

WJEC Chemistry GCSE

2: Particles and Atomic Structure

Practice Questions

England Specification

1.

(a) (i) Complete the following table of information about the atoms of some elements. [5]

Element	Symbol	Number of protons	Number of neutrons	Number of electrons
beryllium	${}^9_4\text{Be}$	4	5	4
fluorine	${}^{19}_9\text{F}$	9	.....	.....
calcium	.....	20	20	.....
argon	${}^{40}_{18}\text{Ar}$	.....	22	18

(ii) Give the names of the elements which have the same mass number. [1]

..... and

(iii) Using X to represent an electron, draw the electronic structure of argon. [1]

(b) Boron has two isotopes, ${}^{11}_5\text{B}$ and ${}^{10}_5\text{B}$.

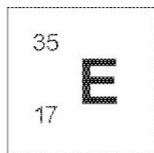
Give one similarity and one difference between the nuclei of these two boron atoms. [2]

Similarity

Difference

(Total 9)

2. An atom of element E is represented as follows.



State and explain what information this gives you about element E.

You may wish to refer to the key on the Periodic Table to help you answer this question. [6 QWC]

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3. (a) Atoms consist of particles called electrons, neutrons and protons.

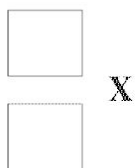
Complete the following table by giving the charge on an electron and the mass of a neutron. [2]

	Mass	Charge
electron	negligible	.....
neutron	.....	neutral (0)
proton	1	positive (+1)

- (b) Potassium is represented as ${}_{19}^{39}\text{K}$.

Element X has 9 electrons, 10 neutrons and 9 protons.

Write the information for element X in the same form as above. [1]



- (c) Chlorine has two isotopes: chlorine-35 and chlorine-37.

Complete the table below. [2]

	chlorine-35	chlorine-37
Atomic number	17	17
Mass number	35	37
Number of electrons	.....	17
Number of neutrons	18	.....
Number of protons	17	17

(d) The atomic number of sodium is 11.

Place a tick (✓) in the box next to the electronic structure of sodium.

[1]

- | | |
|-------|--------------------------|
| 11 | <input type="checkbox"/> |
| 2,9 | <input type="checkbox"/> |
| 4,7 | <input type="checkbox"/> |
| 2,4,5 | <input type="checkbox"/> |
| 2,8,1 | <input type="checkbox"/> |

(e) Element Z is found in Group 2 and in Period 4 of the Periodic Table.

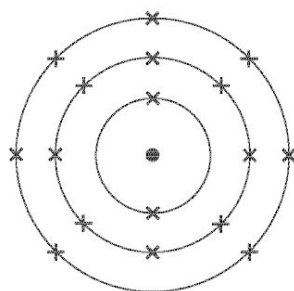
Place a tick (✓) in the box next to the electronic structure of element Z.

[1]

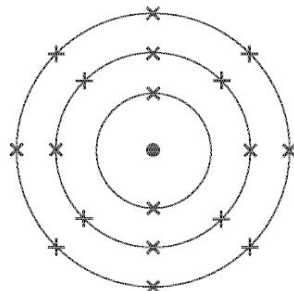
- | | |
|---------|--------------------------|
| 2,4 | <input type="checkbox"/> |
| 4,2 | <input type="checkbox"/> |
| 2,8,2 | <input type="checkbox"/> |
| 2,8,8,2 | <input type="checkbox"/> |
| 2,8,8,4 | <input type="checkbox"/> |

(Total 7)

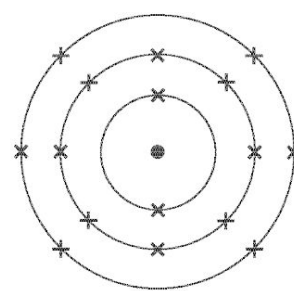
4. The following diagrams show the electronic structures of five elements, A–E.



