Practice Test

1) Increase the pressure in a container of oxygen gas while keeping the temperature constant and you increase the
A) molecular speed.
B) molecular kinetic energy.
C) Choice A and choice B are both true.
D) Neither choice A or choice B is true.
Answer: D

2) At the same temperature, which move with the greater speed in the air?
A) very light molecules
B) heavier molecules
C) All will have equal average speeds.
Answer: A

3) If a solid object radiates more energy than it absorbs, its
A) internal energy and temperature decrease.
B) temperature decreases.
C) internal energy decreases.
D) None of the above choices are true.
Answer: C

4) The planet Earth loses heat mainly by
A) conduction.
B) convection.
C) radiation.
D) all of these
Answer: C

5) If you double the pressure of an ideal gas while keeping the temperature constant, the average kinetic energy of the molecules
A) is doubled.
B) increases by more than twice.
C) increases by less than twice.
D) remains unchanged.
Answer: D

6) Sound waves can interfere with one another so that no sound results.
A) True
B) False
C) Either true or false, depending on the air temperature.
Answer: A

7) A Thermos bottle has double glass walls with silver coating on the glass surfaces that face one another. The silver coating reduces the energy that is transferred by
A) conduction.
B) convection.
C) radiation.
D) friction.
E) none of these
Answer: C

8) In a mixture of hydrogen gas, oxygen gas, and nitrogen gas, the molecules with the greatest average speed are those of
A) hydrogen.
B) oxygen.
C) nitrogen.
D) All will have the same average speed at the same temperature.
Answer: A

9) 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

10) When a bimetallic bar made of copper and iron strips is heated, the bar bends toward the iron strip. The reason for this is
A) iron gets hotter before copper.
B) copper gets hotter before iron.
C) copper expands more than iron.
D) iron expands more than copper.
E) none of these
Answer: C

11) Which of the following expands most when the temperature is increased? Equal volumes of
A) iron.
B) wood.
C) ice water.
D) helium.
E) All expand the same.
Answer: D

12) 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

13) The faster a fluid moves, the
A) greater its internal pressure.
B) less its internal pressure.
C) internal pressure is unaffected.
Answer: B

14) When water is turned on in a shower, the shower curtain moves towards the water. This has to do with
A) capillary action.
B) surface tension.
C) heat capacity.
D) pressure of a moving fluid.
E) none of these
Answer: D

15) A helium-filled balloon released in the atmosphere will rise until
A) the pressure inside the balloon equals atmospheric pressure.
B) atmospheric pressure on the bottom of the balloon equals atmospheric pressure on the top of the balloon.
C) the balloon and surrounding air have equal densities.
D) all of these
E) none of these
Answer: C

16) When gas in a container is squeezed to half its volume and the temperature remains the same, the gas pressure
A) halves.
B) doubles.
C) quadruples.
D) remains the same.
Answer: B

17) An umbrella tends to move upwards on a windy day principally because
A) air gets trapped under the umbrella, warms, and rises.
B) buoyancy increases with increasing wind speed.
C) air pressure is reduced over the curved top surface.
D) all of these
Answer: C

18) Suspend a pair of Ping-Pong balls from two strings so there is a small space between them. If you blow air between the balls, they will swing
A) toward each other.
B) apart from each other.
C) away from the air stream, but not necessarily toward or apart from each other.
Answer: A

19) 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

20) Atmospheric molecules do not fly off into outer space because of
A) their relatively high speeds.
B) their relatively low densities.
C) Earth gravitation.
D) cohesive forces.
Answer: C

21) What is the approximate mass of a 1-square-centimeter column of air that extends from sea level to the top of the atmosphere?
A) 1 gram
B) 1 kilogram
C) 10 kilograms
D) 100 kilograms
Answer: B

22) A bubble of air released from the bottom of a lake
A) rises to the top at constant volume.
B) becomes smaller as it rises.
C) becomes larger as it rises.
D) alternately expands and contracts as it rises.
E) none of these
Answer: C

23) About how high can water be theoretically lifted by a vacuum pump at sea level?
A) less than 10.3 m
B) more than 10.3 m
C) 10.3 m
Answer: C

24) 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
25) Near the top of a mountain, water in an open pot boils at
A) a higher temperature than at sea level.
B) a lower temperature than at sea level.
C) the same temperature as at sea level.
D) None of the above choices are true.
Answer: B

26) When water vapor condenses on the inside of a window, the room becomes slightly
A) warmer.
B) cooler.
C) neither warmer nor cooler.
Answer: A

27) Systems that are left alone, tend to move toward a state of
A) less entropy.
B) more entropy.
C) no entropy.
D) neither of these
Answer: B

28) A process which takes place at constant temperature is
A) an isobaric process.
B) an isothermal process.
C) an isochoric process
D) impossible.
Answer: B

29) 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

30) The vibrations of a longitudinal wave move in a direction
A) along the direction of wave travel.
B) at right angles to the direction of wave travel.
C) that changes with speed.
Answer: A

31) 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

32) 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

33) An object that completes 100 vibrations in 5 seconds has a period of
A) 0.5 second.
B) 1 second.
C) 2 seconds.
D) None of the above choices are correct.
Answer: D

34) A node is a position of
A) minimum amplitude.
B) maximum amplitude.
C) half amplitude.
D) neither of these.
Answer: A

35) 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

36) 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

37) The speed of a sound wave in air depends on
A) its frequency.
B) its wavelength.
C) the air temperature.
D) all of the above choices are correct.
E) None of the above choices are correct.
Answer: C
38) 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

39) The natural frequency of an object depends on its
   A) size, shape and elasticity.
   B) size and shape.
   C) size and elasticity.
   D) shape and elasticity.
   Answer: A

40) An adiabatic process is characterized by the absence of
   A) entropy.
   B) pressure change.
   C) heat exchange.
   D) temperature change.
   E) None of the above choices are true.
   Answer: C