This chapter has 49 questions.
Scroll down to see and select individual questions or narrow the list using the checkboxes below.

Select 0 questions at random and keep in order

- ☐ *Multiple Choice Questions* - (39)
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- ☐ Topic: Gas behavior and the first law - (5)
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1. The temperature of a sample of a substance is a way to gauge
   - ○ the average momentum of the fastest 50% of the molecules in the sample.
   - ○ the kinetic energy of the fastest moving molecule in the sample.
   - ○ the average momentum of the molecules in a sample.
   - → ○ the average kinetic energy of the molecules in that sample.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Temperature and its measurement
Type: Conceptual
Multiple Choice Question
MC The temperature of a sample of a substance i... Type: Definition

2. After I dip a cup of water from the ocean, I can conclude that
   - ○ the temperatures are the same but the water in the cup has more energy.
   - → ○ the temperature of the water in the cup is the same as the temperature of the water in the ocean.
   - ○ the ocean temperature is higher because it has more molecules in it.
   - ○ the ocean temperature is higher because it never loses its heat.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Temperature and its measurement
Type: Conceptual
Multiple Choice Question
MC After I dip a cup of water from the ocean, I... Type: Definition

3. Heat is a form of energy, and it has long been known that heat energy will naturally flow
   - → ○ from hot to cold objects.
   - ○ from cold to hot objects.
   - ○ from solids to liquids, but only when the solid is melting.
   - ○ from liquids to solids, except when the solid is melting.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Heat and specific heat capacity
Type: Conceptual
Multiple Choice Question
MC Heat is a form of energy, and it has long be... Type: Definition

4. The amount of heat is often measured in calories. If I add 1 calorie of heat energy to 1 gram of water, the temperature of the water will
   - ○ decrease by 1°F.
   - ○ decrease by 1°C.
   - ○ stay the same, since water has a very high specific heat.
   - ○ increase by 1°F.
   - → ○ increase by 1°C.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Heat and specific heat capacity
Type: Conceptual
Multiple Choice Question
MC The amount of heat is often measured in calo... Type: Definition

5. On a cold winter's morning you awake and step out of bed. One foot is on the tile floor and the other is on a rug on the floor. Which statement is true?
   - ○ The tile feels colder because it is smoother than the rug.
   - ○ The tile feels colder because it is connected to the cold ground outside.
   - → ○ The tile feels colder because it conducts heat more rapidly away from your foot.
   - ○ The tile feels colder because it cannot absorb water like the rug can.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: The flow of heat
Type: Conceptual
Multiple Choice Question
MC On a cold winter's morning you awake...

Select 6. Two identical objects, one light colored and the other dark colored, are at the same elevated temperature, 50°C. You now place them in a dark, much cooler room. Which object will reach the room's temperature first?

- ○ The light colored object
- → ○ The dark colored object
- ○ Both reach room temperature at same time.
- ○ As strange as it seems, neither object will ever reach room temperature because energy conservation prevents the loss of energy.

Accessibility: Keyboard Navigation
Difficulty: Medium
Gradable: automatic
Multiple Choice Question
Topic: The flow of heat
MC Two identical objects, one light colored and...
Type: Conceptual

7. Two identical objects, one light colored and the other dark colored, are at the same cool temperature. Then, you place them outside, on a warm day, in direct sunlight. Which object will warm up faster?

- → ○ The dark one
- ○ The light one
- ○ Both warm up at the same rate.
- ○ As strange as it seems, neither object will ever warm up because energy conservation prevents the addition of energy.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: The flow of heat
MC Two identical objects, one light colored and...
Type: Conceptual

8. The lowest possible temperature a body can approach is called

- ○ "mighty" cold.
- → ○ absolute zero.
- ○ triple point.
- ○ critical temperature.
- ○ triple absolute zero.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Temperature and its measurement
Multiple Choice Question
Type: Conceptual
MC The lowest possible temperature a body can a...
Type: Definition

9. Water freezes at 273° on the _____ scale.

- ○ Fahrenheit
- ○ Celsius
- ○ Rankin
- → ○ Kelvin
- ○ Vernier

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Topic: Temperature and its measurement
Multiple Choice Question
Type: Conceptual
MC Water freezes at 273° on the _____ sc...
Type: Definition

10. When the temperature of the air in a balloon is raised, the volume of the balloon

- → ○ increases.
- ○ stays the same.
- ○ decreases.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: Gas behavior and the first law
MC When the temperature of the air in a balloon...
Type: Conceptual

Select 11. Objects A and B are at the same temperature. Object A now has its temperature increased by one Fahrenheit degree, while B has its temperature increased by one Kelvin degree. Which object now has higher temperature?

