BONDS EXAM 3rd ESO D

NAME AND SURNAME_____

EXAM B

1) Write down the electron configuration of the following elements: 5 points

a) Be (Z = 4):

b) Si (Z = 14):

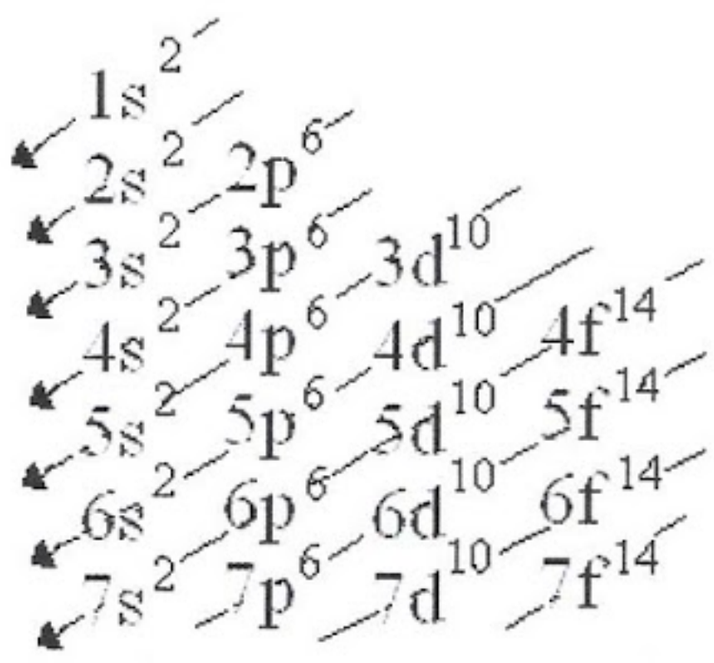
c) Zn (Z = 30):

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

ANSWER:

a) Be (Z = 4): $2s^2$ ⟹ 2 valence electrons

b) Si (Z = 14): $3s^2 3p^2$ ⟹ 4 valence electrons

c) Zn (Z = 30): $4s^2$ ⟹ 2 valence electrons

d) Kr (Z = 36): $4s^2 4p^6$ ⟹ 8 valence electrons

e) B (Z = 5): $2s^2 2p^1$ ⟹ 3 valence electrons

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3) Circle the pairs of isotopes:

a) $^{10}_{5}B$, $^{9}_{4}Be$, $^{14}_{7}N$, $^{11}_{5}B$ | 5 points

b) $^{27}_{13}Al$, $^{30}_{14}Si$, $^{28}_{14}Si$, $^{7}_{3}Li$ | 5 points

ANSWER:

a) $^{10}_{5}B$, $^{9}_{4}Be$, $^{14}_{7}N$, $^{11}_{5}B$

b) $^{27}_{13}Al$, $^{30}_{14}Si$, $^{28}_{14}Si$, $^{7}_{3}Li$

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4) What is the chemical bond between $_{20}Ca$ and $_{16}S$ like? | 5 points

ANSWER:

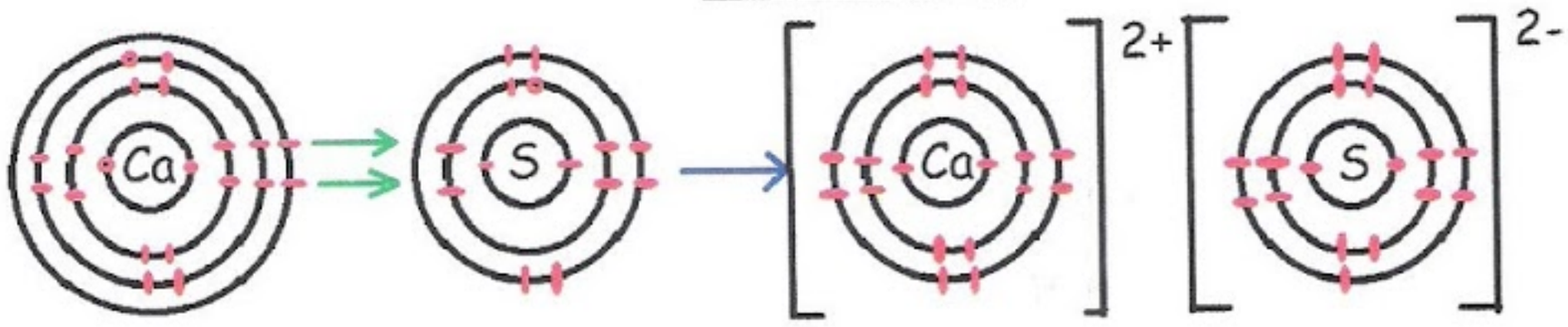
$_{20}Ca$: metal
$_{16}S$: non-metal
⟹ IONIC BOND

