

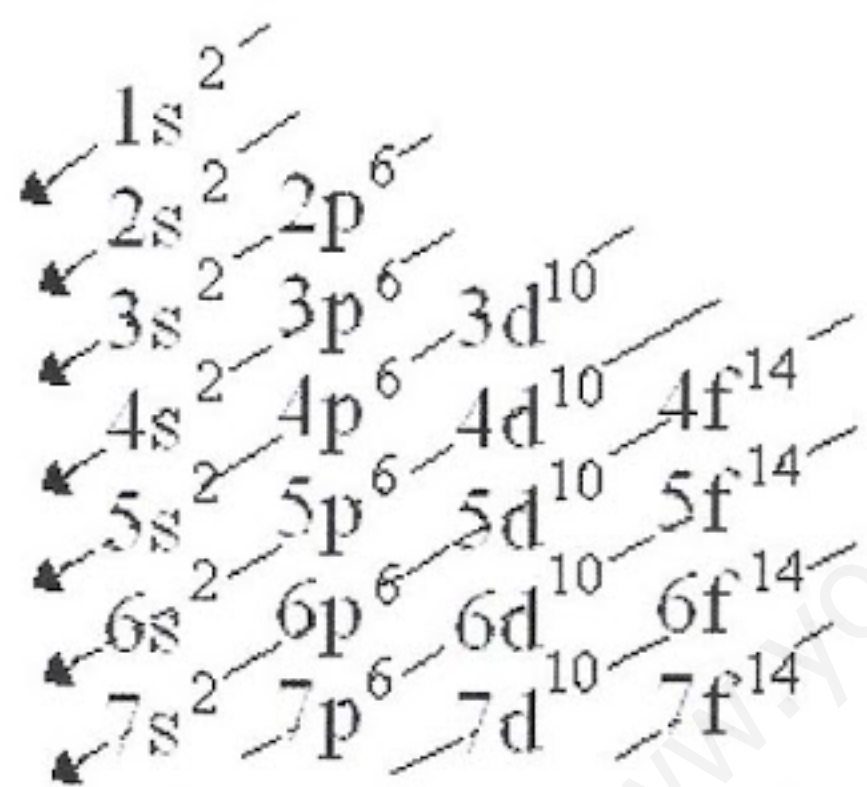
EXAM B

1) Write down the electron configuration of the following elements:

5 points

a) Be ($Z = 4$):b) Si ($Z = 14$):c) Zn ($Z = 30$):d) Kr ($Z = 36$):e) B ($Z = 5$):ANSWER:

To write the electron configuration we need Möller's diagram:

a) Be ($Z = 4$): $1s^2 2s^2$ b) Si ($Z = 14$): $1s^2 2s^2 2p^6 3s^2 3p^2$ c) Zn ($Z = 30$): $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10}$ d) Kr ($Z = 36$): $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6$ e) B ($Z = 5$): $1s^2 2s^2 2p^1$

2) Write down the valence electrons of the elements in the previous activity.

5 points

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ANSWER:

- a) Be ($Z = 4$): $2s^2 \Rightarrow 2$ valence electrons
- b) Si ($Z = 14$): $3s^2 3p^2 \Rightarrow 4$ valence electrons
- c) Zn ($Z = 30$): $4s^2 \Rightarrow 2$ valence electrons
- d) Kr ($Z = 36$): $4s^2 4p^6 \Rightarrow 8$ valence electrons
- e) B ($Z = 5$): $2s^2 2p^1 \Rightarrow 3$ valence electrons

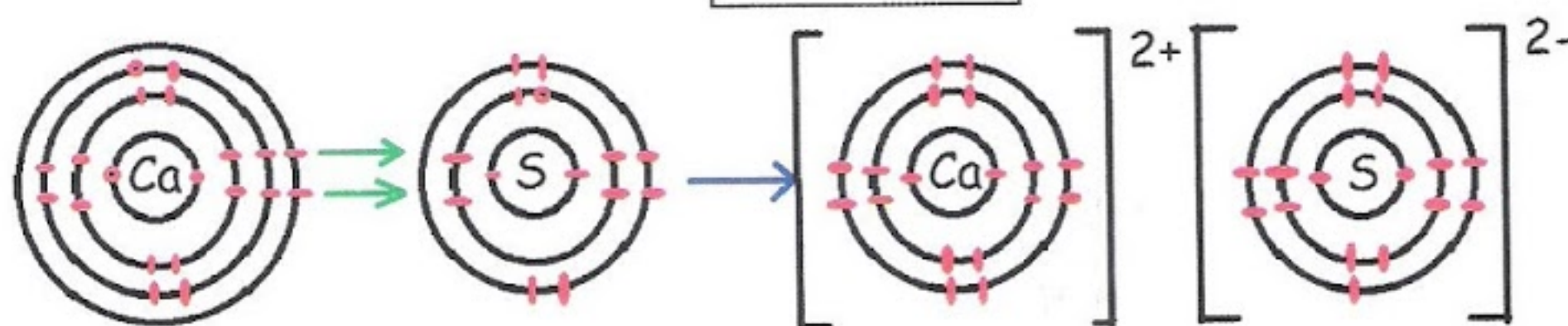
3) Circle the pairs of isotopes:

a) $^{10}_5B$, 9_4Be , $^{14}_7N$, $^{11}_5B$ 5 pointsb) $^{27}_{13}Al$, $^{30}_{14}Si$, $^{28}_{14}Si$, 7_3Li 5 pointsANSWER:a) $^{10}_5B$, 9_4Be , $^{14}_7N$, $^{11}_5B$ b) $^{27}_{13}Al$, $^{30}_{14}Si$, $^{28}_{14}Si$, 7_3Li 4) What is the chemical bond between $^{20}_{20}Ca$ and $^{16}_{16}S$ like?5 pointsANSWER: $^{20}_{20}Ca$: metal $^{16}_{16}S$: non-metal $\Rightarrow$ IONIC BOND