- ○ Object A.
- → ○ Object B.
- ○ Both have the same temperature.
- ○ It is impossible to tell from this data.

Multiple Choice Question
Accessibility: Keyboard Navigation
MC Objects A and B are at the same temperature....
Difficulty: Medium
Gradable: automatic
Topic: Temperature and its measurement

Type: Conceptual
Type: Definition

12. Which process does not transfer heat energy between objects?
    - ○ Convection.
    - ○ Radiation.
    - → ○ Reflection.
    - ○ Conduction.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: The flow of heat
Multiple Choice Question
Type: Conceptual
MC Which process does not transfer heat energy ...
Type: Definition

13. A mixture consists of 70 g of ice and 60 g of liquid water, both at 0°C. (The latent heat of fusion of water is 80 cal/g and the specific heat capacity of water is 1.0 cal/g C°.) The amount of heat that must be added to melt all of the ice is about
    - ○ 4000 cal.
    - → ○ 5600 cal.
    - ○ 21,600 cal.
    - ○ 32,400 cal.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: Heat and specific heat capacity
MC A mixture consists of 50 g of ice and 60 g o...
Type: Numerical

14. While studying for this quiz you realize that you still have 100 g of lukewarm coffee at 40°C left in a paper cup. When you pour 20 g of boiling water into the cup, the temperature of the resulting coffee-like mixture will be now
    - → ○ 50°C.
    - ○ 60°C.
    - ○ 67°C.
    - ○ 70°C.
    - ○ 80°C.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: Heat and specific heat capacity
MC While studying for this quiz you realize tha...
Type: Numerical

15. A box of graham crackers is labeled "120 Calories per serving." Assuming this means 120 kcal, and recalling that 4.16 J = 1 cal, the energy of a serving of the graham crackers is about
    - → ○ 5×10^5 J.
    - ○ 5×10^4 J.
    - ○ 4.2×10^3 J.
    - ○ 120 J.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: Joule's experiment and the first law of thermodynamics
MC A box of graham crackers is labeled 12...
Type: Numerical

16. The temperature of 100 g of water is to be raised from 10°C to 90°C. The energy needed to do this is about
    - ○ 1×10^3 cal.
    - ○ 5×10^3 cal.
    - ○ 6×10^3 cal.
    - → ○ 8×10^3 cal.
    - ○ 5.4×10^4 cal.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: Heat and specific heat capacity
MC The temperature of 100 g of water is to be ...
Type: Numerical

17. Which of the following temperatures is the lowest?
    - ○ 0°C.
    - → ○ 0°F.
    - ○ 263 K.
    - ○ All are the same.

Select

Multiple Choice Question
Accessibility: Keyboard Navigation
MC Which of the following temperatures is the l...
Difficulty: Medium

Gradable: automatic
Topic: Temperature and its measurement
Type: Numerical

18. Absolute zero is the temperature
    - ○ on the coldest day recorded at Nome, Alaska.
    - → ○ at which an ideal gas would exert zero pressure.
    - ○ of the freezing point of water.
    - ○ of the boiling point of liquid helium.
    - ○ of the freezing point of mercury.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Temperature and its measurement
Type: Conceptual
Multiple Choice Question
MC Absolute zero is the temperature
Type: Definition

19. Four samples of steel, lead, alcohol, and glass all have the same mass and are all initially at 20°C. After 100 calories of heat are added to each sample, the final temperatures are 38.2°C for the steel, 85.6°C for the lead, 23.4°C for the alcohol, and 30°C for the glass. Which of these four materials has the largest specific heat capacity?
    - ○ The steel.
    - ○ The lead.
    - → ○ The alcohol.
    - ○ The glass.
    - ○ All have the same heat capacity, since all absorbed 100 cal of heat.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Heat and specific heat capacity
Type: Conceptual
Multiple Choice Question
MC Four samples of steel, lead, alcohol, and gl...

