

PHYSICAL SCIENCES

GR 10 RESOURCE



EXERCISE 1.5

MODULE 1 TOPIC 3, p. 28
Gr 10 Physical Sciences 3-in-1

QUESTION 1

Use the Periodic Table to complete the table below.

Element	Symbol	Atomic number	Mass number	Protons	Electrons	Neutrons
Beryllium						
Phosphorous						
Argon						
Cobalt						
Bromium ion						
Silver ion						

QUESTION 2

For each of the element symbols given below, provide the number of protons, neutrons and electrons.

2.1 ${}^{19}_{9}\text{F}$ 2.2 ${}^{27}_{13}\text{Al}$ 2.3 ${}^{56}_{26}\text{Fe}^{3+}$

QUESTION 3

Complete 3.1 to 3.26 in the table below.

Element atom/ion symbol	Atomic number (Z)	Number of Neutrons (N)	Number of electrons	Mass number (A)
3.1	3.2	0	3.3	3.4
3.5	19	3.6	18	3.7
3.8	3.9	3.10	38	88
N	3.11	3.12	7	3.13
Cu	3.14	3.15	3.16	63
Pb ²⁺	3.17	125	3.18	3.19
I ⁻	53	3.20	3.21	3.22
Ti ⁴⁺	3.23	3.24	3.25	3.26

QUESTION 4

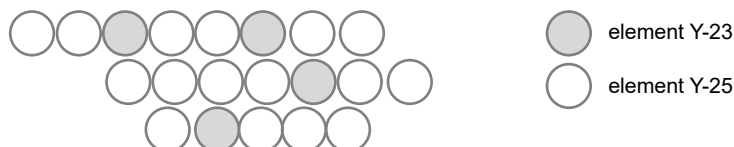
4.1 Consider the unknown elements **A** to **E** below.

A	B	C	D	E
$^{19}_{9}\text{X}$	$^{19}_{10}\text{X}$	$^{20}_{9}\text{X}$	$^{21}_{11}\text{X}$	$^{19}_{8}\text{X}$

4.1.1 Give the LETTERS of the elements that are isotopes.

4.1.2 Give the NAMES of the isotopes identified in QUESTION 4.1.1.

4.2 Another element **Y** occurs in nature as two isotopes, namely **Y-23** and **Y-25**. The drawing below represents a sample of 20 atoms of this element. Use the information to calculate the relative atomic mass of element **Y**.



4.3 Consider two unknown element particles **X** and **Y** below.



4.3.1 Use the Periodic Table and identify the element particles **X** and **Y²⁻**.

4.3.2 Draw an Aufbau diagram from the element particle **X**.

4.3.3 Write down the electron configuration (sp-notation) for the element particle **Y²⁻**.

4.4 Potassium naturally exists as isotopes, ^{39}K , ^{40}K and ^{41}K .

Isotope	% abundance	Atomic Mass number
^{39}K	93,259	38,964
^{40}K	0,012	39,964
^{41}K	6,729	X

4.4.1 Define the term *isotope*.

4.4.2 The relative atomic mass of potassium is 39,098. Determine the atomic mass number (**X**) of Potassium 41 isotope.

EXERCISE ANSWERS

QUESTION 1

1.1 Be	1.2 4	1.3 9	1.4 4	1.5 4	1.6 5
1.7 P	1.8 15	1.9 31	1.10 15	1.11 15	1.12 16
1.13 Ar	1.14 18	1.15 40	1.16 18	1.17 18	1.18 22
1.19 Co	1.20 27	1.21 59	1.22 27	1.23 27	1.24 32
1.25 Br ⁻	1.26 35	1.27 80	1.28 35	1.29 36	1.30 45
1.31 Ag ⁺	1.32 47	1.33 108	1.34 47	1.35 46	1.36 61

QUESTION 2

2.1 protons: 9	neutrons: 10	electrons: 9
2.2 protons: 13	neutrons: 14	electrons: 13
2.3 protons: 26	neutrons: 30	electrons: 23

QUESTION 3

3.1 H	3.2 1	3.3 1	3.4 1	3.5 K ⁺	3.6 20
3.7 39	3.8 Sr	3.9 38	3.10 50	3.11 7	3.12 7
3.13 14	3.14 29	3.15 34	3.16 29	3.17 82	3.18 80
3.19 207	3.20 74	3.21 54	3.22 127	3.23 81	3.24 123
3.25 77	3.26 204				

QUESTION 4

4.1.1 A and C

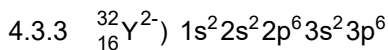
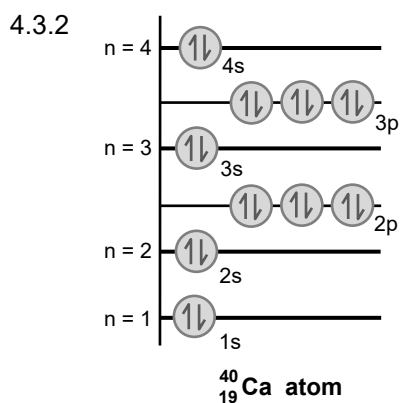
4.1.2 Fluorine-19 and Fluorine-20

$$4.2 \quad A_r(Y) = \frac{(4 \times 23) + (16 \times 25)}{20}$$

$$= 24,6$$

4.3.1 X: calcium atom (Ca)

Y²⁻: sulphur ion (S²⁻)



4.4.1 Isotopes are atoms of the same element **having the same number of protons, but different numbers of neutrons.**

$$4.4.2 \quad A_r(K) = \frac{(93,259 \times 38,964) + (0,012 \times 39,964) + (6,729 \times X)}{100}$$

$$39,098 \times 100 = 3633,744 + 0,480 + 6,729X$$

$$6,729X = 275,558$$

$$X = 40,95$$