BONDS EXAM 3rd ESO D

NAME AND SURNAME_____

EXAM A

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

a) K (Z = 19):

b) C (Z = 6):

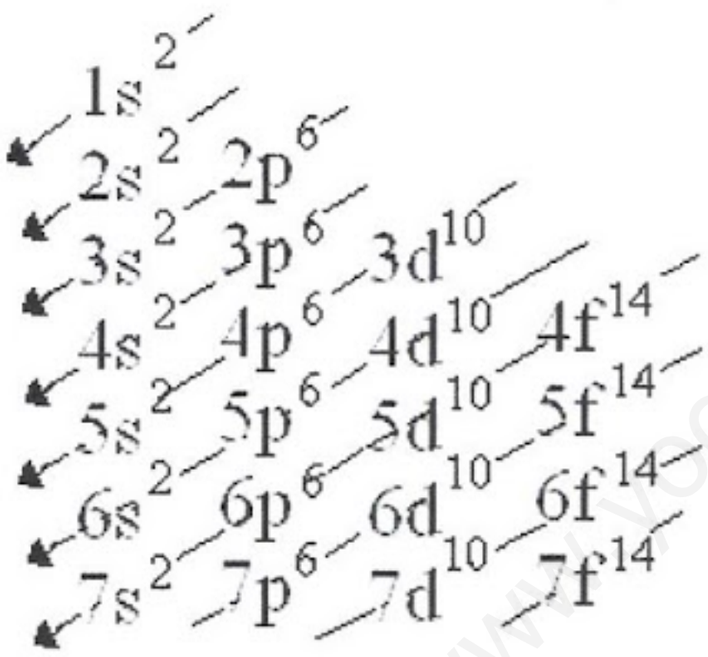
c) I (Z = 53):

d) Ne (Z = 10):

e) Cr (Z = 24):

ANSWER:

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



a) K (Z = 19): $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$

b) C (Z = 6): $1s^2 2s^2 2p^2$

c) I (Z = 53): $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^5$

d) Ne (Z = 10): $1s^2 2s^2 2p^6$

e) Cr (Z = 24): $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^4$

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2) Write down the valence electrons of the elements in the previous activity. 5 points

ANSWER:

a) K (Z = 19): $4s^1 \Longrightarrow$ 1 valence electron.

b) C (Z = 6): $2s^2 2p^2 \Rightarrow$ 4 valence electrons.

c) I (Z = 53): $5s^2 5p^5 \Longrightarrow$ 7 valence electrons.

d) Ne (Z = 10): $2s^2 2p^6 \Longrightarrow$ 8 valence electrons.

e) Cr (Z = 24): $4s^2 \Rightarrow$ 2 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 $_{12}$Mg and $_{16}$S like? 5 points

ANSWER:

$_{12}$Mg: metal

$_{16}$S: non-metal

$\Longrightarrow$ IONIC BOND

Element	Electron configuration	Valence electron	Ion	Formula
$_{12}$Mg	$1s^2 2s^2 2p^6 3s^2$	2	Mg^{2+}	MgS
$_{16}$S	$1s^2 2s^2 2p^6 3s^2 3p^4$	6	S^{2-}	

