



مدونة المناهج السعودية

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الموقع التعليمي لجميع المراحل الدراسية

في المملكة العربية السعودية

Chapter 1 +2+3

سجس = لیل

Atoms are made up of three particles .p., .n., .e... Protons, electrons, neutrons

Anything has a mass and occupies space is matter

If Neutral atom lose one electron or more it's called cation

If Neutral atom gain one electron or more it's called anion

Isotopes are atoms have the same number of protons "atomic number"

Element in the periodic table arrange in order of increasing their atomic number
mass

Isotopes :Are atoms have the same number of proton but different number of neutrons "mass n"

The smallest building block of matter called atom

Which one classified as homogeneous mixture...sugar with water.

Which one classified as heterogeneous mixture...sea water / Air

The limiting reagent is the reactant used up first in a reaction.

SI Section

The SI unit for measuring the amount of substance is : mole (mol).

The SI unit for measuring the Temperature is : Kelvin (K).....

The SI unit for measuring the Time is : second (s).....

The SI unit for measuring the Mass is : Kilogram (Kg).....

The SI unit for measuring the Length is : meter (m).....

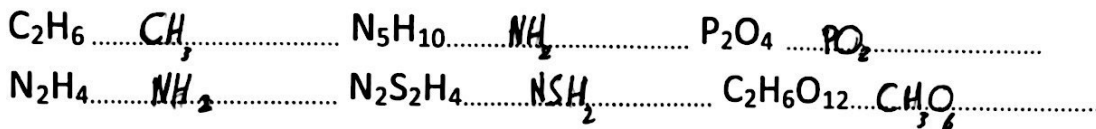
Giga in SI unit equal = 10^9

Mega in SI unit equal = 10^6

Pico in SI unit equal = 10^{12}

Nano in SI unit equal = 10^9

Determine the Empirical formula for the following compounds :



"نقسم على 2"

The number of neutron in Sodium

(Na) $23 - 11 = 12$

The number of neutron in Potassium

(K) $39 - 19 = 20$

The number of neutron in Phosphorous

(P) $31 - 15 = 16$

The number of neutron in Chlorine

(Cl) $35 - 17 = 18$

The mass number of an atoms contain 20 protons and 20 neutron

Q- How many electron are there in the following ion

$^{31}_{15}P^{3+}$ $e = 15 - 3 = 12$

$^{35}_{17}Cl^{-1}$ $e = 17 + 1 = 18$

$^{23}_{11}Na^{1+}$ $e = 11 - 1 = 10$

$^{40}_{20}Ca^{+2}$ $e = 20 - 2 = 18$

$^{32}_{16}S^{-2}$ $e = 16 + 2 = 18$

$^{78}_{34}Se^{-2}$ $e = 34 + 2 = 36$

Which one is monoatomic anion?

Cation		Anion	
MONO	POLY	MONO	POLY
Na ⁺	NH ₄ ⁺	S ⁻²	NO ₂ ⁻¹
Ca ⁺²		C ⁻⁴	CrO ₃ ⁻¹
Al ⁺³		P ⁻³	SO ₄ ²⁻
K ⁺¹			CN ⁻¹
			SO ₄ ²⁻

Naming Compound :

Covalent (Molecular compound)

P_2Cl_5 DiPhosphorous pentachloride

CO_2 Carbon monoxide

NO Nitrogen monoxide

nonmetal with nonmetal

N_2O_4 DiNitrogen tetraoxide

SO_3 Sulfur trioxide

Ionic compound

K_2SO_4 Potassium Sulfate

nonmetal with metal

K_2SO_3 Potassium Sulfite

KNO_3 Potassium Nitrate

Na_2S Sodium Sulfide

$NaNO_3$ Sodium Nitrate

$LiNO_3$ Lithium Nitrate

$AlPO_4$ Aluminium Phosphate

$AlCl_3$ Aluminium Chloride

$CaCl_2$ Calcium Chloride

$CaCO_3$ Calcium Carbonate

FeO Iron(II) Oxide

Periodic Table

The group 1 A called *.Alkali metal*

The group 2 A called *.Alkali earth metal*

The group 7 A called *.Halogenes*

The group 8 A called *.Noble gases*

The symbol of

Carbon *.C...* Barium *.....Ba.....* Copper *.Cu.* Aluminium *Al*

Which one of the following classified as Halogen: a. F b. C d. Na

Mole calculation :

