أهلا يا أصدقاء💓.

جمعت لكم حلول الاسسمنت
الموجود نهاية كل توبيك ، اعتذر
اذا كان فيها اي غلط.

- ودعواتكم لي ولكل شخص
ساعدني فيها💓.

Chapter 1

Assessment

1- The process is which a solid substance is transformed directly into a gas is called _____ and it requires _____ of temperature.

2- _____ is the physical process which changes a gas into a liquid, and it needs _____ of temperature.

3- Which state of matter has a fixed volume but not a fixed shape.

4- A_____ matter is able to assume both the shape and volume of its container.

5- The ability of both _____ and _____ states of matter to flow makes them able to change their shape to the shape of their reservoir.

6- Classify each substance as a pure substance or a mixture, and indicate the type of each of them (element, compound or homogeneous, heterogeneous):

a. sweat	b. carbon dioxide	c. aluminum	d. salt	e. rust
f. wet sand	g. air	h. oxygen gas	i. bronze alloy	j. honey

Assessment

Answer the following questions:

1- The process is which a solid substance is transformed directly into a gas is called Sub Sublimation and it requires increas of temperature.

2- Condensing is the physical process which changes a gas into a liquid, and it needs decreas of temperature.

3- Which state of matter has a fixed volume but not a fixed shape. liquid

4- A gasses matter is able to assume both the shape and volume of its container.

5- The ability of both liquid and gas states of matter to flow makes them able to change their shape to the shape of their reservoir.

6- Classify each substance as a pure substance or a mixture, and indicate the type of each of them (element, compound or homogeneous, heterogeneous):

a. sweat homogous b. carbon dioxide compound c. aluminum element d. sand compound heterogeneous e. rust compound [iron+O_2]

f. wet sand hetrogenous g. air homogous compound h. oxygen gas O_2 → element i. bronze alloy hetrogous homogeneous j. honey homogous

Assessment

Identify the following as chemical or physical changes or properties:

1. blue color
2. melting point
3. density
4. reaction with water
5. flammability
6. hardness
7. toxicity
8. boiling point
9. reaction with acid
10. luster
11. perfume odor
12. sour taste
13. coal Burns
14. dry ice sublimes
15. Ag (Silver) tarnishes
16. milk sours
17. an apple is cut
18. fruit rot
19. heat changes H_2O to steam
20. pancakes cook
21. baking soda reacts to vinegar
22. grass grows
23. iron rusts
24. a tire is inflated
25. alcohol evaporates
26. food is digested
27. ice melts
28. paper absorbs water

Identify the following as chemical or physical changes or properties:

1. blue color
   Physical Property
2. melting point
   Physical Properties
3. density
   Physical Properties
4. reaction with water
   chemical Properties
5. flammability
   chemical Properties
6. hardness
   Physical Properties
7. toxicity
   chemical Properties
8. boiling point
   Physical Properties
9. reaction with acid
   chemical Properties
10. luster
    Physical Property
11. perfume odor
    Physical Properties
12. sour taste
    Physical Properties
13. coal Burns
    chemical changes
14. dry ice sublimes
    physical changes
15. Ag (Silver) tarnishes
    chemical changes
16. milk sours
    chemical changes
17. an apple is cut
    Physical changes
18. fruit rot
    chemical changes
19. heat changes H_2O to steam
    Physical changes
20. pancakes cook
    chemical changes
21. baking soda reacts to vinegar
    chemical changes
22. grass grows
    chemical changes
23. iron rusts
    chemical changes
24. a tire is inflated
    Physical changes
25. alcohol evaporates
    Physical changes
26. food is digested
    chemical changes
27. ice melts
    Physical changes
28. paper absorbs water
    Physical changes

Assessment

1- Do the following conversions:

a. 55 m = ... km = ... cm

b. 11 s = ... ms = ... ks

c. 2.7 g = ... pg = ... ng

d. 3.6 L = ... mL = ... µL

2- Express the temperature −56 °F in both °C and K.

3- Perform each of the following unit conversions:

a. 13.53 m to yd

b. 2.87 kg to lb

c. 2.45 L to qt

d. 123.7 mm to in

4- Calculate the density of penny that has a mass of 2.49 g and a volume of 0.349 cm^3.

1- Do the following conversions:

a. 55 m = 55×10^{-3} km = 55×10^{2} cm

b. 11 s = 11×10^{3} ms = 11×10^{-3} ks

c. 2.7 g = 2.7×10^{12} pg = 2.7×10^{9} ng

d. 3.6 L = 3.6×10^{3} mL = 3.6×10^{6} µL

2- Express the temperature −56 °F in both °C and K. $°C = \frac{(°F-32)}{1.8} = \frac{(-56-32)}{1.8}$

$°C = -48.9$

3- Perform each of the following unit conversions:

2.45 L → qt

1 L → 1.06 qt

$x = \frac{2.45\times1.06}{1}$

x = 2.6 qt

a. 13.53 m to yd

13.53 m → yd

1 m → 1.09 yd

$x = \frac{13.53\times1.09}{1} = 14.74$ yd

b. 2.87 kg to lb

2.87 kg → lb

1 kg → 2.21 lb

$x = \frac{2.87\times2.21}{1} = 6.34$ lb

c. 2.45 L to qt

d. 123.7 mm to in

123.7 mm → m

123.7×10^{-3} m

123.7×10^{-3} m → in

1 m → 39.4 in

$x = \frac{123.7\times10^{-3}\times39.4}{1}$

x = 4.9 in

4- Calculate the density of penny that has a mass of 2.49 g and a volume of 0.349 cm^3.

$D = \frac{m}{v} = \frac{2.49}{0.349}$

$D = 7.134\ g/cm^3$

Chapter 2

Assessment

Answer the following questions:

1- Fill in the blanks to complete the table:

Symbol	Z	A	Number of p	Number of e⁻	Number of n	Charge
_____	8	_____	_____	_____	8	2–
Ca^{2+}	20	_____	_____	_____	20	_____
Mg^{2+}	_____	25	_____	_____	13	2+
N^{3-}	_____	14	_____	10	_____	_____

2- Determine the number of p^+, n^0, and e^- in each atom:

a. $^{14}_{7}N$ **b.** $^{23}_{11}Na$ **c.** $^{222}_{86}Rn$ **d.** $^{208}_{82}Pb$

3- Determine the number of protons and the number of electrons in each ion:

a. Ni^{2+} **b.** S^{2-} **c.** Br^- **d.** Cr^{3+}

4- Write isotopic symbols of the form $^{A}_{Z}X$ for each isotope:

a. the copper isotope with **36** neutrons

b. the oxygen isotope with **8** neutrons

c. the aluminum isotope with **14** neutrons

d. the iodine isotope with **74** neutrons

Assessment

Answer the following questions:

1- Fill in the blanks to complete the table:

Symbol	Z	A	Number of p	Number of e⁻	Number of n	Charge
O^{2-}	8	8+8=16	8	8+2=10	8	2-
Ca^{2+}	20	20+20=40	20	20-2=18	20	2+
Mg^{2+}	12	25	12	12-2=10	13	2+
N^{3-}	7	14	7	10	14-7=7	3-

2- Determine the number of p^+, n^0, and e^- in each atom:

a. $^{14}_{7}N$ p=7 n=7 e=7

b. $^{23}_{11}Na$ p=11 n=12 e=11

c. $^{222}_{86}Rn$ p=86 n=136 e=86

d. $^{208}_{82}Pb$ p=82 e=82 n=126

3- Determine the number of protons and the number of electrons in each ion:

a. Ni^{2+} p=28 e=26

b. S^{2-} p=16 e=18

c. Br^- p=35 e=36

d. Cr^{3+} p=24 e=21

4- Write isotopic symbols of the form $^{A}_{Z}X$ for each isotope:

a. the copper isotope with **36** neutrons $^{65}_{29}Cu$

b. the oxygen isotope with **8** neutrons $^{16}_{8}O$

c. the aluminum isotope with **14** neutrons $^{27}_{13}Al$

d. the iodine isotope with **74** neutrons $^{127}_{53}I$

Assessment

Answer the following questions:

Isotope	Abundance	Mass
^{53}X	25.00 %	52.62
^{56}X	37.00 %	56.29
^{58}X	38.00 %	58.31

1- Element X has three isotopes (see the table), the atomic mass of this element is _____ amu.

