Student name:_____

TRUE/FALSE - Write 'T' if the statement is true and 'F' if the statement is false.

1) The more toxic the pollutant, the higher the concentration is set when concerning air quality standards.

- ⊙ true
- ⊙ false

2) Even though the concentration of air pollution has gone down over time, people in some metropolitan areas still breath are that contains unhealthy levels of pollutants.

- ⊙ true
- ⊙ false

CHECK ALL THAT APPLY. Choose all options that best completes the statement or answers the question.

3) Which of the following are examples of technological advances that have reduced air pollution?

A) Paint with reduced VOCs
B) Catalytic converters
C) Burning gasoline in leaf blowers
D) Low sulfur diesel fuels

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

4) Of five major gaseous components of air, which is the only one to vary significantly in concentration from place to place and from day to day?

A) Water vapor
B) Carbon dioxide
C) Nitrogen
D) Argon

5) Which two gases make up more than 95 percent of an inhaled breath?

A) NO_2 and N_2
B) CO_2 and O_2
C) O_2 and N_2
D) N_2 and Ar

6) What is the primary component of an exhaled breath?

A) N_2
B) O_2
C) CO_2
D) H_2O

7) Which component of the air makes up approximately 100 times more of an exhaled breath than of an inhaled breath?

A) Ar
B) O_2
C) O_3
D) CO_2

8) The _____ concentration in the air over the desert differs dramatically from that in the air in the tropical rainforest.

A) N_2
B) O_2
C) CO_2
D) H_2O

9) Which component of the air is an element?

A) H_2O
B) NO_2
C) O_2
D) CO_2

10) Air is a(n)

A) element.
B) compound.

C) mixture.
D) pure substance.

11) Which substance is not considered to be an air pollutant?

A) N_2
B) SO_2
C) NO_2
D) O_3

12) Ozone is considered an air pollutant in the _____ but is a valuable protective layer in the _____.

A) troposphere; stratosphere
B) stratosphere; mesosphere
C) stratosphere; troposphere
D) mesosphere; stratosphere

13) A particular sample of air is 2.5 percent water vapor. Express the concentration of water vapor in parts per million (ppm).

A) 0.0000025 ppm
B) 0.025 ppm
C) 250 ppm
D) 25000 ppm

14) The EPA limit for CO is 9 ppm. Express this number as a percentage.

A) 90 percent
B) 9 percent
C) 0.09 percent
D) 0.0009 percent

15) Which pollutant is present in air as particulate matter?

A) Soot
B) Ozone
C) Sulfur dioxide

D) Carbon monoxide

16) What two factors are considered when determining the risk assessment for air pollutants?

A) Exposure and ppm
B) Percentage and ppm
C) Toxicity and percentage
D) Toxicity and exposure

17) When assessing the risk of an air pollutant, which does not play a role in considering someone's exposure to the pollutant?

A) A person's lung capacity
B) A person's breathing rate
C) The toxicity of the pollutant
D) The concentration in air of the pollutant

18) The burning of coal produces sulfur dioxide, SO_2, a pollutant that slowly reacts in air to form SO_3. Sulfur trioxide dissolves into airborne water droplets to form a very corrosive solution of sulfuric acid. Which is a product of burning coal that hastens the transformation of sulfur dioxide into sulfur trioxide?

A) Carbon dioxide
B) Carbon monoxide
C) Nitrogen dioxide
D) Particles of ash

19) All of these pollutants can be detected by their odors except

A) CO.
B) O_3.
C) SO_x.
D) NO_x.

20) Which pollutant are you more likely to encounter in dangerous concentrations indoors rather than outdoors?

A) Nitrogen dioxide
B) Carbon monoxide
C) Ozone
D) Sulfur dioxide

21) In general, which airborne material is not likely to be affected by the filters or indoor air handling equipment?

A) Particulates
B) Pollen
C) Soot
D) Carbon monoxide

22) Which color, as used in the Air Quality Index, warns that the level of a pollutant is hazardous, the most dangerous level?

A) Orange
B) Green
C) Yellow
D) Maroon

23) Based on its name, which carbon compound contains the fewest carbon atoms?

A) Ethanol
B) Methane
C) Chlorobutane
D) Propyl alcohol

24) P_2O_5 is the chemical formula for

A) pentoxygen diphosphide.
B) diphosphorus pentoxide.
C) dioxygen pentaphosphide.
D) monophosphorus pentoxide.

25) The name of the compound formed by combining carbon atoms  with oxygen atoms  to form  is

A) carbon oxide.
B) monocarbon dioxide.
C) carbon dioxide.
D) carbonate.

26) Choose the proper coefficients for each substance to balance this equation.

___ $C_2H_4(g)$ + ___ $O_2(g)$ → ___ $CO_2(g)$ + ___ $H_2O(g)$

A) 1, 1, 2, 2
B) 1, 3, 2, 2
C) 2, 3, 4, 2
D) 2, 2, 4, 2

27) Choose the proper coefficients for each substance to yield a balanced equation.

A) 1, 1, 1
B) 2, 1, 1
C) 2, 1, 2
D) 1, 1, 2

28) Which is the balanced chemical equation showing hydrogen peroxide (H_2O_2) decomposing into hydrogen (H_2) and oxygen (O_2)?

A) $H_2O_2 \rightarrow H_2 + O_2$
B) $H_2 + O_2 \rightarrow H_2O_2$
C) $2\ H_2 + O_2 \rightarrow 2\ H_2O_2$
D) $2\ H_2O_2 \rightarrow 2\ H_2 + O_2$

29) Which is the balanced chemical equation for the reaction of nitrogen (N_2) with oxygen (O_2) to form NO?