Calculate the molar mass (molecular formula) for the following:

$$\text{NaCl} \dots 23 + 35 \dots = 58 \text{ amu}$$

$$\text{NaOH} \dots 23 + 16 + 1 \dots = 40 \text{ amu}$$

$$\text{CH}_4 \dots 12 + 4(1) \dots = 16 \text{ amu}$$

$$\text{NH}_3 \dots 14 + 3(1) \dots = 17 \text{ amu} \dots \dots \dots$$

How many mole are there in 23 g of sodium ?

$$n = \frac{m}{MM} = \frac{23\text{g}}{23\text{amu}} = 1 \text{ mole} \dots \dots \dots$$

How many grams are there in 0.10 mol of CH_4 ?

$$MM = n \times m = 0.10 \times (12 + 4) = 0.10 \times 16 = 1.6 \text{ g} \dots \dots \dots$$

How many atoms are there in 3 mole of Hydrogen ?

$$n \times N_A = 3 \times 6.022 \times 10^{23} = 1.8066 \times 10^{24} \text{ atoms} \dots \dots \dots$$

How many molecules are there in 8 g of Oxygen ?

$$\dots \dots \dots \frac{m}{MM} \times N_A = \frac{8}{16} \times 6.022 \times 10^{23} = 3.011 \times 10^{23} \dots \dots \dots$$

Density Calculation

Temperature Conversion

$$??K \rightarrow C^\circ = K - 273$$

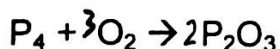
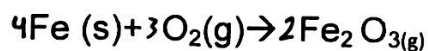
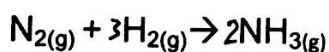
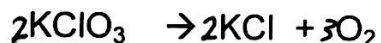
$$??C^\circ \rightarrow K = C + 273$$

$$??F^\circ \rightarrow C^\circ = (F - 32) \times \frac{5}{9}$$

$$C \rightarrow F = \left(\frac{9}{5} \times C\right) + 32$$

Balance the following equation:

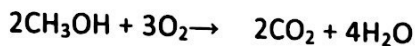
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Mole & Mass calculation (chemical equation)

imp.p

Methanol burns in air according to the equation



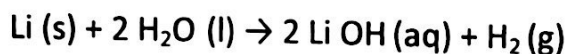
If 209 g of methanol are used up in the combustion, what mass of water is produced? (answer 235 g H₂O)

$$\text{mass} = \frac{\text{mass A}}{m_A} \times MC \times \frac{c}{a}$$

All alkali metals react with water to produce hydrogen gas and the corresponding alkali metal hydroxide. A typical reaction is that between lithium and water

$$\text{H}_2\text{O} = \frac{209}{32} \times 18 \times \frac{9}{2} = 235\text{g}$$

of water



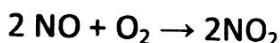
How many mole of LiOH are produce by 3 mole of H₂O?

$$\text{moles mole A} \times \frac{c}{a}$$

The Limiting reagents :

$$\text{LiOH} = 3 \times \frac{2}{2} = 3 \text{ mole LiOH}$$

If 2.0 mole of NO were mixed with 2.0 mol of O₂ to react as the following equation



[Determine the limiting reagent?] → *119 g 10:30:30*

نوع الـ NO

	NO	O ₂
No. Of mol	2	2
Coefficient	2	1
Ratio	$\frac{2}{2} = 1$	$\frac{2}{1} = 2$
The smallest no.	✓	x
The limiting reagent is : ..NO..		