2- Which pairs of elements do you expect to be similar? Why?

a. N and Ne b. Mo and Sr c. Ar and Kr d. Cl and I e. P and Pd

3- Determine whether or not each element is a main-group element:

a. tellurium b. potassium c. vanadium d. manganese

4- Predict the charge of the monoatomic ion formed by each element:

a. O b. K c. Al d. Rb e. N

5- Using a copy of the periodic table, write the name of each element and classify it as a metal, nonmetal, or metalloid:

a. Na b. Mg c. Br d. N e. As

6- Using a copy of the periodic table, classify each element as an alkali metal, alkaline earth metal, halogen, or noble gas:

a. sodium b. iodine c. calcium d. barium e. krypton

Assessment

Answer the following questions:

Isotope	Abundance	Mass
^{53}X	25.00 %	52.62
^{56}X	37.00 %	56.29
^{58}X	38.00 %	58.31

$(\frac{25}{100} \times 52.62) + (\frac{37}{100} \times 56.29) + (\frac{38}{100} \times 58.31) = 56\text{ amu}$

1- Element X has three isotopes (see the table), the atomic mass of this element is _____ amu.

2- Which pairs of elements do you expect to be similar? Why? Because they are from the same group.

a. N and Ne b. Mo and Sr (c.) Ar and Kr (d.) Cl and I e. P and Pd

3- Determine whether or not each element is a main-group element:

a. tellurium (Main element) b. potassium (Main element) c. vanadium (transitional) d. manganese (transitional)

4- Predict the charge of the monoatomic ion formed by each element:

a. O^{2-} b. K^{1+} c. Al^{3+} d. Rb^{1+} e. N^{3-}

5- Using a copy of the periodic table, write the name of each element and classify it as a metal, nonmetal, or metalloid:

a. Na (Sodium, metal) b. Mg (Magnesium, Metal) c. Br (Bromine, nonmetal) d. N (Nitrogen, nonmetal) e. As (Arsenic, metalloid)

6- Using a copy of the periodic table, classify each element as an alkali metal, alkaline earth metal, halogen, or noble gas:

a. sodium (Alkali metal) b. iodine (Halogen) c. calcium (Alkaline earth metal) d. barium (Alkaline earth metal) e. krypton (Noble gases)

Assessment

Answer the following questions:

1- Name an element in the fourth period of the periodic table with:

a. five valence electrons b. a complete outer shell

2- Write full orbital diagrams for each element:

a. N b. F c. Mg d. Al e. K

3- Determine the number of valence electrons in each element.

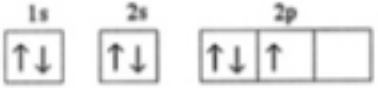
a. Ba b. Cs c. Ne d. S e. C

4- The complete electron configuration of sulfur is _____.

A) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$ B) $1s^2\ 2s^2\ 2p^{10}\ 3s^2$

C) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2\ 4p^2$ E) $1s^4\ 2s^4 2\ p^6\ 3s^2$

5- Which one of the following is the correct electron configuration for a ground-state nitrogen atom?

A) 

B) 

C) 

D) 

Assessment

Answer the following questions:

1- **Name an element in the fourth period of the periodic table with:**

a. five valence electrons As b. a complete outer shell Kr

2- **Write full orbital diagrams for each element:**

a. N b. F c. Mg d. Al e. K

3- **Determine the number of valence electrons in each element.**

a. Ba 2 b. Cs 1 c. Ne 8 d. S 6 e. C 4

4- **The complete electron configuration of sulfur is _____.**

A) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$ B) $1s^2\ 2s^2\ 2p^{10}\ 3s^2$

C) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^{10}\ 4s^2\ 4p^2$ E) $1s^4\ 2s^4 2\ p^6\ 3s^2$

5- **Which one of the following is the correct electron configuration for a ground-state nitrogen atom?**

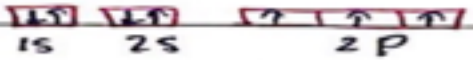
A) 

B) 

C) 

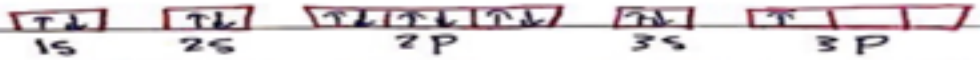
D) 

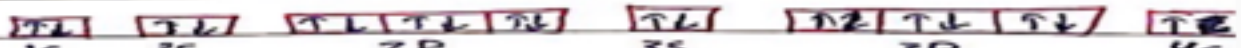
حل سؤال ٢

a- N_7 ; 

b. F_9 ; 

c. Mg_{12} : 

d. Al_{13} : 

e. K_{19} : 

Assessment

Answer the following questions:

1. Arrange these elements: Mg, Na, Cl, Ar, Si, and P, in order of:

a. decreasing atomic radius.
b. increasing ionization energy.
c. decreasing electronegativity.
d. increasing metallic character

2. Choose the more metallic element from each pair:

a. Sr or Sb
b. Be or Ba
c. Ti or Cu
d. S or Si

3. Choose the largest atom from each pair:

a. Al or Cl
b. Si or C
c. S or Se
d. Ne or Xe

4. Arrange the elements in order of increasing atomic radius: Ca, Sc, As, Co, Fe.

5. Arrange these elements in order of increasing electronegativity: C, N, O, Be, B.

6. Define each term and indicate what happens for each of them when moving right to left within a period of the periodic table?

a. Electronegativity
b. Ionization energy
c. Atomic radius
d. Metallic character
e. Electron affinity

Assessment

Answer the following questions:

1. Arrange these elements: Mg, Na, Cl, Ar, Si, and P, in order of:

a. decreasing atomic radius. Na → Mg → Si → P → Cl → Ar

b. increasing ionization energy. Na → Mg → Si → P → Cl → Ar

c. decreasing electronegativity. Ar → Cl → P → Si → Mg → Na

d. increasing metallic character Ar → Cl → P → Si → Mg → Na

2. Choose the more metallic element from each pair:

a. Sr or Sb b. Be or Ba c. Ti or Cu d. S or Si

3. Choose the largest atom from each pair:

a. Al or Cl b. Si or C c. S or Se d. Ne or Xe

4. Arrange the elements in order of increasing atomic radius: Ca, Sc, As, Co, Fe.

As → Co → Fe → Sc → Ca

5. Arrange these elements in order of increasing electronegativity: C, N, O, Be, B.

Be → B → C → N → O

6. Define each term and indicate what happens for each of them when moving right to left within a period of the periodic table?

a. Electronegativity decrease b. Ionization energy → decrease c. Atomic radius increase

d. Metallic character increase e. Electron affinity decrease

Chapter 3

Assessment

Classify the following substances as: Atomic Elements, Molecular Elements, Molecular compounds, or Ionic Compounds:

a. Barium, Ba .....

b. Iron (III) chloride, $FeCl_3$ .....

c. Bromine, Br_2 .....

d. Ethanol, C_2H_6O .....

e. Nitrogen monoxide, NO .....

f. Cobalt, Co .....

g. Carbon monoxide, CO .....

h. Nickel(II) chloride, $NiCl_2$, ...

i. Sodium iodide, NaI .....

j. Phosphorus chloride, PCl_3 .....

Assessment

Classify the following substances as: Atomic Elements, Molecular Elements, Molecular compounds, or Ionic Compounds:

a. Barium, Ba ..... Atomic Elements .....

b. Iron (III) chloride, $FeCl_3$ ..... Ionic compounds .....

c. Bromine, Br_2 ..... Molecular Elements .....

d. Ethanol, C_2H_6O ..... Molecular compounds .....

e. Nitrogen monoxide, NO ..... Molecular compounds

f. Cobalt, Co ..... Atomic Elements .....

g. Carbon monoxide, CO ..... Molecular compounds

h. Nickel(II) chloride, $NiCl_2$, ... Ionic compounds

i. Sodium iodide, NaI ..... Ionic Compounds .....

j. Phosphorus chloride PCl_3 ..... Molecular compounds.