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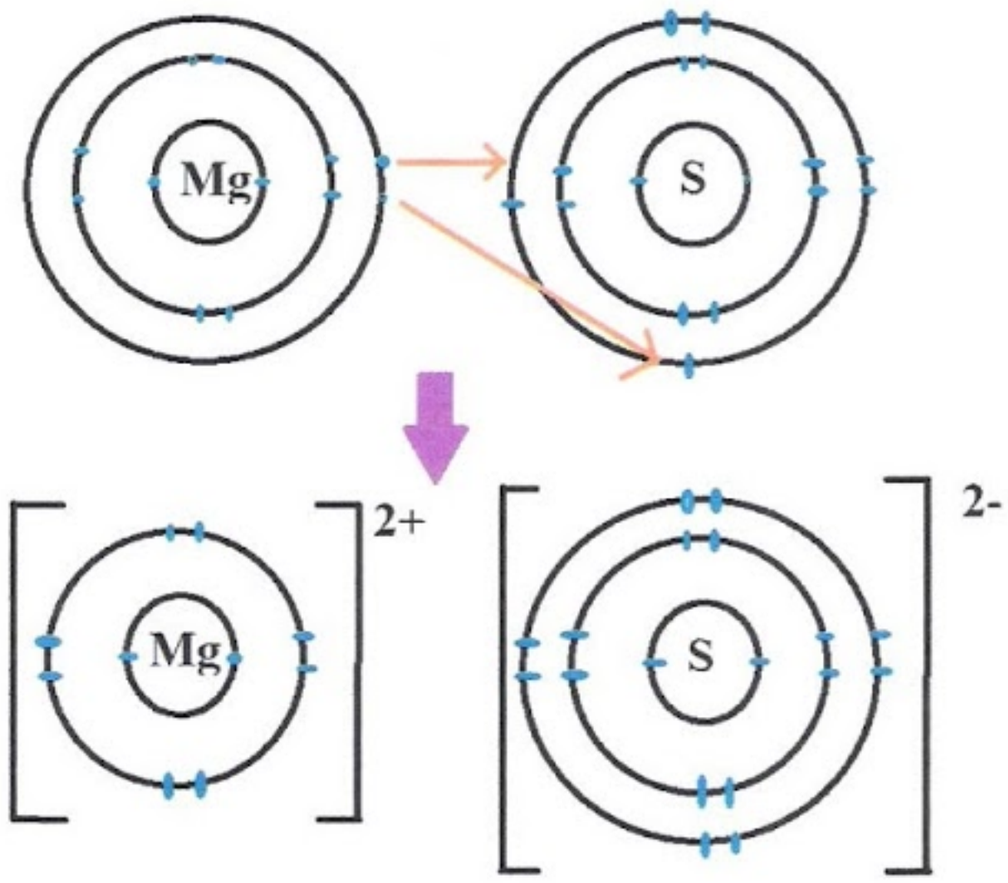

5) What is the chemical bond between $_{11}Na$ and $_{17}Cl$ like? 5 points

ANSWER:

$_{11}Na$: metal

$_{17}Cl$: non-metal

⇒ IONIC BOND

Element	Electron configuration	Valence electron	Ion	Formula
$_{11}Na$	$1s^2 2s^2 2p^6 3s^1$	1	Na^+	NaCl
$_{17}Cl$	$1s^2 2s^2 2p^6 3s^2 3p^5$	7	Cl^-	

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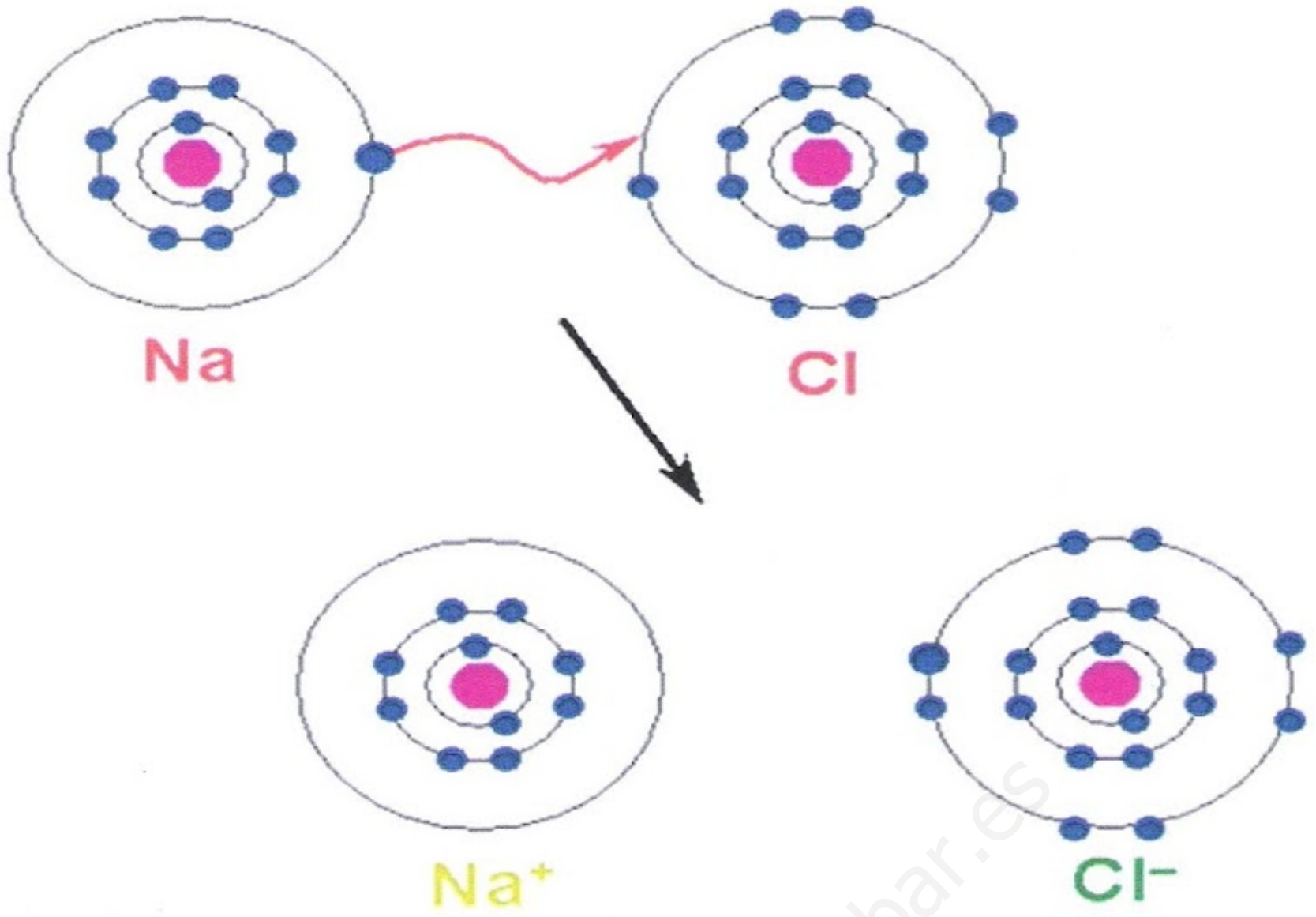