Mass Percent% :

Calculate the mass percent of Nitrogen in NH₃?

$$\text{N\%} = \frac{m \text{ N}}{m \text{ M}} \times 100 = \frac{14}{17} \times 100 = 82\%$$

$$\text{H\%} = \frac{3 \times 1}{17} \times 100 = 18\% \quad \rightarrow \text{N} + 3(\text{H}) = 14 + 3(1) = 17$$

Determination of molecular formulas → *الـ الجزيء* *empirical*

A sample of compound contains 1.25 g of nitrogen(N) and 3.47g of oxygen (O). The molar mass of this compound is between 90g and 95 g . Determine the molecular formula and the accurate molar mass of the compound?

	N	O
$\frac{m}{MM}$	$\frac{1.25}{14}$	$\frac{3.47}{16}$
	$\frac{0.08}{0.08}$	$\frac{0.217}{0.08}$
	1	2.7

Theoretical Yield Problems : $\text{yield} = \frac{\text{Actual yield}}{\text{theoretical yield}} \times 100$

Calculate the percent yield if the actual yield was 70.0 g and the theoretical yield was 90.0?

$$\frac{70.0}{90.0} \times 100 = 77.7\%$$

1- Write the symbol for an atom with the following components; 11 protons and 12 neutrons.

- a. Cl
- b. Na
- c. N
- d. F

$$\begin{array}{r} \text{mass number} \quad \text{protons} \quad \text{neutrons} \\ 23 \quad - \quad 11 \quad = \quad 12 \end{array}$$

2-The empirical formula for Butanoic acid $C_4H_8O_2$ is

- a. $C_4H_8O_2$
- b. C_3H_6O
- c. C_2H_4O
- d. CHO

3-SI unit of pressure is

- a. Kg
- b. Kelvin
- c. mole
- d. Pascal وحدة الضغط

4-What is the appropriate SI unit for distance المسافة

- a. centimeters
- b. inches
- c. meters
- d. kilometers

5-Which of the following is classified as a halogen?

- a. C
- b. Ar
- c. F
- d. Na

6-One of the following is classified as a solution; محلول

- a. C
- b. CO_2
- c. Sea water
- d. Water + Oil

7-The atomic number indicates..... العدد الذري

- a) the number of neutrons in a nucleus
- b) the total number of neutrons and protons in a nucleus
- c) the number protons or electrons in a neutral atom
- d) the number of atoms in 1 g of an element

8-Aluminum forms an ion with a charge of.....

- a) +2
- b) -2
- c) +3

الشحنة

The correct name of the compound Na_3N is.....9-

- a) Sodium nitride
- b) Sodium azide
- c) Trisodium nitrite
- d) Sodium nitrate

10-Which isotope has 45 neutrons?

- a) $^{36}\text{Kr}_{80}$
- b) $^{34}\text{Se}_{78}$
- c) $^{80}\text{Br}_{35}$ $80 - 35 = 45$
- d) $^{34}\text{Cl}_{17}$

11- H_2O is considered as.....

- a) Element
- b) Polyatomic molecule جزيء متعدد الذرات
- c) Diatomic molecule
- d) Mixture

12-The mass number indicates.....

- a) the number of neutrons in a nucleus
- b) the total number of neutrons and protons in a nucleus
- c) the number protons or electrons in a neutral atom
- d) the number of atoms in 1 g of an element

13-The SI unit for measuring the amount of substance is.....

- a) Kg
- b) Kelvin
- c) mole
- d) Pascal

14- A certain isotope X^- contains 54 electrons and 78 neutrons. What is the mass number of this isotope?