Assessment: Write the missing names and formulas of the following compounds, and mention the type of each of them (ionic, molecular or acid):

Name: ID: Section:

Formula	Name	Compound Type	Formula	Name	Compound Type
	Calcium chloride			Carbon dioxide	
Fe_2O_3				Hydrochloric acid	
LiF			P_2O_5		
	Copper(I) bromide			Nitrogen trifluoride	
$Mg(NO_3)_2$			N_2O_4		
Fe_2S_3			CO		
CuS			HBr		
	Sodium nitrite		Na_3PO_4		
Al_2S_3				Dihydrogen monoxide	
	Aluminium hydroxide		N_2O		
Cu_2CO_3			H_2S		
$Fe(HCO_3)_3$				Dinitrogen tetrahydride	
	Ammonium sulfite		S_2F_{10}		
NH_4NO_3			SF_6		
$Al_2(SO_4)_3$				Nitrogen monoxide	
	Radium hydroxide		SrF_2		
	Barium bicarbonate		N_2O_3		
FeF_2			$Ca(OH)_2$		
$Cu(NO_3)_2$				Iron(II) oxide	

Assessment: Write the missing names and formulas of the following compounds, and mention the type of each of them (ionic, molecular or acid):

Name: ID: Section:

Formula	Name	Compound Type	Formula	Name	Compound Type
$CaCl_2$	Calcium chloride	Ionic	CO_2	Carbon dioxide	Molecular
Fe_2O_3	iron (III) oxide	Ionic	HCl	Hydrochloric acid	Acid
LiF	Lithuim (I) flouride	Ionic	P_2O_5	diphosphorous pentoxide	Molecular
CuBr	Copper(I) bromide	Ionic	NF_3	Nitrogen trifluoride	Molecular
$Mg(NO_3)_2$	Magnesium nitrate	Ionic	N_2O_4	dinitrogen tetroxide	Molecular
Fe_2S_3	iron (III) sulfide	Ionic	CO	Carbon monoxide	Molecular
CuS	copper (II) sulfide	ionic	HBr	Hydrobromic acid	Acid
$NaNO_2$	Sodium nitrite	ionic	Na_3PO_4	Sodium phosphate	Ionic
Al_2S_3	Aluminum sulfide	ionic	H_2O	Dihydrogen monoxide	Molecular
$Al(OH)_3$	Aluminium hydroxide	ionic	N_2O	dinitrogen monoxide	Molecular
Cu_2CO_3	Copper (I) carbonate	ionic	H_2S	dihydrogen monosulfide	Molecular
$Fe(HCO_3)_3$	iron (III) bicarbonate	Ionic	N_2H_4	Dinitrogen tetrahydride	Molecular
$(NH_4)_2SO_3$	Ammonium sulfite	ionic	S_2F_{10}	disulfur decaflouride	Molecular
NH_4NO_3	Ammonium nitrate	ionic	SF_6	sulfur hexaflouride	Molecular
$Al_2(SO_4)_3$	Aluminium sulfate	ionic	NO	Nitrogen monoxide	Molecular
Rn(OH)	Radium hydroxide	ionic	SrF_2	Strontium flouride	Ionic
$Ba(HCO_3)_2$	Barium bicarbonate	ionic	N_2O_3	dinitrogen trioxide	Molecular
FeF_2	iron (II) flouride	ionic	$Ca(OH)_2$	Calcium hydroxide	Ionic
$Cu(NO_3)_2$	Copper (II) nitrate	ionic	$Fe(OH)_2$	Iron(II) hydroxide	Ionic

Assessment

1- How many **moles** of H_2O are there in **100 g** H_2O?

2- Calculate the number of iron **atoms** present in a **4 g** piece of iron.

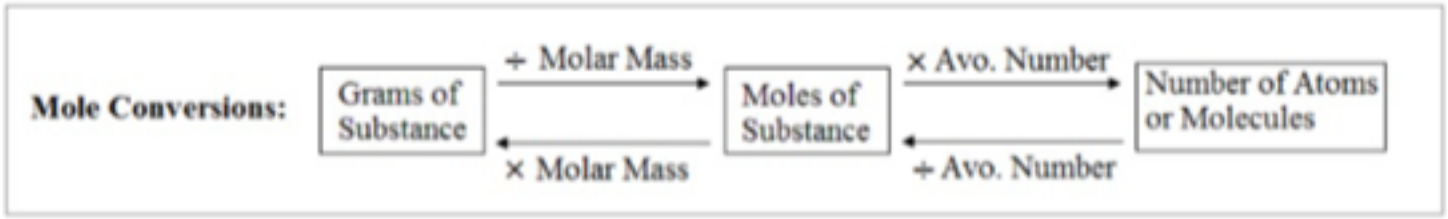
3- How many CO **molecules** are there in **2.67 moles** of CO?

4- How many **moles** of NH_3 are there in **0.2 Kg** of NH_3?

5- What is the **mass (g)** of 4.3×10^{24} **atoms** of silver?

6- Calculate the number of oxygen **molecules** in **250 g** oxygen.

7- What is the **mass (g)** of 9.2×10^{23} **particles** of $Al_2(CO_3)_3$?



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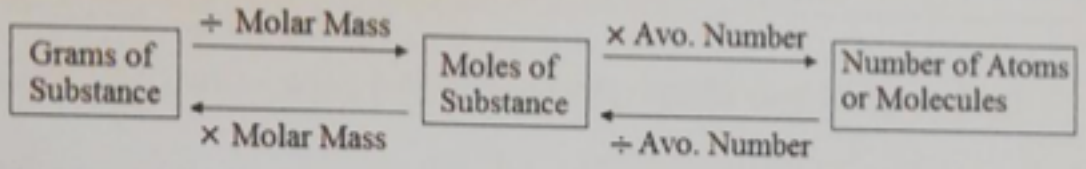
Mole Conversions:



Assessment

1- Give the coefficients that are necessary to balance each of the following equations:

$$H_2(g) + Cl_2(g) \rightarrow HCl(g)$$

$$Cu_2O(s) + C(s) \rightarrow Cu(s) + CO(g)$$

$$Co(NO_3)_3(aq) + (NH_4)_2S(aq) \rightarrow Co_2S_3(s) + NH_4NO_3(aq)$$

$$Co_2O_3(s) + C(s) \rightarrow Co(s) + CO_2(g)$$

2- What is the coefficient of H_2O when each of the following equations are balanced?

$$CO_2(g) + CaSiO_3(s) + H_2O(l) \rightarrow SiO_2(s) + Ca(HCO_3)_2(aq)$$

$$C_4H_{10}(g) + O_2(g) \rightarrow CO_2(g) + H_2O(g)$$

السؤال الأول

① $H_2 + Cl \longrightarrow 2HCl$

② $Cu_2O + C \longrightarrow 2Cu + CO$

③ $2Co(NO_3)_3 + 3(NH_4)_2S \rightarrow Co_2S_3 + 6NH_4NO_3$

④ $2Co_2O_3 + 3C \longrightarrow 4Co + 3CO_2$

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25

السؤال الثاني

① $2CO_2 + CaSiO_3 + H_2O \rightarrow SiO_2 + Ca(HCO_3)_2$

the coefficient of H_2O is 1

② $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$

the coefficient of H_2O is 10

Assessment

1- Write the Lewis structure for each atom or ion:

a. Al b. sodium ion c. magnesium ion d. chloride ion

2- Use Lewis structures to explain why each element occurs as diatomic molecules:

a. hydrogen b. bromine c. oxygen d. nitrogen

3- Write the Lewis structure for each compound:

a. PH_3 b. SCl_2 c. HI d. CH_4

e. NaF f. CaO g. $SrBr_2$ h. K_2O

4- Determine whether a bond between each pair of atoms would be nonpolar covalent, polar covalent, or ionic.

a. Br & Br b. C & Cl c. Mg & I d. Sr & O

5- Order these compounds in order of increasing carbon–carbon **bond strength** and in order of decreasing carbon–carbon **bond length**:

$$HC{\equiv}CH \ , \ H_2C{=}CH_2 \ , \ H_3C{-}CH_3$$

Assessment

1- Write the Lewis structure for each atom or ion:

a. Al· b. sodium ion $Na\cdot$ c. magnesium ion $Mg:$ d. chloride ion $\cdot\ddot{Cl}:$

