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**GCSE Combined Science**

**(and Chemistry)**

**Student Answer Booklet**

**Atomic structure and periodic table**

**Contents:**

1. ANSWERS Multiple Choice Quiz
2. ANSWERS Exam Practice

**Multiple Choice Answers**

**Atomic structure and the periodic table**

1. **a**
2. **c**
3. **a**
4. **c**
5. **b**
6. **b**
7. **c**
8. **a**
9. **d**
10. **a**
11. **b**
12. **b**
13. **b**
14. **b**
15. **b**
16. **d**
17. **a**
18. **d**
19. **b**
20. **d**

**Exam Practice Questions**

**Question 1:**

(a)     Carbon and silicon

1

(b)     Atomic number

1

(c)     Hydrogen / fluorine / chlorine are not in Group 1 of the periodic table

**or**

Hydrogen and fluorine / chlorine are not in the same group of the periodic table

1

Lithium / sodium / potassium are in Group 1 of the periodic table

1

(d)     plum pudding model has a single ball of positive charge and nuclear model has positive charges in the centre / nucleus

1

plum pudding model has electrons in random positions and nuclear model has electrons
in fixed positions

1

plum pudding model has no nucleus and the nuclear model has a nucleus

1

plum pudding model has no neutrons and the nuclear model has neutrons in the nucleus

1

(e)



1

(f)     Covalent bond

1

[10]

**Question 2:**

(a)     1 × 10−10 m

1

(b)     1 / one

allow alkali metals

1

(c)     R and S

1

because they have the same number of protons

allow same atomic number, different mass number

1

and a different numbers of neutrons

1

(d)     **Level 3 (5–6 marks):**

A relevant and coherent explanation of the trend in reactivity. The response makes
logical links between the points raised and considers both the number of energy levels
and the distance between the nucleus and the outer energy level.

**Level 2 (3–4 marks):**

Statements that are linked to provide a simple explanation of the trend in reactivity using either the number of energy levels or the distance between the nucleus and the outer energy level.

**Level 1 (1–2 marks):**

Simple statements made about the halogens or the trend in reactivity.

**0 marks:**

No relevant comment

**Indicative content**

Simple statements / descriptions

•        have 7 electrons in the outer shell

•        need to gain an electron

•        form ions with a -1 charge

•        halogens further down the group are less reactive (or vice versa)

•        halogens further down the group have more shells or energy levels (or vice versa)

Linked statements / explanations

•        have 7 electrons in the outer shell so need to gain an electron to have the electronic structure of a noble gas

•        halogens further down the group are less reactive because they have more shells or energy levels (or vice versa)

•        halogens further down the group have more shells or energy levels so less attractive force on the incoming electron (or vice versa)

•        halogens further down the group have more shells or energy levels so more ‘shielding’ against the incoming electron (or vice versa)

•        outer electrons of halogens further down group are further away from the attractive force of the nucleus (or vice versa)

•        an electron is less easily gained because there are more shells or energy
levels (or vice versa)

•        an electron is less easily gained because the outer electrons are further from
the attractive force of the nucleus (or vice versa)