

Chapter 1: Matter, Energy, and Heat Basics

MULTIPLE CHOICE

1. What is the correct definition of matter?
 - a. Anything that has weight and mass and occupies space.
 - b. A substance that has definite volume and sufficient mechanical strength to maintain a constant shape.
 - c. A substance that has neither definite volume nor definite shape.
 - d. A substance that has definite volume but does not have definite shapes.

ANS: A PTS: 1

2. What is correct definition of a solid?
 - a. Anything that has weight and mass and occupies space.
 - b. A substance that has definite volume and sufficient mechanical strength to maintain a constant shape.
 - c. A substance that has neither definite volume nor definite shape.
 - d. A substance that has definite volume but does not have definite shape.

ANS: B PTS: 1

3. What is correct definition of a liquid?
 - a. Anything that has weight and mass and occupies space.
 - b. A substance that has definite volume and sufficient mechanical strength to maintain a constant shape.
 - c. A substance that has neither definite volume nor definite shape.
 - d. A substance that has definite volume but does not have definite shapes.

ANS: D PTS: 1

4. What is the correct definition of a gas?
 - a. Anything that has weight and mass and occupies space.
 - b. A substance that has definite volume and sufficient mechanical strength to maintain a constant shape.
 - c. A substance that has neither definite volume nor definite shape.
 - d. A substance that has definite volume but does not have definite shapes.

ANS: C PTS: 1

5. What is the correct description of Boyle's law?
 - a. There is a definite relationship between the pressure and volume of a gas if the temperature is kept constant.
 - b. There is a definite relationship between the volume and temperature of a gas if the pressure is kept constant.
 - c. The total pressure of a confined mixture of different gases is equal to the sum of the pressure of each gas in the mixture.
 - d. Energy can be changed in form but cannot be created or destroyed.

ANS: A PTS: 1

6. What is the correct description of Dalton's law?
 - a. There is a definite relationship between the pressure and volume of a gas if the temperature is kept constant.

- b. There is a definite relationship between the volume and temperature of a gas if the pressure is kept constant.
- c. The total pressure of a confined mixture of different gases is equal to the sum of the pressure of each gas in the mixture.
- d. Energy can be changed in form but cannot be created or destroyed.

ANS: C PTS: 1

7. What is the correct description of Charles' law?
- a. There is a definite relationship between the pressure and volume of a gas if the temperature is kept constant.
 - b. There is a definite relationship between the volume and temperature of a gas if the pressure is kept constant.
 - c. The total pressure of a confined mixture of different gases is equal to the sum of the pressure of each gas in the mixture.
 - d. Energy can be changed in form but cannot be created or destroyed.

ANS: B PTS: 1

8. The ability or capacity to do work is the description for which term?
- a. Energy
 - b. Power
 - c. Horsepower
 - d. None of the above

ANS: A PTS: 1

9. The force exerted on an object times the distance the object is moved, measured in foot-pounds, is the definition of which term?
- a. Energy
 - b. Power
 - c. Horsepower
 - d. Work

ANS: D PTS: 1

10. ____ is the rate of doing work.
- a. Energy
 - b. Power
 - c. Horsepower
 - d. Work

ANS: B PTS: 1

11. On a Fahrenheit scale, water boils at ____ degrees and freezes at ____ degrees.
- a. 100 and 0
 - b. 212 and 32
 - c. 220 and 30
 - d. 150 and 0

ANS: B PTS: 1

12. On a Celsius scale, water boils at ____ degrees and freezes at ____ degrees.
- a. 100 and 0
 - b. 212 and 32
 - c. 220 and 30

d. 150 and 0

ANS: A PTS: 1

13. On the Fahrenheit scale, absolute zero, or the temperature at which all molecular movement stops, is _____ degrees.

a. 0
b. -273
c. -460
d. -273

ANS: C PTS: 1

14. Which description best describes heat transfer by convection ?

a. A cooking pot heated on an electric stove element.
b. Heat rising from a baseboard heater.
c. Heat from the sun.
d. All of the above.

ANS: B PTS: 1

15. Which description best describes heat transfer by conduction?

a. A cooking pot heated on an electric stove element.
b. Heat rising of a baseboard heater.
c. Heat from the sun.
d. All of the above.

ANS: A PTS: 1

16. Which description best describes heat transfer by radiation?

a. Water heated in a pot on an electric stove element.
b. Heat rising of a baseboard heater.
c. Heat from the sun.
d. All of the above.

ANS: C PTS: 1

17. Changing 32 degree water to 32 degree ice involves which type of heat?

a. Latent
b. Sensible
c. Both
d. Neither

ANS: A PTS: 1

18. Atmospheric pressure at sea level is _____.

a. 0 psia
b. 14.7 psia
c. 12 psig
d. -14.7 psig

ANS: B PTS: 1

19. On a psig gauge, "0" is actually _____.

a. 0 psia
b. 14.7 psia

- c. 12 pisa
- d. -14.7 psia

ANS: B PTS: 1

20. Vacuum is measured in which increments?

- a. Inches of Hg
- b. psig
- c. psia
- d. cfm

ANS: A PTS: 1

21. How Btus must be removed from one pound of 32 degree water to change it to one pound of 32 degree ice?

- a. 16
- b. 144
- c. 180
- d. 970

ANS: B PTS: 1

22. Approximately how many Btus does it take to change one pound of 212 degree water into one pound of 212 degree steam?

- a. 16
- b. 144
- c. 180
- d. 970

ANS: D PTS: 1

23. The amount of power consumed is directly related to the amount of work done. If we can reduce the amount of work required to heat or cool a structure, we will _____.

- a. generate power
- b. maximize power
- c. save power
- d. waste power

ANS: C PTS: 1

24. Ineffective heat transfer can result in _____.

- a. poor indoor air quality
- b. poor outdoor air quality
- c. reduced power consumption
- d. increased atmospheric pressure

ANS: A PTS: 1

SHORT ANSWER

1. List the three laws of physics.

ANS:

Boyle's law, Charles' law, Dalton's law

PTS: 1

2. What does the acronym Btu stand for when referring to heat transfer?

ANS:

British thermal unit

PTS: 1

3. What is the definition of a Btu?

ANS:

The amount of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit.

PTS: 1