2- Use Lewis structures to explain why each element occurs as diatomic molecules: $:\ddot{Br}-\ddot{Br}:$ $\ddot{O}=\ddot{O}$

a. hydrogen $H-H$ b. bromine c. oxygen d. nitrogen $:N\equiv N:$

3- Write the Lewis structure for each compound:

a. PH_3 $H-\ddot{P}-H$ (H) b. SCl_2 $:\ddot{Cl}-\ddot{S}-\ddot{Cl}:$ c. HI $H-\ddot{I}:$ d. CH_4 $H-C-H$ (H)

e. NaF $Na^+[:\ddot{F}:]^-$ f. CaO $Ca^{+2}[:\ddot{O}:]^{2-}$ g. $SrBr_2$ $Sr^{2+}\ 2[:\ddot{Br}:]^-$ h. K_2O $2K^+[:\ddot{O}:]^{2-}$

4- Determine whether a bond between each pair of atoms would be nonpolar (1) covalent, polar covalent (2), or ionic (3).

a. Br & Br (1) b. C & Cl (2) c. Mg & I (3) d. Sr & O (3)

5- Order these compounds in order of increasing carbon–carbon **bond strength** and in order of decreasing carbon–carbon **bond length**:

$HC\equiv CH$, $H_2C=CH_2$, H_3C-CH_3

3 2 1

Chapter 4

Assessment

1. Calculate the number of NO_2 moles that will be formed when each amount of N_2O_5 completely dissociates:

$$2\ N_2O_5(g) \rightarrow 4\ NO_2(g) + O_2(g)$$

a) 1.3 mol of N_2O_5 **b)** 1.55 kg of N_2O_5 **c)** 10.5 g of N_2O_5 **d)** 2.25×10^{23} molecules of N_2O_5

2. How many moles of H_2O would be produced when 5 moles of C_2H_6O completely react with oxygen gas according to the equation?

$$C_2H_6O + 3\ O_2 \rightarrow 2\ CO_2 + 3\ H_2O$$

3. What is the mass (in g) of $AlCl_3$ that will be produced when 95 grams of Al completely react with excess Cl_2 according to this equation?

$$2\ Al + 3\ Cl_2 \rightarrow 2\ AlCl_3$$

4. How many moles of CO_2 would be produced when 4.5×10^{23} molecules of C_3H_7COOH completely react with oxygen gas according to the following equation?

$$C_3H_7COOH + 5\ O_2 \rightarrow 4\ CO_2 + 4\ H_2O$$

5. Lithium and nitrogen react to produce lithium nitride as follows: $6\ Li(s) + N_2(g) \rightarrow 2\ Li_3N(s)$

How many grams of N_2 are needed to fully react with 15 g of lithium?

6. Given the following reaction: $N_2(g) + 3\ H_2(g) \rightarrow 2\ NH_3(g)$

a) How many grams of N_2 are required by 35 g of H_2 to make a complete reaction?

b) What is the mass (in g) of NH_3 that will be produced from 35 g of H_2?

1. $2N_2O_5 \rightarrow 4NO_2 + O_2$

a. $2N_2O_5 \rightarrow 4NO_2$

$1.3 \rightarrow X$

$\frac{(4 \times 1.3)}{2} = 2.6\ NO_2$

B. $2N_2O_5 \rightarrow 4NO_2$

$5.8 \rightarrow X$

$\frac{(4 \times 5.8)}{2} = 11.6\ NO_2$

C. $216\ g\ N_2O_5 \rightarrow 184\ g\ NO_2$

$10.5 \rightarrow X$

$\frac{(184 \times 10.5)}{216} = 99\ NO_2$

d. $216\ g\ N_2O_5 \rightarrow 184\ NO_2$

$1550 \rightarrow X$

$\frac{(184 \times 1550)}{216} = 1320\ g\ NO_2$

2. $C_2H_6O + 3O_2 \rightarrow 2CO_2 + 3H_2O$

$1\ C_2H_6O \rightarrow 3\ H_2O$

$5 \rightarrow X$

$\frac{(5 \times 3)}{1} = 15\ H_2O$

3. $2Al + 3Cl_2 \rightarrow 2AlCl_3$

$54\ g\ Al \rightarrow 266\ g\ AlCl_3$

$95 \rightarrow X$

$\frac{(266 \times 95)}{54} = 468\ g\ AlCl_3$

4. $C_3H_7COOH + 5O_2 \rightarrow 4CO_2 + 4H_2O$

~~4.3×10^{23}~~

1 mole C_3H_7COOH = 4 mole CO_2

0.7 = 2.8 mole CO_2

5. $6Li + N_2 \rightarrow 2Li_3N$

6 mole Li $\rightarrow$ $2Li_3N$

47 g Li $\rightarrow$ 70

15 $\rightarrow$ X

= 22.34 g

Assessment

1- For the following reaction, find the **limiting reactant, excess reactant, and theoretical yield (in moles)** if we started the reaction with 12.6 **mol** Na and 6.9 **mol** Br_2

$$2\ Na(s) + Br_2(g) \rightarrow 2\ NaBr(s)$$

2- For the following reaction, calculate the **theoretical yield** of product (in g) if we started the reaction with 7.5 **g** Al and 24.8 **g** Cl_2

$$2\ Al(s) + 3\ Cl_2(g) \rightarrow 2\ AlCl_3(s)$$

3- What is the **percent yield** for a reaction if its theoretical yield is 83 **g** and its actual yield is 75 **g**?

[1] $2Na_{(s)} + Br \longrightarrow NaBr_{(s)}$

2 mol ⟶ 2 mol NaBr

12.6 mol ⟶ X

mol 12.6 = NaBr عدد مولات

1 mol Br_2 ⟶ 2 mol NaBr

6.9 mol Br_2 ⟶ X mol NaBr

13.8 mol = NaBr عدد مولات

limited reactant = Na

Excess " = Br_2

Theoretical Yield = 12.6 NaBr

[2] $2Al_{(s)} + 3Cl_{2(g)} \longrightarrow 2AlCl_{3(s)}$

2 mol Al ⟶ 2 $AlCl_3$

$\frac{7.5}{26.4}$ mol Al ⟶ X

0.55 mol = $AlCl_3$ عدد مولات

3 mol Cl_2 ⟶ 2 $AlCl_3$

$\frac{24.8}{2(35.45)}$ mol Cl_2 ⟶ X

mol 0.233 = $AlCl_3$

Theortical Yeild = $0.233[26.9 + 3(35.45)] = 31.079$

[3] $\text{Percent Yeild} = \frac{\text{Actual Yield}}{\text{Theoretical Yield}} \times 100$

$\text{Percent yield} = \frac{75}{83} \times 100$

$= 90.3\ \%$

Assessment

1- Calculate the molarity of each solution:

a) 4.3 mol of LiCl in 2.75 L solution.

b) 21.5 g $C_6H_{12}O_6$ in 1.85 L of solution.

2- How many moles of KCl are there in each solution?

a) 0.55 L of a 2.3 M KCl solution.

b) 114 mL of a 1.85 M KCl solution.

3- A saline solution contains 1.5 g of sodium chloride, NaCl, dissolved in 100 mL of solution. What is the molar concentration of the solution?

4- A laboratory procedure calls for making 400 mL of a 1.3 M $NaNO_3$ solution. What mass of $NaNO_3$ (in g) is needed?

5- If 123 mL of a 1.1 M glucose solution is diluted to 500 mL, what is the molarity of the diluted solution?

6- To what volume should you dilute 50 mL of a 12 M stock HNO_3 solution to obtain a 0.1 M HNO_3 solution?