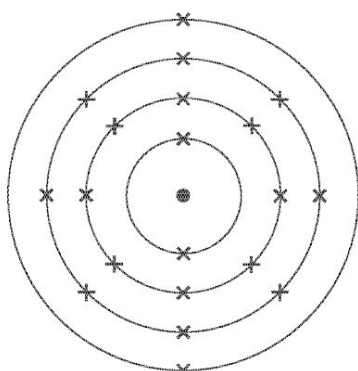
A



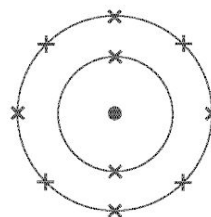
B



C



D



E

- (a) (i) Give the letter of the element, A–E, that is in Period 2 of the Periodic Table. Give the reason for your choice in terms of electronic structure. [2]

Element

Reason

- (ii) Give the letters, A–E, of **two** elements that are in Group 0 of the Periodic Table. Give the reason for your choice in terms of electronic structure. [2]

Elements and

Reason





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- (iii) Another element, X, is in the same group as element E but is one place above it. Draw a diagram of the electronic structure of element X. [1]

- (b) Explain how the electronic structure of element A can be used to determine the number of protons in its nucleus. [2]

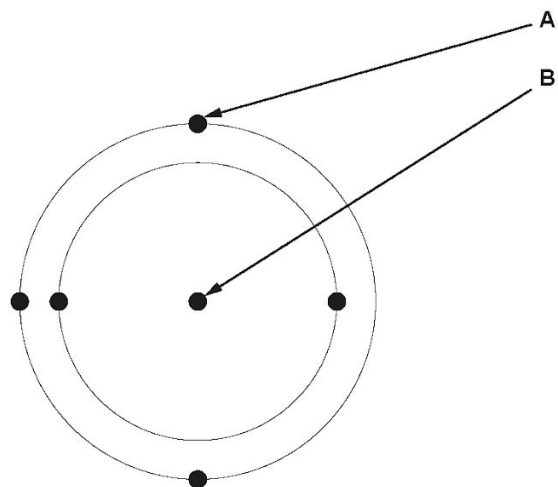
.....
.....

(Total 7)

5. (a) Draw lines to match each diagram below with the correct description. One has been done for you. [2]

Diagram	Description
	molecule of a compound
	molecule of an element
	mixture of two elements
	atom

(b) The following diagram shows an atom.



The box below contains some words that could be used in a description of the atom.

neutral	electron	positive
negative	nucleus	orbit

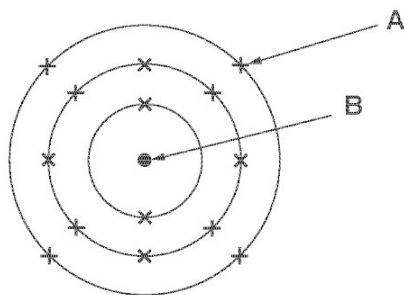
Use only words from the box to complete the table.

[2]

	Name	Charge
part A
part B

(Total 4)

6. The diagram shows an atom of silicon.



(a) Name particle A. [1]

(b) B is the nucleus. Name the two types of particle present in the nucleus of an atom. [2]
..... and

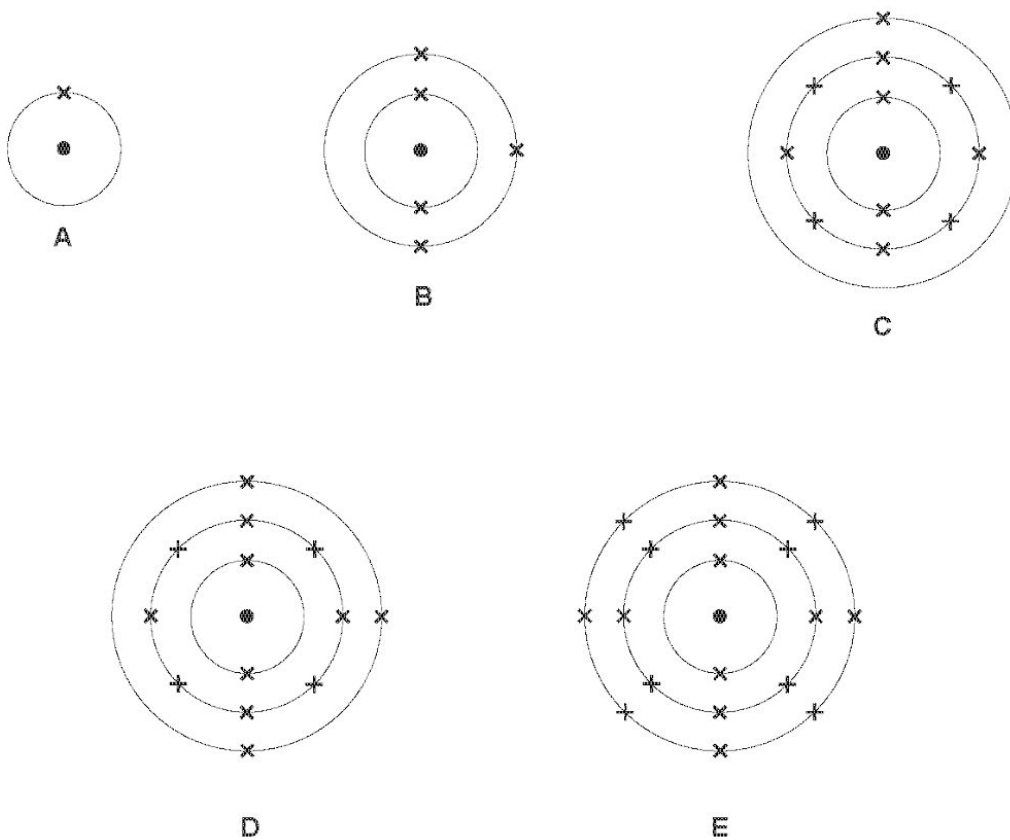
(c) Use the information in the diagram to give