20. On a cold day, a metal fence post feels colder to the touch than a tree. This sensation of different temperatures is explained by the fact that
    - ○ the temperature of the tree is higher.
    - ○ the specific heat capacity of the metal is higher.
    - ○ the specific heat capacity of the wood in the tree is higher.
    - → ○ the thermal conductivity of the metal is higher.
    - ○ the thermal conductivity of the wood in the tree is higher.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: The flow of heat
Type: Conceptual
Multiple Choice Question
MC On a cold day, a metal fence post feels cold...

21. The term *heat* in physics is
    - ○ equivalent to temperature.
    - ○ equivalent to internal energy.
    - → ○ energy transferred to a body because of a difference in temperature.
    - ○ any energy transferred to a body that raises the temperature of the body.
    - ○ the same as work.

Select

Accessibility: Keyboard Navigation
Difficulty: Medium
Gradable: automatic
Topic: Heat and specific heat capacity
Type: Conceptual
Multiple Choice Question
MC The term heat in physics is
Type: Definition

22. During the course of a demonstration the professor is called away. When he returns he finds a beaker of water that was at room temperature is now at a slightly higher temperature. There is a stirring rod on the desk and a cigarette lighter. The professor can assume that the temperature increase is due to
    - ○ heat added to the system.
    - ○ mechanical work done on the system.
    - → ○ either heat added or mechanical work done.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Joule's experiment and the first law of thermodynamics
Type: Conceptual
Multiple Choice Question
MC During the course of a demonstration the pro...

Select

23. Heat flows into a gas in a piston and the gas performs some work on its surroundings. The amount of work done is less than the heat added. In this situation,
    - ○ the internal energy of the gas decreased.
    - → ○ the internal energy of the gas increased.

○ the internal energy of the gas did not change.
○ the gas experienced a phase change.
○ energy is not conserved and so it cannot happen.

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: Joule's experiment and the first law of thermodynamics
MC Heat flows into a gas in a piston and the ga...
Type: Conceptual

24. Compare the internal energy of one gram of steam to that of one gram of water if both are at 100°C.
→ ○ The internal energy of the steam will be higher.
○ The internal energy of the water and steam are the same.
○ The internal energy of the water will be higher.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: Joule's experiment and the first law of thermodynamics
MC Compare the internal energy of one gram of s...
Type: Conceptual

25. An ice cube of mass 100 g and at 0°C is dropped into a Styrofoam cup containing 200 g of water at 25°C. (The latent heat of fusion of water is 80 cal/g and the specific heat capacity of water is 1.0 cal/g C°.) Assuming the cup does not exchange any heat with the outside, what will happen?
○ All of the water will freeze.
○ Some of the water will freeze.
○ Nothing will happen.
Select → ○ Some of the ice will melt.
○ All of the ice will melt.

Accessibility: Keyboard Navigation
Difficulty: Hard
Gradable: automatic
Multiple Choice Question
Topic: Heat and specific heat capacity
MC An ice cube of mass 100 g and at 0°C is ...
Type: Numerical

26. Heat is added to an ideal gas and the gas expands. In such a process the temperature
○ must always increase.
○ must always decrease.
→ ○ will remain the same if the work done equals the heat added.
○ will remain the same if the work done is less than the heat added.
Select ○ will remain the same if the work done exceeds the heat added.

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: Heat and specific heat capacity
MC Heat is added to an ideal gas and the gas ex...
Type: Conceptual

27. Hot cider is poured into a metal cup. Shortly thereafter the handle of the cup becomes hot. This is due to the process of
○ radiation.
○ convection.
→ ○ conduction.
Select ○ will remain the same if the work done exceeds the heat added.

