

1. Trace the development of atomic structure by completing the table below:

	Year	Contribution
Greeks	a.	b.
J. Dalton	c.	d.
Einstein	e.	f.
Rutherford	g.	h.
Bohr	i.	j.
De Broglie	k.	l.
Schroedinger	m.	n.
Aneta Stodolna	o.	p.

2. The sign convention indicating the number of sub-atomic particles within an atom α is given below. What information is associated with each of the symbols?

$\begin{matrix} A \\ Z \end{matrix} \alpha^g$	Symbol	Label	Meaning or interpretation
	A	a.	b.
	g	c.	d.
	Z	e.	f.

3. Complete the table below

Symbol	# of protons	# of electrons	# neutrons	Charge
${}^{23}_{11}\text{Na}$	a.	b.	c.	d.
${}^{35}_{17}\text{Cl}^-$	e.	f.	g.	h.
${}^{55}_{26}\text{Fe}^{3+}$	i.	j.	k.	l.

4. Which have the same number of valence electrons?

a. ${}^{39}_{19}\text{K}^+$	b. ${}^{18}_{18}\text{Ar}$	c. ${}^{35}_{17}\text{Cl}^-$	d. All
a. ${}^{16}_8\text{O}$	b. ${}^{32}_{16}\text{S}$	c. Se	d. All

5. Which produce/s cations?

${}_6\text{C}$	${}_3\text{Li}$	${}_{12}\text{Mg}$	${}_3\text{Li}$ & ${}_{12}\text{Mg}$
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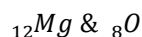
6. Which is the strongest metal?

${}_3\text{Li}$	${}_{11}\text{Na}$	${}_{30}\text{Zn}$	${}_3\text{Li}$ & ${}_{30}\text{Zn}$
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7. Which is the strongest oxidizing agent?

${}_8\text{O}$	${}_{15}\text{P}$	${}_{17}\text{Cl}$	${}_{36}\text{Kr}$
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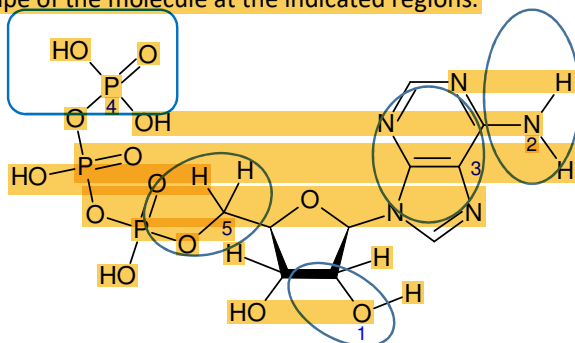
8. Write down the product of the reaction between



9. Sketch the shape of each molecule below

a. CH_4	b. NH_3	c. H_2O	d. H_2CO_3
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10. Write down the shape of the molecule at the indicated regions.



11. Write down correct formula for the following

a. Magnesium hydroxide	b. Hydrogen acetate	c. Calcium phosphate
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12. Write down the chemical equation for the processes below

- Iron(II) chloride + hydrogen carbonate to produce iron(II) carbonate + hydrochloric acid
- Magnesium dissolves in acetic acid to liberate hydrogen gas and magnesium acetate.

13. What is the weight (in grams) of one mole of substance?

One gram	6.02×10^{23} particles	Molar mass	All are correct.
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14. The molarity is an expression of concentration. It is defined as $\frac{\# \text{ mol of component}}{\text{Liter}_{\text{solution}}}$, e.g., 0.1M

FeSO_4 means 1L of solution contains 0.1mol of FeSO_4 .

- What is the concentration of 100mL solution that contains 10mmoles of NaCl?
- What is the concentration of 1L solution that contains 0.1mole table sugar, $\text{C}_{12}\text{H}_{22}\text{O}_{11}$?
- Of the two solutions above, which is more concentrated?

The NaCl solution above conducts electricity, whereas the sugar solution does not. For this reason, NaCl is called an electrolyte & the sugar solution, a non-electrolyte.

15. What substances are responsible for the electrical conductivity of the salt solution?

16. What is meant by the van't Hoff factor? How does this relate to the ability of a substance to conduct electricity in solution?

17. A property of solutions that relates to the number of particles present in solution is called osmotic pressure. Two solutions are prepared separately, i.e.,

a. 1mole sugar dissolved in 1L water	b. 1mole NaCl dissolved in 1L water
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Each is placed in a compartment separated from the other by a barrier permeable only to water. The solutions are then left to equilibrate for 24h.

- In which compartment is the solution at a higher level: the sugar compartment or the NaCl compartment?
- Very briefly, explain the result.

18. On opposite sides of a room, 2 separate bottles are placed: one containing crushed bawang the other containing crushed sampaguita flowers. Bawang is known to contain allicin ($\text{C}_6\text{H}_{10}\text{S}_2\text{O}$), whereas sampaguita is known to contain jasmine ($\text{C}_{11}\text{H}_{16}\text{O}$).

- Which of the two would be first perceived by a person entering the doorway?
- Explain your answer very briefly.

garlic