Assessment

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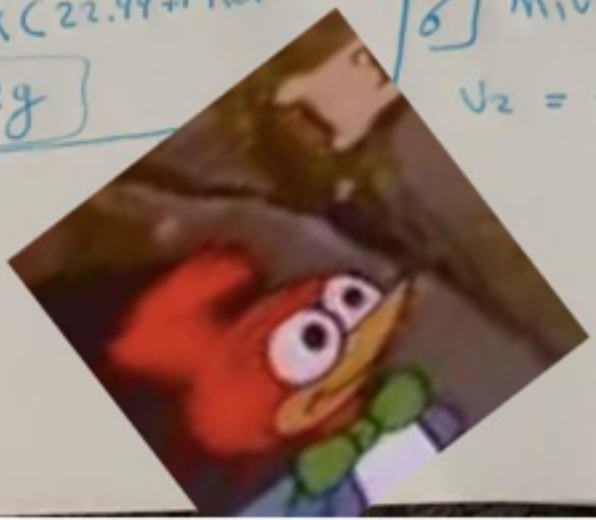


Assessment

All of the following compounds are soluble in water, indicate which of them is expected to produce strong, weak or non-electrolyte solution?

a. $CsCl$

b. CH_3OH

c. $Ca(NO_2)_2$

d. $C_6H_{12}O_6$

e. Acetic acid, vinegar (CH_3COOH) (weak acid)

f. HCl (strong acid)

g. $NaOH$ (strong base)

h. HF (weak acid)

i. NH_4OH (weak base)

All of the following compounds are soluble in water, indicate which of them is expected to produce strong, weak or non-electrolyte solution?

a. $CsCl$ Strong electrolyte

b. CH_3OH week electrolyte

c. $Ca(NO_2)_2$ Strong electrolyte

d. $C_6H_{12}O_6$ Non-electrolyte

e. Acetic acid, vinegar (CH_3COOH) (weak acid) week electrolyte

f. HCl (strong acid) Strong electrolyte

g. NaOH (strong base) Strong electrolyte

h. HF (weak acid) week electrolyte

i. NH_4OH (weak base) week //

Assessment

1- Assign oxidation states to each atom in each ion or compound.

a. Ag **b.** Ag^+

c. CaF_2 **d.** H_2S

e. CO_3^{2-} **f.** CrO_4^{2-}

2- What is the oxidation state of Cr in each compound?

a. CrO

b. CrO_3

c. Cr_2O_3

3- Which reactions are redox reactions? For each redox reaction, identify the oxidizing agent and the reducing agent.

a. $4\,Li(s) + O_2(g) \rightarrow 2\,Li_2O(s)$

b. $Mg(s) + Fe^{2+}(aq) \rightarrow Mg^{2+}(aq) + Fe(s)$

c. $Pb(NO_3)_2(aq) + Na_2SO_4(aq) \rightarrow PbSO_4(s) + 2\,NaNO_3(aq)$

d. $HBr(aq) + KOH(aq) \rightarrow H_2O(l) + KBr(aq)$

Assessment

1- Assign oxidation states to each atom in each ion or compound.

a. $Ag \rightarrow 0$ **b.** $Ag^+ \rightarrow +1$

c. CaF_2 **d.** H_2S

e. CO_3^{2-} **f.** $CrO_4^{2-} \rightarrow -2$

2- What is the oxidation state of Cr in each compound?

a. $CrO \rightarrow Cr - 2 = 0$, $Cr = +2$

b. $CrO_3 \rightarrow Cr + (-2 \times 3) = 0$, $Cr - 6 = 0$, $Cr = +6$

c. $Cr_2O_3 \rightarrow 2Cr + (-2 \times 3) = 0$, $2Cr - 6 = 0$, $\frac{2Cr}{2} = \frac{+6}{2}$, $Cr = +3$

3- Which reactions are redox reactions? For each redox reaction, identify the oxidizing agent and the reducing agent.

a. $4\,Li(s) + O_2(g) \rightarrow 2\,Li_2O(s)$ Li → reducing agent; O → oxidizing agent

b. $Mg(s) + Fe^{2+}(aq) \rightarrow Mg^{2+}(aq) + Fe(s)$ Mg → reducing agent; Fe → oxidizing agent

c. $Pb(NO_3)_2(aq) + Na_2SO_4(aq) \rightarrow PbSO_4(s) + 2\,NaNO_3(aq)$ not redox

d. $HBr(aq) + KOH(aq) \rightarrow H_2O(l) + KBr(aq)$ not redox

Chapter 5

Write the correct expression of the equilibrium constant K_{eq} for each chemical reaction:

1) $C(s) + 2\,H_2(g) \rightleftharpoons CH_4(g)$

2) $N_2(g) + O_2(g) + Br_2(g) \rightleftharpoons 2\,NOBr(g)$

3) $2\,NO(g) \rightleftharpoons N_2(g) + O_2(g)$

4) $CO_3^{2-}(aq) + H_2O(l) \rightleftharpoons HCO_3^{-}(aq) + OH^{-}(aq)$

5) $2\,KClO_3(s) \rightleftharpoons 2\,KCl(s) + 3\,O_2(g)$

6) $HF(aq) + H_2O(l) \rightleftharpoons H_3O^{+}(aq) + F^{-}(aq)$

7) $NH_3(aq) + H_2O(l) \rightleftharpoons NH_4^{+}(aq) + OH^{-}(aq)$

8) $CO(g) + Cl_2(g) \rightleftharpoons COCl_2(g)$

عند كتابة ثابت الاتزان لا نأخذ المادة فقط في الحالة (g) gas and (aq)

(1) $C_{(s)} + 2H_{2(g)} \rightleftharpoons CH_{4(g)}$

$$K_{eq} = \frac{[CH_4]}{[H_2]^2}$$

---

(2) $N_{2(g)} + O_{2(g)} + Br_2 \rightleftharpoons 2\,NOBr_{(g)}$

$$K_{eq} = \frac{[NOBr]^2}{[N_2][O_2][Br_2]}$$

---

(3) $2\,NO_{(g)} \rightleftharpoons N_{2(g)} + O_{2(g)}$

$$K_{eq} = \frac{[N_2][O_2]}{[NO]^2}$$

---

(4) $CO_{3(aq)}^{2-} + H_2O_{(l)} \rightleftharpoons HCO_{3(aq)}^{-} + OH_{(aq)}^{-}$

$$K_{eq} = \frac{[HCO_3^-][OH^-]}{[CO_3^{-2}]}$$

---

(5) $2\,KClO_{3(s)} \rightleftharpoons 2\,KCl_{(s)} + 3\,O_{2(g)}$

$$K_{eq} = [O_2]^3$$

6 $HF_{(aq)} + H_2O_{(l)} \rightleftharpoons H_3O^+_{(aq)} + F^-_{(aq)}$

$$K_{eq} = \frac{[H_3O^+][F^-]}{[HF]}$$

---

7 $NH_{3(aq)} + H_2O_{(l)} \rightleftharpoons NH_4^+{}_{(aq)} + OH^-_{(aq)}$

$$K_{eq} = \frac{[NH_4^+][OH^-]}{[NH_3]}$$

---

8 $CO_{(g)} + Cl_{2(g)} \rightleftharpoons COCl_{2(g)}$

$$K_{eq} = \frac{[COCl_2]}{[CO][Cl_2]}$$

$2\,Na_{(s)} + Br_{2(g)} \longrightarrow 2\,NaBr_{(s)}$

~~$K_{eq} = \frac{1}{[Na]^2[Br_2]}$~~ $K_{eq} = \frac{1}{[Br_2]} = [Br_2]^{-1}$

الاتنين مش

$2\,Al_{(s)} + 3\,Cl_{2(g)} \rightleftharpoons 2\,AlCl_{3(s)}$

$K_{eq} = \frac{1}{[Cl_2]^3} = [Cl_2]^{-3}$ الاتنين مش

$P_{4(s)} + 6\,Cl_{2(g)} \rightleftharpoons 4\,PCl_{3(l)}$

$K_{eq} = \frac{1}{[Cl_2]^6} = [Cl_2]^{-6}$

Le Châtelier's Principle: Assessment

1. Consider the reaction at equilibrium: $2\,KClO_3(s) \rightleftharpoons 2\,KCl(s) + 3\,O_2(g)$

Predict whether the reaction will shift left, shift right, or remain unchanged upon each disturbance.

a. O_2 is removed **b.** KCl is added **c.** $KClO_3$ is added **d.** O_2 is added

2. This reaction is endothermic. $C(s) + CO_2(g) \rightleftharpoons 2\,CO(g)$

Predict the effect (shift right, shift left, or no effect) of increasing and decreasing the reaction temperature.