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: The flow of heat
MC Hot cider is poured into a metal cup...
Type: Conceptual

28. A physics student has to make a choice in the color of paint to put on her geosynchronous communication satellite, MYSAT1. Considering most of its orbit is in sunlight, the decision of a light versus dark color paint will depend on which concept below?
→ ○ A light paint would be better for keeping the satellite cool in sunlight.
○ A dark paint would be better for keeping the satellite cool in sunlight.
○ A light paint would be better in the sunlight and in Earth's shadow for preventing overheating.
Select ○ A dark paint would overheat the satellite when it passes through Earth's shadow but not in sunlight.

Accessibility: Keyboard Navigation
Difficulty: Medium
Gradable: automatic
Multiple Choice Question
Topic: The flow of heat
MC A physics student has to make a choice in th...
Type: Conceptual

Select 29. Which of the following units is not an energy unit?
○ Joule
○ Kilowatt-hour

→ ○ Horsepower
○ Kilocalorie
○ Calorie

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Joule's experiment and the first law of thermodynamics
Type: Conceptual
Type: Definition

Multiple Choice Question
MC Which of the following units is not an energ...

30. The temperature of a 50 g sample of aluminum is raised from 20°C to 60°C when 440 cal of heat are added. The specific heat capacity of the aluminum is

○ not calculable from this data.
○ 0.11 cal/g C°.
○ 15.4 cal/g C°.
○ 0.91 cal/g C°.
→ ○ 0.22 cal/g C°.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Heat and specific heat capacity
Type: Numerical

Multiple Choice Question
MC The temperature of a 50 g sample of aluminum...

31. If you stand near a large fire, your face will be cooler if you place your hand between your face and the fire. Your hand is preventing heat flow by

○ latent heat.
○ conduction.
○ convection.
→ ○ radiation.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: The flow of heat
Type: Conceptual

Multiple Choice Question
MC If you stand near a large fire, your face wi...

32. Whenever a gas is compressed,

→ ○ work must be done on the gas.
○ its internal energy must get smaller.
○ heat must leave the gas.
○ the temperature of the gas must get smaller.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: Joule's experiment and the first law of thermodynamics
Type: Conceptual

Multiple Choice Question
MC Whenever a gas is compressed,

33. After working hard outside on a hot summer day, placing a towel soaked in cold water on your head can feel very good. The reason the towel feels cold to you is that

○ low temperature heat from the towel conducts to your head, lowering your temperature.
○ cold air radiates from the towel to your head.
○ cold air from the towel converts to your head.
→ ○ heat conducts from your head to the towel, lowering your temperature.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: The flow of heat
Type: Conceptual

Multiple Choice Question
MC After working hard outside on a hot summer d...

34. You lose your left sandal during a hot afternoon at the beach. Thus, you must hike back to your vehicle with one bare foot across the burning sand. Why does the bare foot get so much hotter?

→ ○ The sandal insulates the right foot from the hot sand.
○ The sandal conducts heat away from your right foot and into the sand.
○ The sandal is in the shadow of your foot, but the sand is not.
○ Heat flows from your right foot into your left foot and then out into the sand, thus cooling off your right foot.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Topic: The flow of heat
Type: Conceptual

Multiple Choice Question
MC You lose your left sandal during a hot after...

35. Which object is hotter?

→ ○ Object 1 at T = 0°C.

Select

○ Object 2 at T = 0°F.
○ Object 3 at T = 0 K.

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: Temperature and its measurement
MC Which object is hotter?
Type: Conceptual

36. The air at the beach is the same temperature everywhere, but you feel cooler under a beach umbrella because
○ the sand underneath you cools off more rapidly than the water vapor in the air.
○ the umbrella gets hot, which thereby cools off the air underneath it.
→ ○ solar radiation is not heating up your skin.
○ a convection cell forms under the umbrella, thereby cooling you off.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: The flow of heat
MC The air at the beach is the same temperature...
Type: Conceptual

37. When you apply an alcohol swab to your skin, it feels cool because
→ ○ your skin transfers a bit of heat to the liquid alcohol and the alcohol evaporates.
○ the density of alcohol is less than 1 g per cm^3.
○ germs are destroyed by the alcohol, and they give off cold heat as they die.
○ of nothing—it is an illusion, because evaporating alcohol is actually hotter than liquid alcohol.

