Chapter 2 HVAC Fundamentals

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1)

Name the three energy forms (not fuels) used in building environmental systems

A. _____

B. _____

C. _____

1)

_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

2)

How many Btu are required to heat 2 lbs. of water by 4°F?

2)

_____

A)

4

B)

8

C)

2

D)

6

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

3)

Btu is a (quantity of heat _____ / rate of heat flow _____). Btuh is a (quantity of heat _____ / rate of heat flow _____).

3)

_____

4)

kW is a (quantity of electricity _____ / rate of electric power _____). KWH is a (quantity of electricity _____ / rate of electric power _____).

4)

_____

5)
Match these heating fuels with their likely utilization efficiency.
300% 100% 80%

A. Natural gas _____% efficient
B. Electric _____% efficient
C. Electric heat pump _____% efficient

5)

_____

6)
List these heating fuels in order of their cost per mmBtu. Highest cost no. 1; next highest, no. 2; etc.
A. _____ Natural gas
B. _____ Electric heat pump
C. _____ Propane
D. _____ Electric resistance

6)

_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.
7)
Pick the two terms which are synonymous.

7)

_____
A)
Humidity ratio

B)

Relative humidity

C)

Absolute humidity

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.
8)
Wet-bulb temperature is generally (higher _____ / lower _____) than dry-bulb temperature.

8)

_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.
9)
If wet-bulb temperature is equal to dry-bulb temperature, the air is _____. Select all that apply.

9)

_____
A)
Isenthalpic.

B)

Adiabatically conditioned.
C)
100% relative humidity.

D)

Saturated.

10)
A horizontal move to the right on the psychrometric chart corresponds to which of the following?
Select all that apply.

10)

_____
A)
A decrease in specific volume.

B)

An increase in enthalpy.
C)
A decrease in density.

D)

A decrease in humidity ratio.
E)
A decrease in relative humidity.

F)

A decrease in dewpoint.

11)
A horizontal move to the left on the psychrometric chart corresponds to which of the following?
Select all that apply.

11)

_____
A)
A decrease in specific volume.

B)

An increase in enthalpy.

C)

A decrease in density.

D)

A decrease in humidity ratio.

E)

A decrease in relative humidity.

F)

A decrease in dewpoint.

12)

A vertical move upward on the psychrometric chart corresponds to which of the following?
Select all that apply.

12)

_____

A)

A decrease in specific volume.

B)

An increase in enthalpy.

C)

A decrease in density.

D)

A decrease in humidity ratio.

E)

A decrease in relative humidity.

F)

A decrease in dewpoint.

13)

A vertical move downward on the psychrometric chart corresponds to which of the following?
Select all that apply.

13)

_____

A)

A decrease in specific volume.

B)

An increase in enthalpy.

C)

A decrease in density.

D)

A decrease in humidity ratio.

E)

A decrease in relative humidity.

F)

A decrease in dewpoint.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

14)

Fill in the right units of measure for these quantities

A. Air pressure in a duct _____
B. Water pressure in a pipe _____
C. Air velocity in a duct _____
D. Water velocity in a pipe _____

14)

_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

15)

Which of the following equations is correct to calculate sensible heat flow by air?

15)

_____

A)

$Q = 500 * GPM * \Delta T$

B)

$Q = 4.5 * CFM * \Delta H$

C)

$Q = 1.1 * CFM * \Delta T$

D)

$Q = 4840 * CFM * \Delta W$

16)

Which of the following equations is correct to calculate heat flow by water?

16)

_____

A)
Q = 500 * GPM * ΔT

B)

Q = 4.5 * CFM * ΔH

C)
Q = 1.1 * CFM * ΔT

D)

Q = 4840 * CFM * ΔW

17)
Which of the following equations is correct to calculate latent heat flow by air?

17)

_____

A)
Q = 500 * GPM * ΔT

B)

Q = 4.5 * CFM * ΔH

C)
Q = 1.1 * CFM * ΔT

D)

Q = 4840 * CFM * ΔW

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

18)
Name the four parameters that affect comfort
A. _____
B. _____
C. _____
D. _____

18)

_____

1)

A. Thermal, or heat
B. Electrical
C. Mechanical

2)
B

3)
Btu is a (quantity of heat). Btuh is a (rate of heat flow).

4)

kW is a (rate of electric power). KWH is a (quantity of electricity).

5)

A. Natural gas ___80___% efficient
B. Electric ___100___% efficient
C. Electric heat pump ___300___% efficient

6)

A. ___3___ Natural gas
B. ___4___ Electric heat pump
C. ___1___ Propane
D. ___2___ Electric resistance

7)

A, C

8)

Wet-bulb temperature is generally (lower) than dry-bulb temperature.

9)

C, D

10)

B, C, E

11)

A

12)

B, C

13)

A, D, E, F

14)

A. in. w.c.
B. ft. of head or psi
C. ft./min.
D. ft./sec.

15)

C

16)

A

17)

D

18)

A. Temperature
B. Air flow
C. Humidity
D. Radiation