3. Each reaction is allowed to come to equilibrium and then the volume is changed as indicated. Predict the effect

a. $I_2(g) \rightleftharpoons 2\,I(g)$ (volume is increased)
b. $2\,H_2S(g) \rightleftharpoons 2\,H_2(g) + S_2(g)$ (volume is decreased)
c. $I_2(g) + Cl_2(g) \rightleftharpoons 2\,ICl(g)$ (volume is decreased)
d. $C(s) + CO_2(g) \rightleftharpoons 2\,CO(g)$ (volume is increased)

4. Consider the reaction at equilibrium:

$$N_2(g) + 3\,H_2(g) \rightleftharpoons 2\,NH_3(g) + \text{heat}$$

Predict whether the reaction will shift left, shift right, or remain unchanged upon each disturbance.

a. adding N_2 b. decreasing H_2 c. increasing volume
d. increasing pressure e. cooling down f. heating up

1] $2KClO_{3(s)} \rightleftharpoons 2KCl_{(s)} + 3O_{2(g)}$ [1]

a- O_2 removed ⟶ shift right

b- KCl is adden, no effect لانه حالته solid

c- $KClO_3$ is added, no effect لانه solid

d- O_2 is added ⟵ shift Left

2] $heat + C_{(s)} + CO_{2(g)} \rightleftharpoons 2CO_{(g)}$

This reaction is endotheric وبالتالي تفتح الحرارة مع المتفاعلات

a- increasing heat ⟶ shift right

b- decreasing temperature ⟵ shift Left

3] a) $I_{2(g)} \rightleftharpoons 2I_{(g)}$ (Volume increased)

عند دراسة تاثير:- اولا نعد مولات المواد المتفاعلة والناتجة من التفاعل في الحالة الغازية فقط
الضغط او الحجم

increase Volume = decrease Pressure

معناتي أن عدد المولات يقل وبالتالي التفاعل يتجه ناحية عدد المولات الاكثر

⟶ shift right

---

b. $2H_2S_{(g)} \rightleftharpoons 2H_{2(g)} + S_{2(g)}$

2 mol 3 mol

decrease Volume = increase pressure

أي عدد المولات يزداد وبالتالي يتجه ناحية عدد المولات الأقل

⟵ shift left

c- $I_{2(g)} + Cl_{2(g)} \rightleftharpoons 2\,ICl_{(g)}$

2 mol 2 mol

no effect of Pressure or Volume

لان عدد المولات للمتفاعلات يساوي عدد مولات النواتج

---

d. $C_{(s)} + CO_{2(g)} \rightleftharpoons 2\,CO_{(g)}$

1 mol 2 mol

solid تعد

Volume increase = Pressure decrease

عدد المولات يقل و بالتالي يتجه ناحية عدد المولات الاكثر

shift right ⟶

$N_{2(g)} + 3\,H_{2(g)} \rightleftharpoons 2NH_{3(g)} + heat$

(4 mol) (2 mol)

a. adding N_2, ⟶ shift right

b. decreasing H_2, ⟵ shift Left

c. increasing volume = decreasing pressure

يعني عدد المولات يقل و بالتالي يتجه لعدد المولات الاكثر ⟵ shift Left

d. increasing pressure ⟶ shift right

e. cooling down, ⟶ shift right

f. heating up, ⟵ shif Left

Assessment

1. For each strong base solution, determine $[OH^-]$, $[H_3O^+]$, pH, and pOH.
   a. 0.15 M NaOH
   b. 1.5×10^{-3} M $Ca(OH)_2$
   c. 4.8×10^{-4} M $Sr(OH)_2$
   d. 8.7×10^{-5} M KOH
2. Determine the $[OH^-]$, pH, and pOH of a 0.15 M $HCl_{(aq)}$
3. For each reaction, identify the Brønsted–Lowry acid, the Brønsted–Lowry base, the conjugate acid, and the conjugate base.
   a. $H_2CO_3(aq) + H_2O(l) \rightleftharpoons H_3O^+(aq) + HCO_3^-(aq)$
   b. $NH_3(aq) + H_2O(l) \rightleftharpoons NH_4^+(aq) + OH^-(aq)$
   c. $HNO_3(aq) + H_2O(l) \longrightarrow H_3O^+(aq) + NO_3^-(aq)$
4. Write the formula for the conjugate base of each acid.
   a. HCl
   b. H_2SO_3
   c. $HCHO_2$
   d. HF
5. Determine the $[OH^-]$ and pH of a solution that is 0.140 M $HBr_{(aq)}$
6. Classify each species as either a Lewis acid or a Lewis base.
   a. Fe^{3+}
   b. BH_3
   c. NH_3
   d. F^-

1) a. 0.15 M NaOH المولارية هي تركيز الهيدروكسيد
NaOH is a strong base and so $[OH^-] = 0.15$ (1)

$[H^+][OH^-] = 10^{-14}$

$[H^+] = \frac{10^{-14}}{0.15} = 6.66 \times 10^{-14}$

$pH = -\log[H^+] = -\log[6.66 \times 10^{-14}]$
$= 13.17$

$POH = -\log[OH^-] = -\log[0.15]$
$= 0.8239$

أيضا ممكن نحلها بطريقة أخرى

$pH + POH = 14$

$POH = 14 - 13.17 = 6.83$

---

b) 1.5×10^{-3} M $Ca(OH)_2$

$Ca(OH)_2 \longrightarrow Ca^{2+} + 2OH^-$

$[OH^-] = 2 \times M = 2 \times 1.5 \times 10^{-3}$
$= 3 \times 10^{-3}$

$[H^+] = \frac{10^{-14}}{3 \times 10^{-3}} = 0.333 \times 10^{-11}$

$pH = -\log[0.333 \times 10^{-11}]$
$= 11.47$

$pH + POH = 14$

$POH = 14 - 11.47 = 2.53$

الفقرة (c) حلها مثل الفقرة (b)
الفقرة (d) حلها مثل الفقرة (a)

---

(2) 0.15 M HCl حمض قوي (2)

$M = [H^+]$

$[H^+] = 0.15$

$[OH^-] = \frac{0.15}{10^{-14}} =$

(2) 0.15 M HCl

$[H^+] = 0.15$

$[OH^-][H^+] = 10^{-14}$

$[OH^-] = \frac{10^{-14}}{0.15} = 6.66 \times 10^{-14}$

$pH = -\log[H^+] = -\log[0.15] = 0.83$

$pOH = 14 - 0.83 = 13.17$

(2) HCl محلول مولاري

$M = [H^+]$

---

(3) a. $H_2CO_3 + H_2O \rightleftharpoons H_3O^+ + HCO_3^-$

H_2CO_3: acid, H_2O: base, H_3O^+: Conj. acid, HCO_3^-: Conj. base

b. $NH_3 + H_2O \rightleftharpoons NH_4^+ + OH^-$

NH_3: base, H_2O: acid, NH_4^+: Conj. acid, OH^-: Conj. base

c. $HNO_3 + H_2O \rightleftharpoons H_3O^+ + NO_3^-$

HNO_3: acid, H_2O: base, H_3O^+: Conj. acid, NO_3^-: Conj. base

---

(4) write conjugate base of each acid

a. HCl, Cl^-

b. H_2SO_3, HSO_3^-

c. $HCHO_2$, CHO_2^-

d. HF, F^-

المسألة [5] تحل بالمثل زي مسألة [2] [3]

[6] Fe^{+3} Lewis acid

BH_3 Lewis acid

CO_2 Lewis acid

$AlCl_3$ Lewis acid.

BF_3 Lewis acid.

$Br^-, F^-, Cl^-, I^-, O^{2-}, N^{3-}, S^{2-}$

P^{3-} Lewis base

H^- Lewis base

hydride ion

OH^- Lewis base

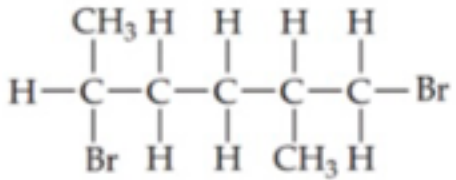
H_2O " "

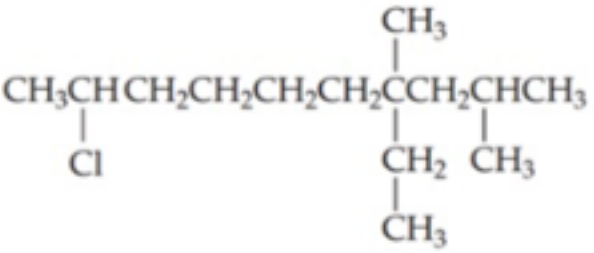
NH_3 " "

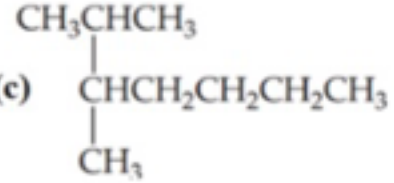
Chapter 7

Assessment

1. Give the the name or structural formula, as appropriate:

(a) 

(b) 

(c) 