Select

Accessibility: Keyboard Navigation
Difficulty: Easy
Gradable: automatic
Multiple Choice Question
Topic: The flow of heat
MC When you apply an alcohol swab to your skin,...
Type: Conceptual

38. An ice cube is floating in a glass of water with the water level just reaching the top of the glass. If the temperature in the surrounding area is above freezing, the ice cube will melt. When it does,
○ water will begin to spill over the top of the glass.
→ ○ the water level in the glass will remain unchanged as the ice continues to melt.
○ the water level in the glass will begin to go down.
○ it is impossible to tell what the water level will do from the information given.

Select

Accessibility: Keyboard Navigation
Difficulty: Medium
Gradable: automatic
Multiple Choice Question
Topic: Heat and specific heat capacity
MC An ice cube is floating in a glass of water ...
Type: Conceptual

39. Water in a dish is set on a table in an initially empty closed room and begins to evaporate. The temperature in the room will
→ ○ begin to increase.
○ begin to decrease.
○ remain the same.
○ not be able to be predicted based on the information given.

Select

Accessibility: Keyboard Navigation
Difficulty: Hard
Gradable: automatic
Multiple Choice Question
Topic: Joule's experiment and the first law of thermodynamics
MC Water in a dish is set on a table in an init...
Type: Conceptual

40. During a phase change the temperature of a system will be _____ as heat is added.
constant

Select

Difficulty: Easy
Gradable: automatic
Topic: Heat and specific heat capacity
Fill-in-the-Blank Question
Type: Conceptual
FB During a phase change the temperature of a s...
Type: Definition

41. The first law of thermodynamics is an extension of the principle of conservation of _____ that we first met in mechanics.
energy

Select

Fill-in-the-Blank Question
Gradable: automatic
FB The first law of thermodynamics is an extens...
Topic: Gas behavior and the first law

42. Heat will not be transferred between two bodies that are at the same _____.
temperature

Select

Fill-in-the-Blank Question
Difficulty: Easy
FB Heat will not be transferred between two bod...
Gradable: automatic

Topic: The flow of heat
Type: Conceptual

43. The transfer of heat from a furnace to the house through ducts is by the process of _____.
convection

Select

Difficulty: Easy
Gradable: automatic

Fill-in-the-Blank Question
FB The transfer of heat from a furnace to the h...

Topic: The flow of heat
Type: Conceptual

44. A student uses a thermometer calibrated in Kelvin units. A temperature change of 20 K is equivalent to a change of how many degrees on the Celsius scale? _____
20

Select

Difficulty: Easy
Gradable: automatic

Fill-in-the-Blank Question
FB A student uses a thermometer calibrated in K...

Topic: Temperature and its measurement
Type: Numerical

45. The internal energy of a system such as helium gas can be identified as the total mechanical energy of the _____.
atoms

Select

Difficulty: Easy
Gradable: automatic

Fill-in-the-Blank Question
FB The internal energy of a system such as heli...

Topic: Gas behavior and the first law
Type: Conceptual

46. When water boils, the primary form of heat flow in the water is _____ (conduction, convection, radiation).
convection

Select

Difficulty: Easy
Gradable: automatic

Fill-in-the-Blank Question
FB When water boils, the primary form of heat f...

Topic: The flow of heat
Type: Conceptual

47. When heat is added to a solid object, the _____ of the object must increase.
temperature

Select

Difficulty: Easy
Gradable: automatic

Fill-in-the-Blank Question
FB When heat is added to a solid object, the __...

Topic: The flow of heat
Type: Conceptual

48. The process in which some substances may remain in a liquid state even though their temperature may dip below the freezing point is known as _____.
supercooling

Select

Difficulty: Hard
Gradable: automatic

Fill-in-the-Blank Question
FB The process in which some substances may rem...

Topic: Gas behavior and the first law
Type: Conceptual
Type: Definition

49. Thermal-electric solar power stations typically experience fluctuations in available sunlight throughout the day, but can use _____ to smooth out electrical power levels to their customers.
phase-change materials

Select

Difficulty: Hard
Gradable: automatic

Fill-in-the-Blank Question
FB Thermal-electric solar power stations typica...

Topic: Gas behavior and the first law
Type: Conceptual
Type: Definition