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

BONDS EXAM 3rd ESO D

NAME AND SURNAME_____

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.

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6) What is the chemical bond between $_9F$ and $_1H$ like? 5 points

ANSWER:

$_1H$: non - metal

$_9F$: non - metal

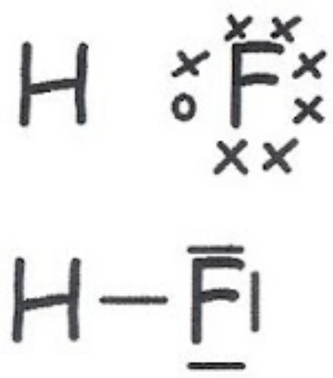
⟹ COVALENT BOND

Element	Electron configuration	Valence electrons	Need	Formula
$_1H$	$1s^1$	1	1	HF
$_9F$	$1s^2 2s^2 2p^5$	7	1	

BONDS EXAM 3rd ESO D

NAME AND SURNAME_____

LEWIS DIAGRAM:



7) What is the chemical bond between $_{15}P$ and $_{15}P$ like? 5 points

ANSWER:

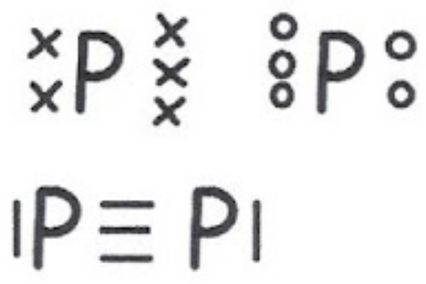
$_{15}P$: non - metal

$_{15}P$: non - metal

⟹ COVALENT BOND

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

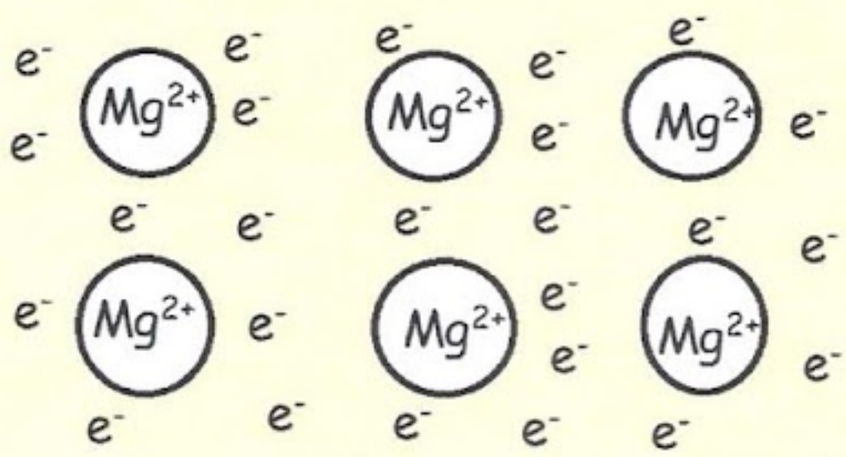
LEWIS DIAGRAM:



8) Explain a magnesium crystal (Z = 12) | 5 points

ANSWER:

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



9) Explain an aluminium crystal (Z = 13) | 5 points

BONDS EXAM 3rd ESO D

NAME AND SURNAME_____

ANSWER:

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