(d) 2-methylheptane

(e) 2,2-dimethylpentane

(f) 4-ethyl-2,3-dimethyloctane

(g) 4-ethyl-1,1-dimethylcyclohexane

(h) 1,2-dimethylcyclohexane

(i) $(CH_3)_2CHCH_2CH_2C(CH_3)_3$

2. Which of the following pairs of compounds are isomers?

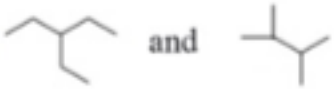
a)  and

b)  and

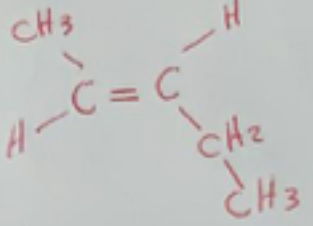
c) C_2H_4 and C_2H_6

d) C_3H_8 and C_4H_{10}

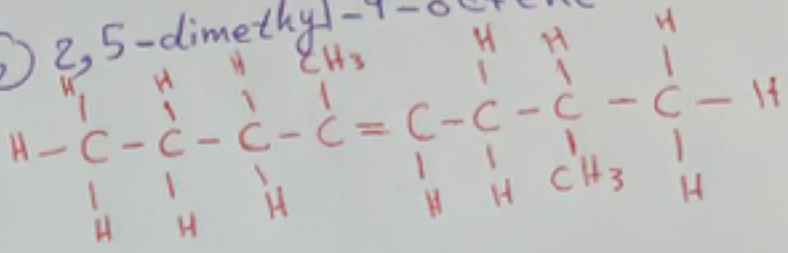
e)  and

F)  and

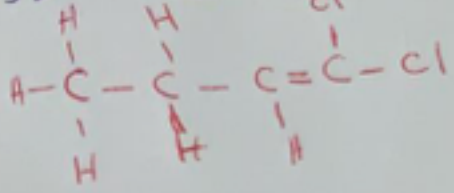
(a) trans-2-pentene



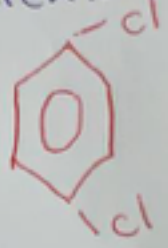
(b) 2,5-dimethyl-4-octene



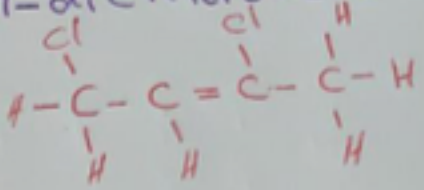
(c) 1,1-dichloro-1-butene



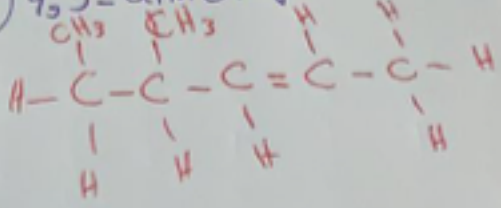
(d) 1,4-dichlorobenzene

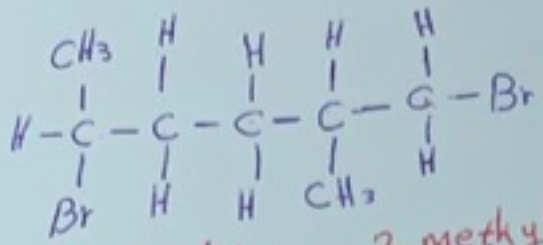


(e) 2,4-dichloro-2-butene

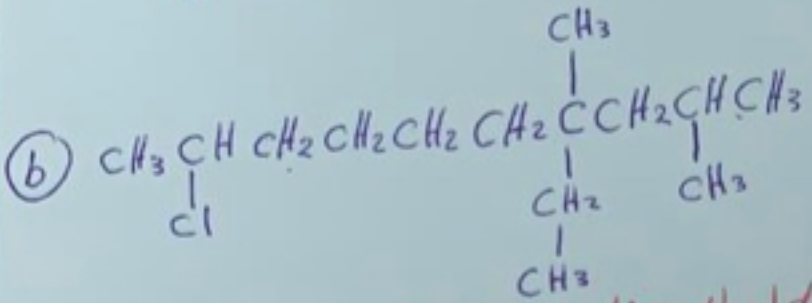


(f) 4,5-dimethyl-2-pentyne

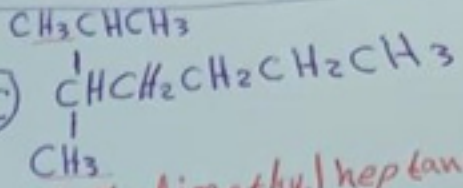


ⓐ 

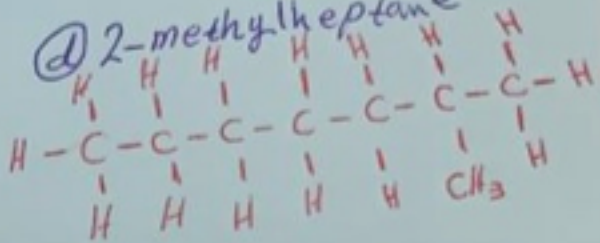
1,5-dibromo-2-methylhexane

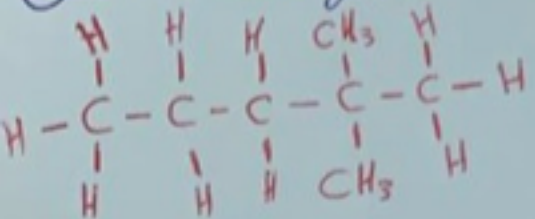
ⓑ 

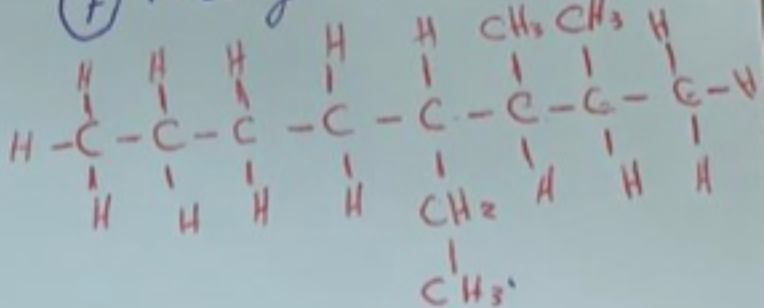
9-cloro-4-ethyl-2,4-dimethyldecane

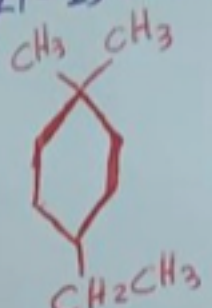
ⓒ 

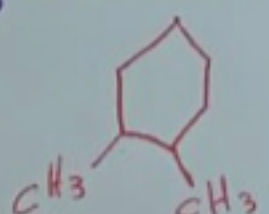
2,3-dimethylheptane

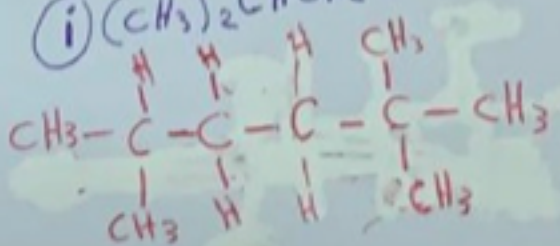
ⓓ 2-methylheptane 

ⓔ 2-2-dimethylpentane 

ⓕ 4-ethyl-2,3-dimethyloctane 

ⓖ 4-ethyl-1,1-dimethylcyclohexane 

ⓗ 1,2-dimethylcyclohexane 

ⓘ $(CH_3)_2CHCH_2CH_2C(CH_3)_3$ 

2,2,5-trimethylhexa

Assessment

1. Name or write the condensed structural formula for the following compounds:

   a) *trans*-2-pentene

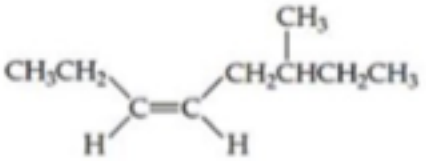
   b) 2,5-dimethyl-4-octene

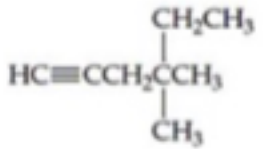
   c) 1,1-dichloro-1-butene

   d) 1,4-dichlorobenzene

   e) 2,4-dichloro-2-butene

   f) 4,4-dimethyl-2-pentyne

   g) 

   h) 

