a system does work and no heat is added to the system, its temperature
A) increases.
B) decreases.
C) remains unchanged.

Answer: B
Diff: 2
Topic: Thermodynamics

20) Sue's refrigerator is built into the wall of her kitchen, so that it exhausts heat to the outdoors rather than into the room. If Sue tries to cool her kitchen by leaving the refrigerator door open, the room temperature will
A) increase at least slightly.
B) decrease at least slightly.
C) remain unchanged.

Answer: B
Diff: 2
Topic: Thermodynamics

21) On a chilly 10-degree-C day, your friend who likes cold weather, wishes it were twice as cold (half as hot). Taken literally, this temperature would be
A) 10 degrees C.
B) 5 degrees C.
C) 0 degrees C.
D) -131.5 degrees C.
E) -141.5 degrees C.

Answer: D
Diff: 3
Topic: Thermodynamics

22) Consider a steaming aluminum soda-pop can that contains a small amount of boiling water. When it is quickly inverted into a bath of cooler water the can is dramatically crushed by atmospheric pressure. This occurs because the pressure inside the can is rapidly reduced by
A) contact with the relatively cool water.
B) sudden slowing of the air and steam molecules inside.
C) condensation of steam inside.
D) reduced internal energy.
E) rapid conduction of heat to the relatively cool water.

Answer: C
Diff: 3
Topic: Thermodynamics