

## Chapter 17: Change of Phase

Conceptual Physics, 10e (Hewitt)

- 3) Evaporation is a cooling process and condensation is  
A) a warming process.  
B) a cooling process also.  
C) neither a warming nor cooling process.

Answer: A

Diff: 1

Topic: Change of State

- 4) Evaporation is a cooling process because  
A) heat is radiated during the process.  
B) of conduction and convection.  
C) the more energetic molecules are able to escape the liquid.  
D) the temperature of the remaining liquid decreases.  
E) none of these

Answer: C

Diff: 1

Topic: Change of State

- 7) Steam burns are more damaging than burns caused by boiling water because steam  
A) gives up additional energy when it condenses.  
B) has more energy per kilogram than boiling water.  
C) Choices A and B are both correct.  
D) Choices B and C are both incorrect.

Answer: C

Diff: 1

Topic: Change of State

- 8) We feel uncomfortably warm on a muggy day because water molecules are  
A) evaporating from our moist bodies.  
B) condensing on our bodies.  
C) evaporating and condensing on our bodies at the same rate.

Answer: C

Diff: 2

Topic: Change of State

- 10) When a gas is changed to a liquid state, the gas  
A) releases energy.  
B) absorbs energy.  
C) neither releases nor absorbs energy.  
D) both releases and absorbs energy.

Answer: A

Diff: 1

Topic: Change of State

- 11) When a solid is changed to a liquid state, the solid  
A) releases energy.

- B) absorbs energy.  
C) neither releases nor absorbs energy.  
D) both releases and absorbs energy.

Answer: B

Diff: 1

Topic: Change of State

- 12) When liquids change to a solid state, they  
A) absorb energy.  
B) release energy.  
C) neither absorb nor release energy.  
D) both absorb and release energy.

Answer: B

Diff: 1

Topic: Change of State

- 14) When heat is added to boiling water, its temperature  
A) increases.  
B) decreases.  
C) does not change.

Answer: C

Diff: 1

Topic: Change of State

- 15) Boiling water does not increase in temperature when additional heat is applied because  
A) the temperature doesn't change in a change of state.  
B) added input energy doesn't increase the water's internal energy.  
C) the increased heating produces increased boiling, and therefore increased cooling.  
D) none of these

Answer: C

Diff: 1

Topic: Change of State

- 16) For increased atmospheric pressure, the boiling temperature of a liquid  
A) goes down.  
B) goes up.  
C) remains at 100 degrees C.

Answer: B

Diff: 1

Topic: Change of State

- 29) When bringing water to a boil in the mountains, the time needed to reach the boiling point is  
A) less than at sea level.  
B) more than at sea level.

C) the same as at sea level.

Answer: A

Diff: 2

Topic: Change of State

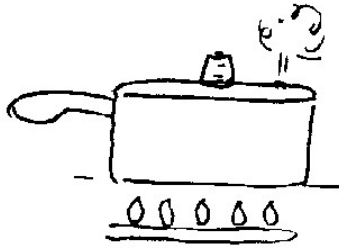


Figure 17-B

30) Food in a pressure cooker is cooked faster because of the

- A) higher temperature.
- B) greater rate of bubble formation in the water.
- C) increased internal energy in the water.
- D) Choices A, B, and C are all true.
- E)

Answer: A

Diff: 2

Topic: Change of State

39) On a humid day, water condenses on the outside of a glass of ice water. This phenomenon occurs mainly because of

- A) the porosity of glass.
- B) capillary action.
- C) adhesion of water molecules to glass.
- D) the saturation of cooled air.
- E) evaporation.

Answer: D

Diff: 2

Topic: Change of State

5) The greater the difference in temperature between the input reservoir and the output reservoir for a heat engine, the

- A) greater the efficiency.
- B) less the efficiency.
- C) Neither efficiency of a heat engine doesn't depend on temperature difference.

Answer: A

Diff: 1

Topic: Thermodynamics

6) The first law of thermodynamics is a restatement of the

- A) principle of entropy.
- B) law of heat addition.
- C) Carnot cycle.
- D) conservation of energy.

E) none of these

Answer: D

Diff: 1

Topic: Thermodynamics

8) Systems that are left alone, tend to move toward a state of

- A) less entropy.
- B) more entropy.
- C) no entropy.

Answer: B

Diff: 1

16) When an ideal gas is subjected to an adiabatic process

- A) no work is done on the gas.
- B) the temperature of the gas does not change.
- C) the internal energy of the gas does not change.
- D) Choices A, B, and C are all true.
- E) None of the above choices are true.

Answer: E

Diff: 1

Topic: Thermodynamics

17) During an adiabatic compression of an ideal gas,

- A) the internal energy of the gas remains constant.
- B) the temperature of the gas does not change.
- C) no heat is supplied to or removed from the gas.
- D) no work is done on the gas.
- E) None of the above choices are true.

Answer: C

Diff: 1

Topic: Thermodynamics

18) A process which takes place at constant temperature is

- A) an adiabatic process.
- B) an isothermal process.
- C) impossible.