(i) the atomic number of silicon, [1]

(ii) the electronic structure of silicon. [1]

5

7. (a) The following diagrams represent atoms of 5 different elements, A, B, C, D and E.
A, B, C, D and E are not chemical symbols.



- (i) Give the electronic structure of E. [1]
- (ii) Which letter represents aluminium? [1]
- (iii) Give the letters of the two elements which are found in the same group of the Periodic Table and give a reason for your choice. [2]

.....

.....

- (b) (i) Calculate the relative formula mass (M_r) of sodium hydroxide, NaOH. [1]

$$A_r(\text{Na}) = 23 \quad A_r(\text{O}) = 16 \quad A_r(\text{H}) = 1$$

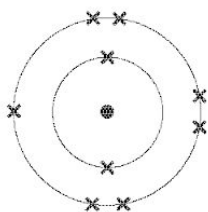
Relative formula mass =

- (ii) Using your answer to part (i), calculate the percentage by mass of oxygen in sodium hydroxide, NaOH. [2]

Percentage by mass of oxygen = %

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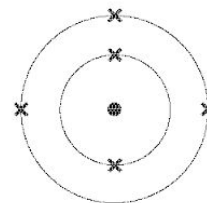
8. (a) The following diagrams represent five different atoms, A–E.



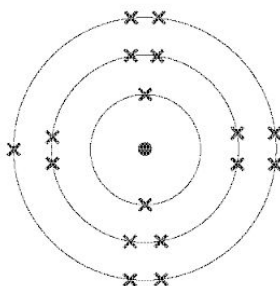
A



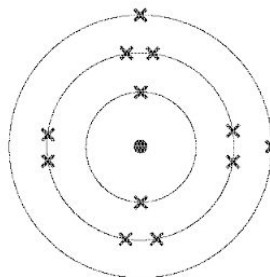
B



C



D



E

Use the diagrams to answer the following questions.

(i) Give the electronic structure of element D. [1]

(ii) Give the letters, A–E, of the elements that are found in Period 3. [1]

..... and

(iii) Give the letters, A–E, of the elements that are found in Group 7. [1]

..... and

(iv) Give the atomic number of element C. [1]

(b) Complete the following table to show the relative masses and charges of the particles found in an atom. [2]

Particle	Relative mass	Relative charge
proton	1	.....
neutron	.....	0
electron	0	-1

9. The following table shows information about some atoms, A–E.

A–E are not the chemical symbols for the elements.

Atom	A	B	C	D	E
atomic number	3	6		10	11
mass number		12	14	20	23
number of protons	3	6	6	10	11
number of neutrons	4	6	8	10	
number of electrons	3	6	6	10	11

(a) Complete the table. [3]

(b) (i) Give the electronic structure of element D. [1]

(ii) Use this information to explain why this element is found in Period 2 and Group 0. [2]

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.....

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(c) Choose the letters, A–E, of the atoms that represent isotopes and give a reason for your choice. [2]

Letters and

Reason

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