

Name:

Edexcel Style

Combined Science GCSE

Key Concepts Test

(Levels 4–9)

Date:

Time Allowed: 50mins

Question	Links to Student Progress Sheet	Score	Total Marks Available
1	1.22, 1.24, 1.43		8
2	1.17, 1.18, 1.40		10
3	1.2, 1.3, 1.6, 1.9, 1.12		11
4	1.32		6
5	1.35, 1.36, 1.37		8
6	1.45, 1.48		7
Total			50

Score	Estimated Grade
47 – 50	9
40 – 46	8
33 – 39	7
28 – 32	6
24 – 27	5
20 – 23	4
0 – 19	U

Please be aware that these grade boundaries are Twinkl's own, and may not be in-line with Edexcel's own.

Area for Improvement:

1. Ions are found in ionic compounds. The table below shows four particles – A, B, C and D – and the numbers of protons, neutrons and electrons in each.

Particle	Protons	Neutrons	Electrons
A	9	10	9
B	12	14	10
C	16	16	16
D	16	18	18

- (a) From the table, explain which particle shows the negative ion.

(2)

- (b) The compound calcium nitrate, $\text{Ca}(\text{NO}_3)_2$ has both nitrate and calcium ions.

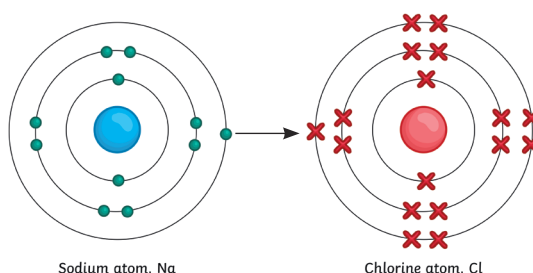
Calculate the relative formula mass of calcium nitrate when the relative atomic masses are:

Ca = 40, N = 14 and O = 16

(2)

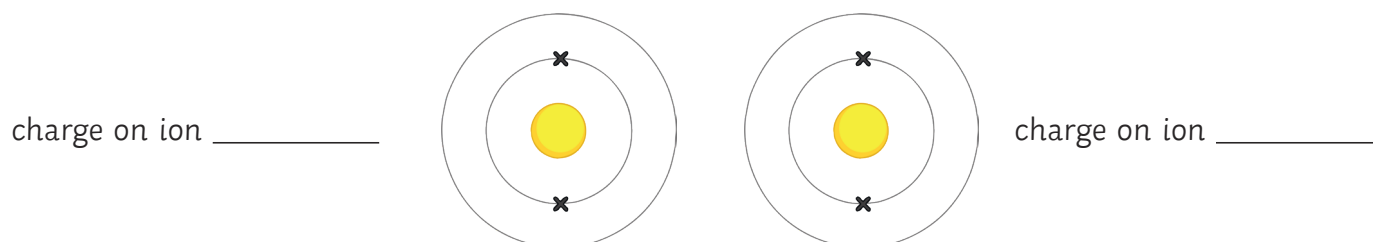
Relative formula mass = _____

- (c) The electron configuration of sodium and chlorine atoms are shown below:



The compound sodium chloride is an ionic compound; it contains sodium and chlorine ions.

Complete the diagram below to show the electron arrangement and charges of the ions in sodium chloride.



(Total for Question 1 = 8 marks)

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- B

[illegible]

- (d) In group 1, the elements become more reactive as they go down the periodic table. Explain why element A is less reactive than element H.

(2)

- (e) (i) Metals conduct electricity. Where on the periodic table are metals found?

(1)

- (ii) Element F is a metal which conducts electricity well. Explain the properties of a metal that allow good electrical conductivity.

(2)

(Total for Question 2 = 10 marks)

3. (a) An atom of sodium has a mass number of 23 and an atomic number of 11. The atom is made up of protons, neutrons and electrons. Complete the table below to show the number of each in an atom of sodium.

(2)

Electrons	Protons	Neutrons

- (b) Explain where in the atom the protons, neutrons and electrons are found.

(2)

- (c) What is the relative mass of an electron?

(1)

- (d) Where is the majority of the mass of an atom concentrated?

(1)

- (e) What is the electronic configuration of a sodium atom?

(1)

- (f) A sample of carbon contains isotopes of carbon-11 and carbon-13. What does the term 'isotope' mean?

(1)

- ☐ Neutron number is the same
☐ Protons number is the same but neutron number is different
☐ Electrons number is the same but proton number is different
☐ Electron number is different

(g) The sample of carbon has in it:

57.3% of carbon-11

42.7% of carbon-13

Calculate the relative atomic mass of carbon to one decimal place.

(3)

(Total for Question 3 = 11 marks)

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This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

(Total for Question 4 = 6 marks)

5. Graphite and diamond both contain carbon atoms.

(a) What is the maximum number of bonds that can be formed by a carbon atom?

(1)

(b) What type of bonding does graphite have?

(1)

(c) Explain why diamond is used for cutting tools and graphite is used for lubricant or electrodes.

(4)

(d) Carbon has an atomic number of 6 and hydrogen an atomic number of 1. Draw a dot and cross diagram of methane, CH₄.

(2)

(Total for Question 5 = 8 marks)

6. Sodium chloride can be formed from reacting sodium and chlorine as shown in the equation below:



(a) Balance the above equation.

(1)

(b) Calculate (to 2dp) the maximum mass that could be formed of sodium chloride if excess chlorine is reacted with 9g of sodium. The relative atomic masses of sodium = 23.0 and chlorine = 35.5

(3)

(c) A compound of chlorine and iron was formed when 7.1g of chlorine was reacted with 5.6g of iron.

Calculate the empirical formula of the compound if the relative atomic mass of chlorine = 35.5 and iron = 56.0.

(3)

(Total for Question 6 = 7 marks)

TOTAL FOR PAPER = 50 MARKS