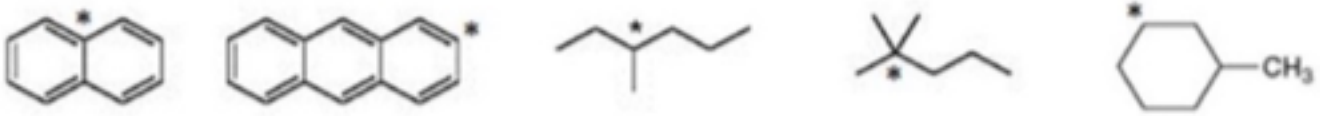
   i) 

2. Identify the type of the following hydrocarbons (alkane, alkene, or alkyne)

   a) C_4H_8 b) C_4H_6 c) C_5H_{12} d) C_7H_{14}

   e) C_8H_{16} f) $C_{18}H_{38}$ g) C_6H_{10} h) $C_{10}H_{22}$

3. In the following carbon skeletons , how many hydrogen atoms shall be bonded to the carbon marked with a *?



1. Name or write the condensed structural formula for the following compounds:

a) *trans*-2-pentene

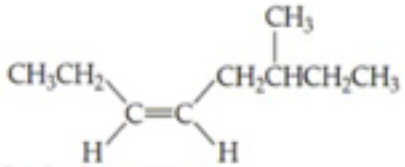
b) 2,5-dimethyl-4-octene

c) 1,1-dichloro-1-butene

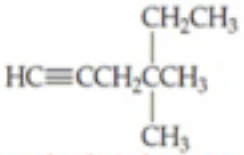
d) 1,4-dichlorobenzene

e) 2,4-dichloro-2-butene

f) 4,5-dimethyl-2-pentyne

g) 

Cis-6-methyl- 3-octene

h) 

4.4-dimethyl-1-hexyne

i) 

Phenol or hydroxy benzene

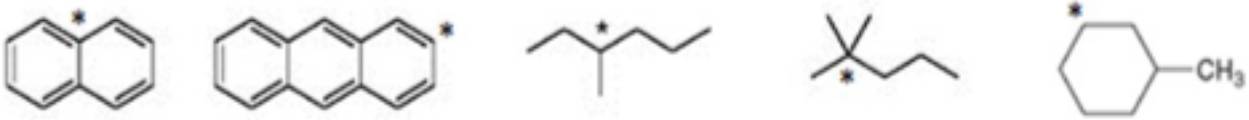
2. Identify the type of the following hydrocarbons (alkane, alkene, or alkyne)

a) C_4H_8 b) C_4H_6 c) C_5H_{12} d) C_7H_{14}

e) C_8H_{16} f) $C_{18}H_{38}$ g) C_6H_{10} h) $C_{10}H_{22}$

Alkene: a, d, e,
Alkane: c, f, h
Alkyne: b, g

3. In the following carbon skeletons , how many hydrogen atoms shall be bonded to the carbon marked with a *?

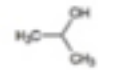


Hydroden: 1 1 1 0

2

Assessment

1. Identify the type (family) of the following organic compounds

a. 
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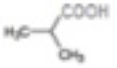
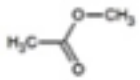
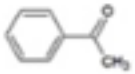
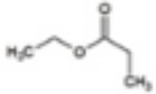
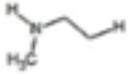
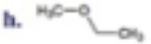
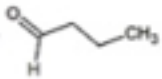
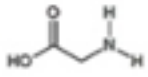
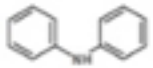
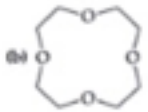
c. 
d. 
e. 
f. 
g. 
h. 
i. 
j. 
k. 
l. 

2. Identify the functional groups in each of the following compounds:

(a) H_3C-CH_2-OH

(b) 

(c) $H_3C-\overset{H}{\underset{|}{N}}-CH_2CH=CH_2$

(d) 

(e) $CH_3CH_2CH_2CH_2CHO$

(f) $CH_3C{=}CCH_2COOH$

3. _____ **is formed by the reaction of a carboxylic acid with an alcohol**

A) aldehyde. B) ester. C) ether. D) ketone.

4. _____ **is the hydrolysis of an ester using a base.**

A) Saponification
B) Decarboxylation
C) Detoxification
D) Alcoholysis

5. Oxidation of an aldehyde produces a _____.

A) carboxylic acid.
B) alcohol.
C) ester.
D) ketone.

6. The common functional group in aldehydes and ketones is ____.

A) hydroxyl group.
B) phenol group.
C) ether group.
D) carbonyl group.

7. The Product of the reaction between a carboxylic acid and an amine is _____.

A) aldehyde. B) amide. C) ester. D) ketone.

8. _____ **are used as medical anesthetics.**

9. _____ **are responsible for the pleasant aroma of fruits.**

10. The suffix _____ **is used at the end of esters names.**

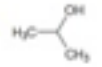
11. The partial oxidation of alcohols produces _____, **while further oxidation produces** _____.

12. _____ **are the most common organic bases.**

Assessment

Answer the following questions:

1. **Identify the type (family) of the following organic compounds**

a. 
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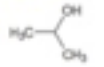
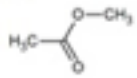
c. 
d. 
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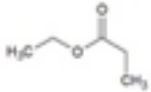
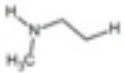
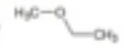
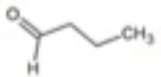
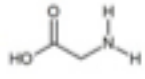
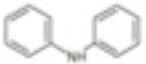
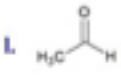
f. 
g. 
h. 
i. 
j. 
k. 
l. 

2. **Identify the functional groups in each of the following compounds:**

(a) H_3C-CH_2-OH
(b) 
(c) $CH_3CH_2CH_2CH_2CHO$
(d) 
(e) $H_3C-\overset{H}{\underset{|}{N}}-CH_2CH=CH_2$
(f) $CH_3C{\equiv}CCH_2COOH$

3. _____ **is formed by the reaction of a carboxylic acid with an alcohol**

A) aldehyde. B) ester. C) ether. D) ketone.

4. _____ **is the hydrolysis of an ester using a base.**

A) Saponification B) Decarboxylation
C) Detoxification D) Alcoholysis

5. **Oxidation of an aldehyde produces a _____.**

A) carboxylic acid. B) alcohol.
C) ester. D) ketone.

6. **The common functional group in aldehydes and ketones is ____.**

A) hydroxyl group. B) phenol group.
C) ether group. D) carbonyl group.

7. **The Product of the reaction between a carboxylic acid and an amine is _____.**

A) aldehyde. B) amide. C) ester. D) ketone.

3 ester
4 A
5 A
6 D
7 b

Q1
Alcohol: a, c
Ether: b, h
Ketone: e
Aldehyde: I, L
Carboxylic acid: j
Ester:d, f
Amine: g, j, k

Q2
a: Alcohol
B: ether
C: amine, alkene
D: Ketone
E:aldehyde
F: Carboxylic acid, alkyne

8. **ether are used as medical anesthetics.**
9. **ester are responsible for the pleasant aroma of fruits.**
10. **The suffix ate is used at the end of esters names.**
11. **The controlled oxidation of alcohols produces aldehyde or ketone, while further oxidation produces carboxylic acid or ester.**
12. **amine are the most common organic bases.**

Assessment

➢ **Answer the following questions:**

1. The suffix _____ on a ketone or aldehyde indicates a sugar.

A) – ane B) – ene C) – one D) – ose

2. _____ is the sugar component in RNA.

A) Fructose B) Galactose C) Glucose D) Ribose

3. Which of the following bases is NOT found in RNA nucleotide?

A) Adenine B) cytosine C) Thymine D) uracil

4. Amino acids are the building units of _____.

A) carbohydrates. B) fats. C) proteins. D) vitamins.

5. The amide bond that joins two amino acids is called _____.

A) ester linkage B) glycoside linkage C) peptide linkage D) phosphate linkage

6. _____ is a lipid composed of glycerol and three fatty acids?

A) Cholesterol B) Oils C) Triglyceride D) Wax

7. Glycogen is classified as _____.

A) disaccharides. B) plant polysaccharide.

C) monosaccharide. D) animal polysaccharide