



## Matter and material: The atom

### Practice test and memo

#### Practice test

Mark allocation: 30 marks

Time allocation: 30 minutes

Refer to the periodic table at the end of the test.

1. Four options are provided as possible answers to the following questions. Each question has only one correct answer. Write only the letter (A-D) next to the question number.

1.1 The electronic configuration of an element is given as X:  $1s^22s^22p^63s^23p^3$ . Which of the following is the group and period of this element X? (2)

- A. Group 13 and Period 3
- B. Group 15 and Period 3
- C. Group 3 and Period 3
- D. Group 5 and Period 2

1.2 Which of the following electron configurations represents a noble gas? (2)

- A.  $1s^1$
- B.  $1s^22s^2$
- C.  $1s^22s^22p^6$
- D.  $1s^22s^22p^63s^2$

1.3 The number of neutrons of  $^{24}_{12}\text{Mg}$  is: (2)

- A. 6
- B. 24
- C. 36
- D. 12

1.4 The number of valence electrons in an atom of oxygen is: (2)

- A. 2
- B. 8
- C. 6
- D. 1

2. Complete the table below. Write only the answer next to the question number. (5)

Element name	Mass number	Atomic number	Number of protons	Number of neutrons	Number of electrons
Sodium	2.1	11	11	2.2	11
2.3	27	2.4	13	2.5	13



3. A group of Astronauts after a trip to the moon bring back an element which they thought was previously undiscovered. After a laboratory analysis they find the isotopic notation to  ${}_{16}^{32}\text{Y}$ .
- 3.1 Define an isotope. (2)
- 3.2 Write down the name of the element that Y represents. (1)
- 3.3 In which group and period would element Y belong? (2)
- 3.4 Write down the sp notation of element Y. (2)
- 3.5 Draw the Aufbau diagram of element Y. (3)
- 3.6 How many core electrons does element Y have? (1)
- 3.7 How many valence electrons does element Y have? (1)

4. Potassium has three naturally occurring isotopes. Their abundances are shown in the table below.

Isotope	Relative abundance (%)
Potassium-39	93.26
Potassium-40	6.73
Potassium-41	0.01

- 4.1 Which of these isotopes has the greatest number of neutrons? (1)
- 4.2 Calculate the relative atomic mass ( $A_r$ ) of potassium using information given in the table above. (4)



1 (I)	2 (II)	3	4	5	6	7	8	9	10	11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)	
1 1 H																	2 4 He	
3 7 Li	4 9 Be												5 11 B	6 12 C	7 14 N	8 16 O	9 19 F	10 20 Ne
11 23 Na	12 24 Mg												13 27 Al	14 28 Si	15 31 P	16 32 S	17 35,5 Cl	18 40 Ar
19 39 K	20 40 Ca	21 45 Sc	22 48 Ti	23 51 V	24 52 Cr	25 55 Mn	26 56 Fe	27 59 Co	28 59 Ni	29 63,5 Cu	30 65 Zn	31 70 Ga	32 73 Ge	33 75 As	34 79 Se	35 80 Br	36 84 Kr	
37 86 Rb	38 88 Sr	39 89 Y	40 91 Zr	41 92 Nb	42 96 Mo	43 96 Tc	44 101 Ru	45 103 Rh	46 106 Pd	47 108 Ag	48 112 Cd	49 115 In	50 119 Sn	51 122 Sb	52 128 Te	53 127 I	54 131 Xe	
55 133 Cs	56 137 Ba	57 139 La	72 179 Hf	73 181 Ta	74 184 W	75 186 Re	76 190 Os	77 192 Ir	78 195 Pt	79 197 Au	80 201 Hg	81 204 Tl	82 207 Pb	83 209 Bi	84 209 Po	85 209 At	86 209 Rn	
87 226 Fr	88 226 Ra	89 Ac																
			58 140 Ce	59 141 Pr	60 144 Nd	61 Pm	62 150 Sm	63 152 Eu	64 157 Gd	65 159 Tb	66 163 Dy	67 165 Ho	68 167 Er	69 169 Tm	70 173 Yb	71 175 Lu		
			90 232 Th	91 Pa	92 238 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr		

KEY/SLEUTEL

Atomic number  
Atoomgetal

Electronegativity  
Elektronegatiwiteit

Symbol  
Simbool

Approximate relative atomic mass  
Benaderde relatiewe atoommassa

Practice test memo

1.

1.1 B✓✓

1.2 C✓✓

1.3 D✓✓

1.4 C✓✓

2.

2.1 23✓

2.2 12✓

2.3 Aluminium✓

2.4 13✓

2.5 14✓

3.

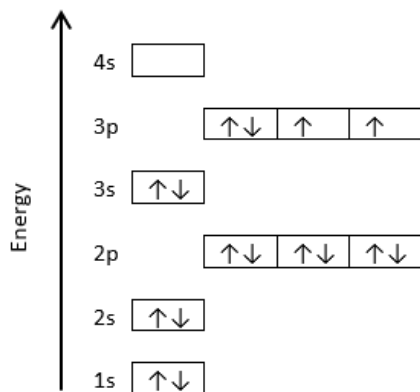
3.1 Atoms of the same element with the same number of protons but a different number of neutrons✓✓

3.2 Sulfur✓

3.3 Group 15✓Period 3✓

3.4  $1s^22s^22p^63s^23p^4$ ✓✓

3.5 Aufbau diagram of sulfur: ✓ for correct layout including energy layout, ✓ for arrows in opposite directions, ✓ for correct number of arrows to represent sulfur.



3.6 10✓

3.7 6✓

4.

4.1 Potassium-41✓

$$\begin{aligned}
 4.2 \quad Ar &= \left(\frac{93,26}{100} \times 39\right) \checkmark + \left(\frac{6,73}{100} \times 40\right) \checkmark + \left(\frac{0,01}{100} \times 41\right) \checkmark \\
 &= 36,3714 + 2,692 + 0,0041 \\
 &= 39,01 \checkmark
 \end{aligned}$$