

Die Atoom Memo

November 2018/1

1.3 B ✓✓ (2)

QUESTION 4/VRAAG 4

4.1 The number of protons in an atom of an element ✓✓ / Die aantal protone in 'n atoom van 'n element (2)

4.2.1 $^{30}_{14}\text{Si}$ ✓✓ $^{28}_{14}\text{Si}$ ✓

<ul style="list-style-type: none">• Identification of element (Si) / Identifiseer element (Si) ✓• Correct mass number and atomic number (A and Z) / Korrekte massagetal en atoomgetal (A en Z) ✓• No mark for swapping of A and Z / Geen punt indien A en Z omgeruil word

(2)

4.2.2 P ✓ / Sodium / Na / Natrium (1)

4.2.3 S^{2-} ✓✓

<ul style="list-style-type: none">• Identification of correct element (S) / Identifiseer korrekte element (S) ✓• Correct charge (2-) / Korrekte lading (2-) ✓• Incorrect identification of element / Verkeerde element (0/2)
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(2)

4.3.1 Rb_2O ✓✓ (2)

4.3.2 Rb is in the same group as P / Na ✓ / Rb is in dieselfde groep as P / Na
OR/OF Rb is in group 1 / Rb is in groep 1
∴ has the same valency as P / Na. ✓ / ∴ het dieselfde valensie as P / Na. (2)

4.4 Increases. ✓ / Neem toe
From P to R, the atomic radius gets smaller. ✓ **OR/OF** The outer electrons get closer to the nucleus.
Van P na R raak die atomiese radius kleiner. / Die buite-elektrone kom nader aan die kern.
The attraction between the nucleus and the outer electron gets stronger ✓ ∴ more energy is needed to remove the electrons. ✓ / Die aantrekkingskrag tussen die kern en die buite-elektrone raak sterker ∴ meer energie is nodig om die elektrone te verwyder. (4)

4.5 10 (electrons) ✓

2p	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow$	✓
2s	$\uparrow\downarrow$	}		✓
1s	$\uparrow\downarrow$			

(3)

4.6 Hund's rule ✓ / Hund se reël (1)

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4.7 Relative atomic mass/*Relatiewe atoommassa*:

$$A_r = \frac{(28 \times 92,23 + 29 \times 4,68 + 30 \times 3,09) \checkmark}{100 \checkmark}$$
$$= 28,11 \text{ (u)} \checkmark$$

(3)
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1.4 A ✓✓

(2)

QUESTION 4/VRAAG 4

4.1.1 Isotope: atoms of the same element having the same number of protons, but different number of neutrons. **OR** Same atomic number, but different mass numbers. ✓✓

*Isotoop: Atome van dieselfde element wat dieselfde getal protone het, maar verskillende getalle neutrone. ✓✓ **OF** Dieselfde atoomgetalle, maar verskillende massagetalle.*

(2)

4.1.2 50% = 106,9 amu

50% = 109,1 amu ✓

$$A_r = \frac{(50 \times 106,9) + (50 \times 109,1)}{100}$$

= 108 ✓

(5)

4.1.3 Ag/Silver ✓✓

Ag/Silwer ✓✓

(2)

4.2.1 13 ✓

4.2.2 14 ✓

4.2.3 13 ✓

4.2.4 39 ✓

4.2.5 19 ✓

4.2.6 20 ✓

4.2.7 18 ✓

(7)

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1.6 A ✓✓

(2)

QUESTION 5/VRAAG 5

5.1 Isotopes are atoms of the same element having the same number of protons but different numbers of neutrons. ✓✓

OR

Isotopes are atoms of the same element having the same atomic number but different atomic mass (mass number). ✓✓

Isotope is atome van dieselfde element wat dieselfde getal protone het, maar verskillende getalle neutrone.

OF

Isotope is atome van dieselfde element wat dieselfde atoomgetal het, maar verskillende atoommassas (massagetal) het.

(2)

5.2 5.2.1 ${}^{19}_9\text{X}$ and/en ${}^{20}_9\text{X}$ ✓

OR/OF

A and/en C ✓

(1)

5.2.2 Fluorine ✓ / Fluor

(1)

5.3
$$\text{Ar}(\text{Cu}) = \left(\frac{69}{100} \times 63 \right) + \left(\frac{31}{100} \times 65 \right)$$

$$= 63.62 \checkmark \checkmark$$

(4)

5.4 5.4.1 19 ✓

5.4.2 10 ✓

5.4.3 Mg (isotope) OR magnesium (isotope) ✓

Mg (isotoop) OF magnesium (isotoop) ✓

5.4.4 12 ✓

5.4.5 13 ✓

(5)

5.5 $(\text{NH}_4)_2\text{SO}_4$ ✓

(1)