Element	Electron configuration	Valence electron	Ion	Formula
$^{20}_{20}Ca$	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$	2	Ca^{2+}	CaS
$^{16}_{16}S$	$1s^2 2s^2 2p^6 3s^2 3p^4$	6	S^{2-}	

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5 points



5) List the properties of ionic bonds.

5 points

ANSWER:

- Ionic substances require high temperatures to melt.
- Solid at room temperature.
- Form crystals.
- Hard but brittle.
- Do not conduct electricity in solid but do if dissolved in water or melted.
- Can be easily dissolved in water.

6) What is the chemical bond between ${}^9\text{F}$ and ${}^1\text{H}$ like?

5 points

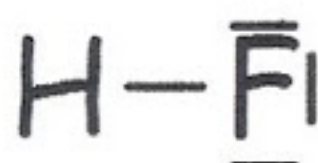
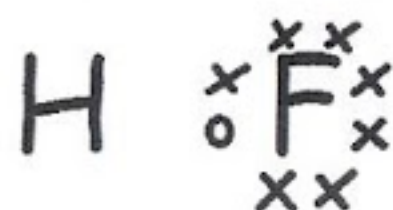
ANSWER: ${}^1\text{H}$: non - metal ${}^9\text{F}$: non - metal

COVALENT BOND

Element	Electron configuration	Valence electrons	Need	Formula
${}^1\text{H}$	$1s^1$	1	1	HF
${}^9\text{F}$	$1s^2 2s^2 2p^5$	7	1	

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LEWIS DIAGRAM:

7) What is the chemical bond between $_{15}\text{P}$ and $_{15}\text{P}$ like?

5 points

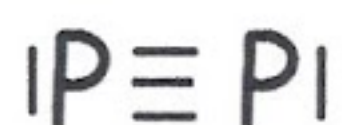
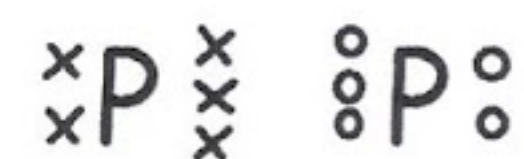
ANSWER: $_{15}\text{P}$: non - metal $_{15}\text{P}$: non - metal

COVALENT BOND

Element	Electron configuration	Valence electrons	Need	Formula
$_{15}\text{P}$	$1s^2 2s^2 2p^6 3s^2 3p^3$	5	2	P_2
$_{15}\text{P}$	$1s^2 2s^2 2p^5 3s^2 3p^3$	5	2	

LEWIS DIAGRAM:

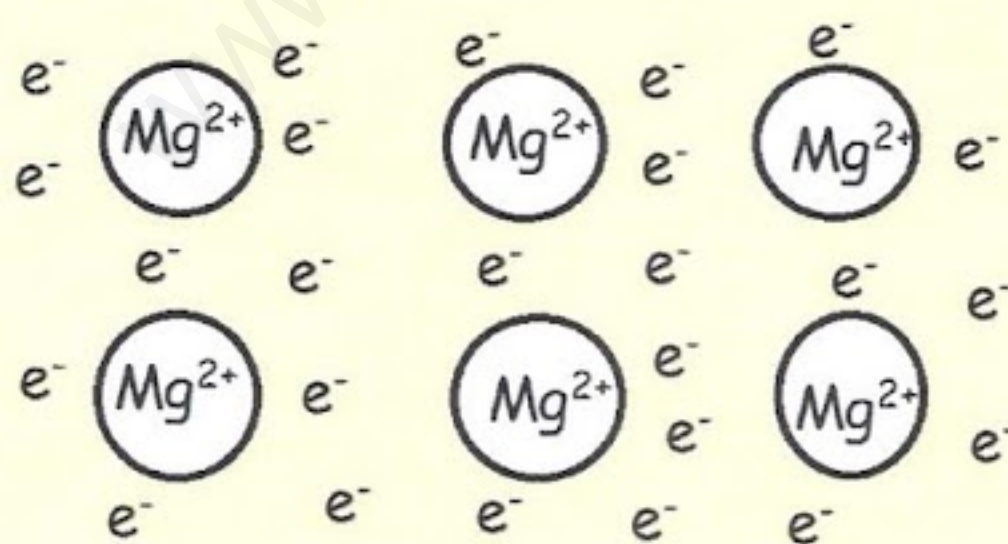
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8) Explain a magnesium crystal ($Z = 12$)

5 points

ANSWER:

Element	Electron configuration	Valence electron	Ion	Formula
$_{12}\text{Mg}$	$1s^2 2s^2 2p^6 3s^2$	2	Mg^{2+}	Mg

9) Explain an aluminium crystal ($Z = 13$)

5 points

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ANSWER:

Element	Electron configuration	Valence electron	Ion	Formula
$_{13}\text{Al}$	$1s^2 2s^2 2p^6 3s^2 3p^1$	3	Al^{3+}	Al