Answer: B

Diff: 1

Topic: Thermodynamics

19) A quantity of water has more entropy when it is

- A) frozen ice.
- B) boiling.
- C) at room temperature.

Answer: B

Diff: 1

Topic: Thermodynamics

24) A heat engine would have 100 percent efficiency if its input reservoir were

- A) 100 times hotter than the exhaust sink.
- B) 1000 times hotter than the exhaust sink.
- C) 100 times cooler than the exhaust sink.

D) any finite temperature if the exhaust sink were at absolute zero.  
E) at any finite temperature regardless of the heat sink temperature.

Answer: D

Diff: 2

Topic: Thermodynamics

30) When a volume of air expands against the environment and no heat enters or leaves, the air temperature will

- A) increase.
- B) decrease.
- C) remain unchanged.

Answer: B

Diff: 2

Topic: Thermodynamics

36) If you run a refrigerator in a closed room with the refrigerator door open, the room temperature will

- A) increase.
- B) decrease.
- C) remain unchanged.

Answer: A

Diff: 3

Topic: Thermodynamics

1) A wiggle in time is a

- A) vibration.
- B) wave.
- C) both
- D) neither

Answer: A

Diff: 1

Topic: Vibrations and Waves

2) A common source of wave motion is a

- A) wave pattern.
- B) harmonic object.
- C) vibrating object.
- D) region of variable high and low pressure.
- E) none of these

Answer: C

Diff: 1

Topic: Vibrations and Waves

4) In a longitudinal wave the compressions and rarefactions travel in

- A) the same direction.
- B) opposite directions.
- C) a vacuum.

Answer: A

Diff: 1

Topic: Vibrations and Waves

5) Which of the following is not a transverse wave?

- A) sound
- B) light
- C) radio
- D) all of these
- E) none of these

Answer: A

Diff: 1

Topic: Vibrations and Waves

11) If the frequency of a certain wave is 10 hertz, its period is

- A) 0.1 second.
- B) 10 seconds.
- C) 100 seconds.
- D) None of the above choices are correct.

Answer: A

Diff: 1

Topic: Vibrations and Waves

13) An object that completes 10 vibrations in 20 seconds has a frequency of

- A) 0.5 hertz.
- B) 2 hertz.
- C) 200 hertz.

Answer: A

Diff: 1

Topic: Vibrations and Waves

17) To say that one wave is out of phase with another is to say that the waves are

- A) of different amplitudes.
- B) of different frequencies.
- C) of different wavelengths.
- D) out of step.
- E) all of these

Answer: D

Diff: 1

Topic: Vibrations and Waves

18) Wave interference occurs for

- A) sound waves.
- B) light waves.
- C) water waves.
- D) All of the above choices are correct.
- E) None of the above choices are correct.

Answer: D

Diff: 1

Topic: Vibrations and Waves

19) A standing wave occurs when

- A) two waves overlap.

- B) a wave reflects upon itself.
- C) the speed of the wave is zero or near zero.
- D) the amplitude of a wave exceeds its wavelength.

Answer: B

Diff: 1

Topic: Vibrations and Waves

30) The pendulum with the greatest frequency is the pendulum with the

- A) shortest period.
- B) shortest length.
- C) shortest period and the shortest length.
- D) shortest amplitude.
- E) greatest amplitude.

Answer: C

Diff: 2

Topic: Vibrations and Waves

32) If the waves are going by at the same frequency, the wave that has the greatest speed will have the greatest

- A) amplitude.
- B) length.
- C) frequency.
- D) None of the above choices are true.

Answer: B

Diff: 2

Topic: Vibrations and Waves

41) Some of a wave's energy dissipates as heat. In time, this will reduce the wave's

- A) speed.
- B) wavelength.
- C) amplitude.
- D) frequency.
- E) period.

Answer: C

Diff: 2

Topic: Vibrations and Waves

43) When a pendulum clock at sea level is taken to the top of a high mountain, it will

- A) gain time.
- B) lose time.
- C) neither gain nor lose time.

Answer: B

Diff: 2

Topic: Vibrations and Waves

1) The source of every sound is something that is

- A) vibrating.
- B) moving.
- C) accelerating.
- D) undergoing simple harmonic motion.

E) a net emitter of energy.

Answer: A

Diff: 1

Topic: Sound

2) A sound source of high frequency emits a high

- A) speed.
- B) amplitude.
- C) pitch.
- D) all of these
- E) none of these

Answer: C

Diff: 1

Topic: Sound

3) Double the frequency of a sound and you halve its

- A) wavelength.
- B) speed.
- C) amplitude.
- D) all of these
- E) none of these

Answer: A

Diff: 1

Topic: Sound

5) The approximate range of human hearing is

- A) 10 hertz to 10,000 hertz.
- B) 20 hertz to 20,000 hertz.
- C) 40 hertz to 40,000 hertz.
- D) Actually all of these depends on the hearing ability of the person.