A) $2\ NO \rightarrow N_2 +$

O_2

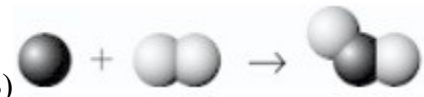
B) $N_2 + O_2 \rightarrow NO$

C) $N_2 + O_2 \rightarrow 2\ NO$

D) $NO \rightarrow N_2 + O_2$

30) Which shows the balanced equation for the reaction of nitrogen ( ), as it is normally found in our atmosphere, with oxygen ( ), as it is normally found in our atmosphere, to form nitrogen dioxide?

A) 

B) 

C)

D) 

31) Green chemistry is

A) the study of how to improve the production of oxygen via photosynthesis.

B) any chemistry having an agricultural base.

C) the cause of the higher temperatures and humidity typically found in greenhouses.

D) the design of products and processes that reduce hazardous substances.

32) Catalytic converters reduce the amount of _____ in car exhaust.

A) O_3

B) CO_2

C) CO

D) N_2

33) Ozone is a secondary pollutant. A secondary pollutant is

A) not as hazardous as a primary pollutant.
B) not produced directly but as the product of the interaction of two or more pollutants.
C) one that is naturally present in our atmosphere.
D) one that is less hazardous than a primary pollutant.

34) There are approximately 2×10^{22} molecules and atoms in each breath we take and the concentration of CO in the air is approximately 9 parts per million. Approximately how many CO molecules are in each breath we take?

A) 2×10^{15}
B) 1.8×10^{17}
C) 2×10^{16}
D) 2×10^{29}

35) Which of the following would be described as "fine particles"?

A) SO_x
B) NO_x
C) O_3
D) 2.5 μm diameter soot

36) The lowest (or closest to the ground) layer of our atmosphere is the

A) troposphere.
B) ozone layer.
C) stratosphere.
D) mesosphere.

37) Balance this equation $P_4 + Cl_2 \rightarrow PCl_5$ with the smallest whole number coefficients. Choose the answer that is the sum of the coefficients. (Do not forget coefficients of "one.")

A) 7
B) 9
C) 11

D) 13
E) 15

38) If 500 mL of air contains 2×10^{22} particles (atoms and molecules), how many particles do you inhale in one day if you breathe 15000 L of air?

A) 2×10^{22}
B) 6×10^{26}
C) 1.2×10^{27}
D) 5×10^{24}

39) If we assume that the top of Mt. Everest is the highest land mass on earth, hikers who scale its summit are standing in the

A) mesosphere.
B) stratosphere.
C) troposphere.
D) ozone layer.

40) The chemical formula for nitrogen monoxide is

A) N_2O.
B) NO.
C) NO_2.
D) N_2O_3.

41) Which correctly pairs an indoor pollutant with its source?

A) Formaldehyde and unvented space heaters
B) O_3 and electrical arcing
C) Radon and glues and solvents
D) Nicotine and paint and paint thinners

42) An inversion layer happens when a certain weather pattern traps cooler air near the surface of the earth with a warmer air mass above it. Why is this a problem?

A) Excess precipitation could cause flooding.
B) The cold air increases the chance for snowstorms.
C) Heatwaves can occur.
D) Air pollution concentrates in the inversion layer.

43) What is the chemical formula for carbon disulfide?

A) CH_4
B) CS_2
C) C_2H_6
D) H_2SO_4

44) A reaction occurs between 6 molecules of H_2 and four molecules of O_2 to form 6 molecules of H_2O, in which one molecule of oxygen is left over:

$6\ H_2 + 4\ O_2 \rightarrow 6\ H_2O + O_2$

Which is the limiting reagent?

A) H_2
B) O_2
C) H_2O
D) None of the above

45) Currently, the primary source of sulfur dioxide emissions into the atmosphere is

A) coal burning power plants.
B) diesel trucks.
C) plastic manufacturing.
D) gasoline-powered lawnmowers.

46) Which is the correct balanced equation for the complete combustion of ethane, C_2H_6, in excess oxygen?

A) $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$
B) $2\ CH_4 + 3\ O_2 \rightarrow 2\ CO + 4\ H_2O$
C) $2C_2H_6 + 7\ O_2 \rightarrow 4\ CO_2 + 6\ H_2O$
D) $2\ C_2H_6 + 5\ O_2 \rightarrow 4\ CO + 6\ H_2O$

47) Which chemical components are given off in car exhaust?

A) CO_2

B) H_2O
C) NO_x
D) All of these choices are correct

48) In metropolitan areas, the concentration of ozone in the atmosphere drops at night. Why?

A) Wind blows away the ozone at night
B) Energy usage goes down at night
C) There are less cars on the road at night
D) The formation of ozone requires sunlight

49) Which air pollutant is the second-leading cause of lung cancer worldwide, behind tobacco smoke?

A) Radon
B) Ozone
C) Carbon monoxide
D) Nitrogen oxides

50) What is the greatest source of indoor air pollution in developing countries?

A) Unvented space heaters
B) Cookstoves
C) Automobiles
D) Paint

Answer Key

Test name: CH2

1) FALSE

2) TRUE

3) [A, B, D]

4) A

5) C

6) A

7) D

8) D

9) C

10) C

11) A

12) A

13) D

14) D

15) A

16) D

17) C

18) D

19) A

20) B

21) D

22) D

23) B

24) B

25) C

26) B

27) C

28) A

29) C

30) C

31) D

32) C

33) B

34) B

35) D

36) A

37) E

38) B

39) C

40) B

41) B

42) D

43) B

44) A

45) A

46) C

47) D

48) D

49) A

50) B