- a) 132 $54 + 78 = 132$
- b) 131
- c) 24
- d) 54

15-The prefix Giga used in the metric system has a value of

- a. 10^{+6}
- b. 10^{+12}
- c. 10^{+9}

16- The mass number of an atom containing 7 protons, 7 electrons and 7 neutrons is; this is the element. +

- a) 14; Argon
- b) 12; Carbon
- c) 14; Nitrogen
- d) 21; Carbon

$$7 + 7 = 14$$



17- One of the following is classified as a mixture;

- a) Sodium chloride
- b) Oxygen
- c) Sea water
- d) Hydrogen.

18- The correct symbol for silver element is

- a) Ag
- b) S
- c) Si
- d) Au

19- The correct name of CF_4 compound is.....

- a) Carbon florate
- b) Carbon florite
- c) Carbamide
- d) carbon tetrafluoride

20- The SI unit for measuring the mass of substance is.....

- a) Kilogram
- b) Kelvin
- c) mole
- d) Pascal

21- Which of the following is not an SI system unit of measurements?

- a) Kilogram
- b) Kelvin
- c) minute
- d) Pascal

22- CH_4 is considered as.....

- a) Element
- b) Polyatomic molecule
- c) Diatomic molecule
- d) Mixture

جزء

23 The correct name of the compound KN_3 is.....

- a) Potassium nitride
- b) Potassium azide
- c) Potassium nitrite
- d) Potassium nitrate

البوتوني

24- The correct name of NF_4 compound is.....

- a) Nitrogen florite
- b) Nitrogen florite
- c) Nitrogen trifluoride
- d) Nitrogen tetrafluoride

تساوي من البوتوني

25- The chemical formula for iron (III) chloride is.....

- a) Fe_2Cl_3
- b) FeCl_2
- c) FeCl_3
- d) Fe_3Cl_2

imp

26- The chemical formula for chromium (III) sulfide is...

- a) Cr_2S_3
- b) Cr_2S
- c) CrS_3
- d) Cr_3S_2

27- The empirical formula for ethane C_2H_6 is

- a. C_2H_5
- b. C_3H_8
- c. CH_3
- d. C_3H_7

28- FeO is considered as.....

- a) Element
- b) Polyatomic molecule
- c) Diatomic molecule
- d) Mixture

جزيء ثنائي

29-What is the appropriate SI unit for distance?

- a) Centimeters
- b) Inches
- c) Meters
- d) Kilometers

30-How many electrons does iron (Fe) atom have?

- a) 26
- b) 30
- c) 56
- d) 70

31-What is the symbol for the element gold?

- a) G
- b) GO
- c) Gol
- d) Au

32- Give a systematic name for the following compound NaOH.

- a) Sodium oxide
- b) nitrogen hydroxide
- c) Sodium hydroxide
- d) Sodium hydride

33- The empirical formula for butane molecule C_4H_{10} is

- a. C_2H_5
- b. C_3H_8
- c. CH_3
- d. C_3H_7

34- Isotopes are atoms of the same element with different.....

- a) Mass number
- b) Atomic number
- c) Number of electrons
- d) Number of protons X

35-How many neutrons does ($^{11}C_6$) atom have?

- a) 5
- b) 6
- c) 10
- d) 11

$$11 - 6 = 5$$

36-How many electrons are in ($^{27}Al_{13}^{3+}$)?

- e. 13
- f. 27
- g. 14
- h. 10

$$13 - 3 = 10$$

37-How many electrons are in ($^{78}Se_{34}^{2-}$)?

- a) 78
- b) 36
- c) 34
- d) 44

$$34 + 2 = 36$$

38- Ca^{2+} is considered as.....

- a) Monoatomic anion
- b) Polyatomic cation
- c) Monoatomic cation أيون موجب أحادي
- d) Polyatomic anion

39- NO_2^- is considered as.....

- a) Monoatomic anion
- b) Polyatomic cation
- c) Monoatomic cation أيون موجب أحادي
- d) Polyatomic anion

40- Cl^- is considered as.....

- a) Monoatomic anion
- b) Polyatomic cation
- c) Monoatomic cation X
- d) Polyatomic anion