Answer: B

Diff: 1

Topic: Sound

7) A sound wave is a

- A) longitudinal wave.
- B) transverse wave.
- C) standing wave.
- D) shock wave.
- E) None of the above choices are correct.

Answer: A

Diff: 1

Topic: Sound

8) Compressions and rarefactions are characteristic of

- A) longitudinal waves.
- B) transverse waves.
- C) both longitudinal and transverse waves.
- D) Neither of the above choices are correct.

Answer: A

Diff: 1

Topic: Sound

- 10) Sound travels faster in  
A) air.  
B) water.  
C) steel.  
D) a vacuum.  
E) Sound travels at about the same speed in all of the above media.

Answer: C

Diff: 1

Topic: Sound

- 11) Sound waves cannot travel in

- A) air.  
B) water.  
C) steel.  
D) a vacuum.  
E) any of the above media

Answer: D

Diff: 1

Topic: Sound

- 13) Sound travels faster in air if the air temperature is

- A) warm.  
B) cold.  
C) average.

Answer: A

Diff: 1

Topic: Sound

- 21) The energy of sound in air eventually becomes

- A) increased internal energy of the air.  
B) weaker and weaker until it disappears.  
C) cancelled by destructive interference.  
D) cancelled by both destructive and constructive interference.

Answer: A

Diff: 1

Topic: Sound

- 28) The least energy required to produce forced vibration in an object occurs

- A) below its natural frequency.  
B) at its natural frequency.  
C) above its natural frequency.

Answer: B

Diff: 1

Topic: Sound

- 30) In designing a music hall, an acoustical engineer deals mainly with

- A) modulation.  
B) forced vibrations.  
C) resonance.  
D) beats.  
E) wave interference.

Answer: E

Diff: 1

Topic: Sound

- 32) The phenomenon of beats results from sound

- A) refraction.  
B) reflection.  
C) interference.  
D) all of these  
E) none of these

Answer: C

Diff: 1

Topic: Sound

- 40) A 340-hertz sound wave travels at 340 m/s in air with a wavelength of

- A) 1 m.  
B) 10 m.  
C) 100 m.  
D) 1000 m.  
E) None of the above choices are correct.

Answer: A

Diff: 2

Topic: Sound

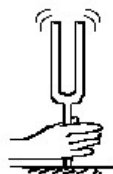


Figure 20-A

- 41) When the handle of a tuning fork is held solidly against a table, the sound becomes louder and the time that the fork keeps vibrating

- A) becomes longer.  
B) becomes shorter.  
C) remains the same.

Answer: B

Diff: 2

Topic: Sound

- 42) Resonance can be looked at as forced vibration with the

- A) least amount of energy input.  
B) maximum amount of energy input.  
C) matching of wave amplitudes.  
D) matching of constructive and destructive interference.  
E) minimum beat frequency.

Answer: A

Diff: 2

Topic: Sound

43) In which one of these media does sound travel the fastest?

- A) water vapor
- B) water
- C) ice
- D) steam
- E) Sound travels the same speed in each of the above media.

Answer: C

Diff: 2

Topic: Sound

45) An explosion occurs 34 km away. Since sound travels at 340 m/s, the time it takes for the sound to reach you is

- A) 0.1 second.
- B) 1 second.
- C) 10 seconds.
- D) 20 seconds.
- E) more than 20 seconds.

Answer: E

Diff: 2

Topic: Sound

46) The beat frequency produced when a 240 hertz tuning fork and a 246 hertz tuning fork are sounded together is

- A) 6 hertz.
- B) 12 hertz.
- C) 240 hertz.
- D) 245 hertz.
- E) None of the above choices are correct.

Answer: A

Diff: 2

Topic: Sound

52) A neon atom has a larger atomic number than a helium atom. At the same temperature and pressure, how does the speed of sound in helium gas compare to the speed of sound in neon gas?

- A) greater in neon than in helium
- B) greater in helium than in neon
- C) the same in both gases
- D) depends on the frequency of the sound generated

Answer: B

Diff: 3

Topic: Sound

1) The pitch of a musical sound depends on the sound wave's

- A) wavelength.

B) frequency.

C) speed.

D) amplitude.

E) all of these

Answer: B

Diff: 1

Topic: Musical Sound

4) The loudness of a musical sound is a measure of the sound wave's

A) wavelength.

B) frequency.

C) speed.

D) amplitude.

E) all of these

Answer: D

Diff: 1

Topic: Musical Sound

7) The quality of a musical note has to do with its

A) loudness.

B) frequency.

C) harmonics.

D) amplitude.

E) All of the above choices are correct.

Answer: C

Diff: 1

Topic: Musical Sound

10) The fundamental frequency of a violin string is 440 hertz. The frequency of its second harmonic is

A) 220 hertz.

B) 440 hertz.

C) 880 hertz.

D) None of the above choices are correct.

Answer: C

Diff: 1

Topic: Musical Sound

15) All other things being the same, strings that have more mass than other strings will produce

A) higher frequency notes.

B) lower frequency notes.

C) the same frequency notes.

Answer: B

Diff: 2

Topic: Musical Sound