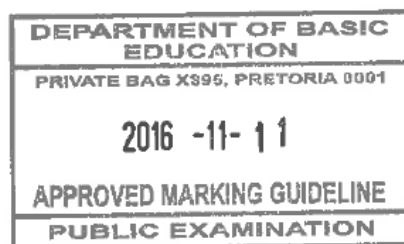
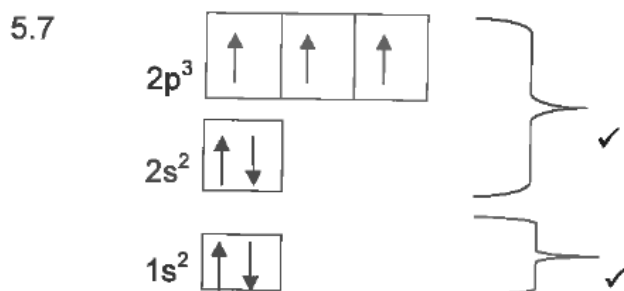
5.6 Covalent bond ✓.

Electrons are shared ✓ between the atoms of hydrogen and nitrogen.

Kovalente binding.

Elektrone word gedeel tussen die atome van waterstof en stikstof.

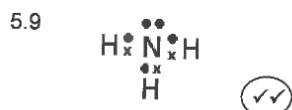
(2)



(2)

5.8 5 ✓

(1)



(2)
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QUESTION 4/VRAAG 4

4.1

4.1.1 The number of protons ✓ in the nucleus of an atom. ✓

Die getal protone in die kern van 'n atoom.

(2)

4.1.2 Atoms of the same element having the same number of protons, ✓ but different numbers of neutrons. ✓

Atome van dieselfde element met dieselfde getal protone maar verskillende getalle neutrone.

OR/OR

Atoms (of the same element) with the same atomic number ✓ but different mass numbers. ✓

Atome (van dieselfde element) met dieselfde atoomgetal, maar verskillende massagetalle.

(2)

4.2

4.2.1 $1s^2 2s^2 2p^6 \checkmark 3s^2 3p^5 \checkmark$

(2)

4.2.2

OPTION 1/OPSIE 1:

%Cl-35 = x and %Cl-37 = y

$x + y = 100 \checkmark \dots\dots\dots 1$

$35,5 = \frac{x(35) + y(37)}{100} \checkmark \dots\dots\dots 2$

1 in 2:

$35,5 = \frac{x(35) + (100 - x)37}{100}$

$3550 = 35x + 3700 - 37x$

$\therefore x = 75 \checkmark$

OPTION 2/OPSIE 2:

%Cl-35 = x \therefore %Cl-37 = 100 - x ✓

$\left(\frac{x}{100}\right)35 + \left(\frac{100-x}{100}\right)37 = 35,5 \checkmark$

$0,35x + 37 - 0,37x = 35,5$

$1,5 = 0,02x$

$x = 75 \checkmark$

Marking criteria/Nasienriglyne

- $x + y = 100$ **OR/OF** $x = 100 - y$
OR/OF $y = 100 - x \checkmark$
- Expression to calculate average atomic mass of 100 atoms. ✓
Uitdrukking om gemiddelde atoommassa van 100 atome te bereken.
- Final answer / Finale antwoord: 75

(3)

Klassifikasie van Materie, Fases, Die Atoom Memo
November 2015/2

4.3

4.3.1 7 ✓

(1)

4.3.2 Covalent (bond)/Kovalente (binding) ✓

(1)

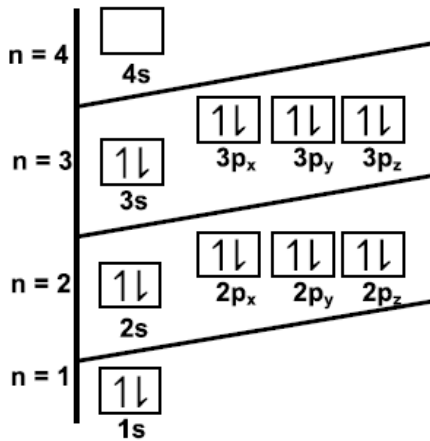
4.3.3



(2)

4.4

4.4.1



Marking criteria/Nasienriglyne:

- Main energy levels shown ✓
Hoofenergievlakke aangedui (1, 2, 3 etc.).
- Orbitals labelled as s or p. Ignore if 4th level and 4s not shown. ✓
Orbitale genommer as s of p. Ignoreer as 4de vlak en 4s nie getoon word nie.
- Nine electron pairs shown as arrows in opposite directions in blocks/circles. ✓
Nege elektronpare getoon as pyltjies in teenoorgestelde rigtings in blokke of sirkels.

(3)

4.4.2 Ca^{2+} ✓ & Cl^- ✓

(2)

[18]