6) What is the chemical bond between $_{1}H$ and $_{16}S$ like? 5 points

ANSWER:

$_{1}H$: non - metal

$_{16}S$: non - metal

⟹ COVALENT BOND

Element	Electron configuration	Valence electrons	Need	Formula
$_{1}H$	$1s^1$	1	1	H_2S
$_{16}S$	$1s^2 2s^2 2p^6 3s^2 3p^4$	6	2	

LEWIS DIAGRAM:

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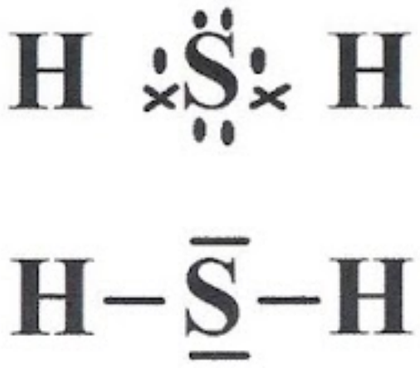


7) What is the chemical bond between $_{17}Cl$ and $_{17}Cl$ like? 5 points

ANSWER:

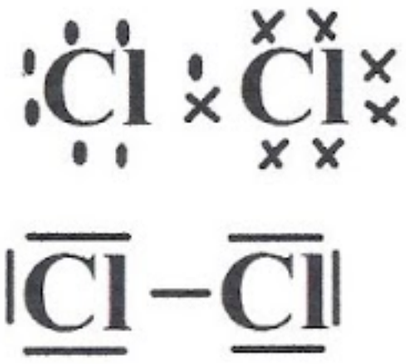
$_{17}Cl$: non - metal

$_{17}Cl$: non - metal

⟹ COVALENT BOND

Element	Electron configuration	Valence electrons	Need	Formula
$_{17}Cl$	$1s^2 2s^2 2p^6 3s^2 3p^5$	7	1	Cl_2
$_{17}Cl$	$1s^2 2s^2 2p^6 3s^2 3p^5$	7	1	

LEWIS DIAGRAM:



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8) List the properties of metallic bonds. 5 points

ANSWER:

- They form crystals.
- Luster (surface light reflectivity).
- Electrical and thermal conductivity.
- Ductility and malleability.
- Tensile strength.

9) Explain a potassium crystal (Z = 19) 5 points

ANSWER:

Element	Electron configuration	Valence electron	Ion	Formula
$_{19}K$	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$	1	K^+	K