

Name:

Edexcel Style

Combined Science GCSE

Radioactivity Test

(Levels 4–9)

Date:

Time allowed: 50mins

Question	Links to Student Progress Sheet	Score	Total marks Available
1	6.1,6.2,6.6		5
2	6.17		6
3	6.3,6.4		4
4	6.9		3
5	6.13		8
6	6.14,6.16		8
7	6.22,6.23,6.26		7
8	6.12		9
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

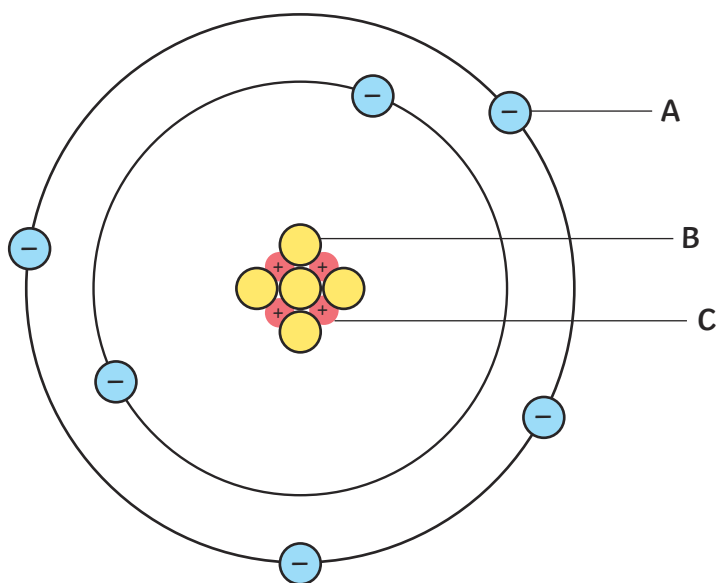
Please be aware that these grade boundaries are Twinkl's own, and may not be in-line with Edexcel's own.

Area for Improvement:

1. (a) A diagram of the atom is shown below.

Label parts A,B and C.

(3)



A _____

B _____

C _____

(b) Explain why atoms do not have an overall charge.

(1)

(c) How does the size of the nucleus compare to the overall size of the atom?

(1)

(Total for Question 1 = 5 marks)

2. The model of the atom has developed over a period of time.

Describe how the model of the atom has changed.

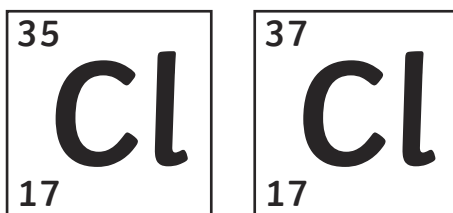
To gain full marks for this question, you will need to name scientists and their discoveries and place your answer in chronological order.

(6)

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(Total for Question 2 = 6 marks)

3. The isotopes of chlorine are shown below.



(a) Define the term 'isotope'.

(1)

(b) Describe the similarities and difference between the chlorine isotopes above.

(3)

(Total for Question 3 = 4 marks)

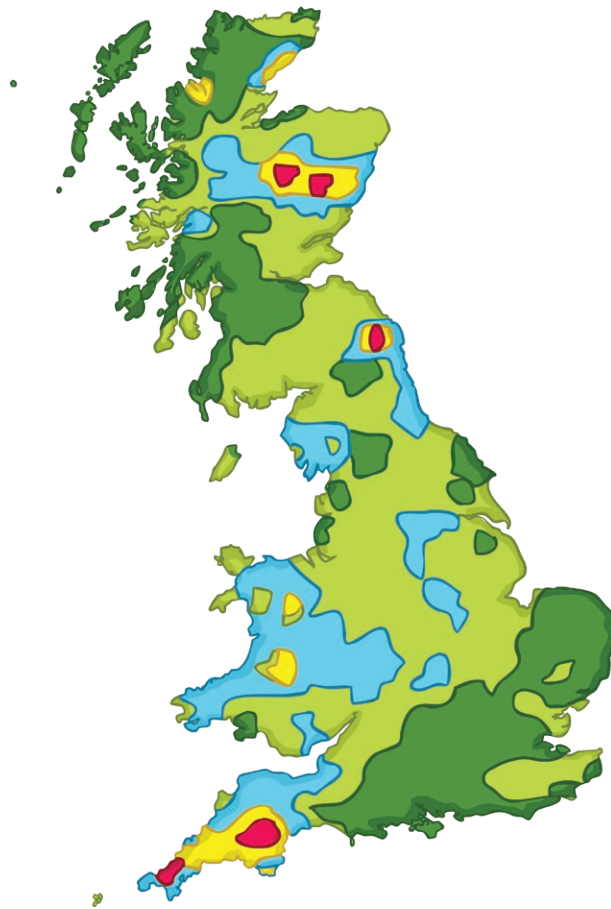
4. Explain how atoms can form positive ions.

(3)

(Total for Question 4 = 3 marks)

5. The map shows background radiation in Britain.

The coloured areas show where it is the strongest with red being the highest level.



(a) State three sources of background radiation.

(3)

1. _____
2. _____
3. _____

(b) The map indicates that the south-west England (especially Cornwall and Devon) has the highest level of background radiation.

Suggest a reason why this is.

(1)

A Geiger-Muller, as shown below can be used to detect radiation. It works by absorbing the radiation and counting each time it has absorbed the radiation. The higher the count, the greater the radiation.



The table below shows the results when two radiation sources, X and Y, were tested with a Geiger-Muller.

Radiation Source	Reading on Geiger – Muller counter per 30 seconds		
	Paper	Aluminium	Lead
X	43	43	0
Y	45	0	0

(c) Identify radiation sources X and Y and explain your answer.

(2)

X: _____

Y: _____

(d) A science teacher wants to show a group of pupils how the Geiger- Muller counter reacts to radioactive sources.

State two safety precautions the teacher should take.

(2)

1. _____

2. _____

(Total for Question 5 = 8 marks)

6. (a) Define the term 'half-life'.

(1)

(b) Beta particles are produced when a radioactive isotope decays.

What is a beta particle?

(1)

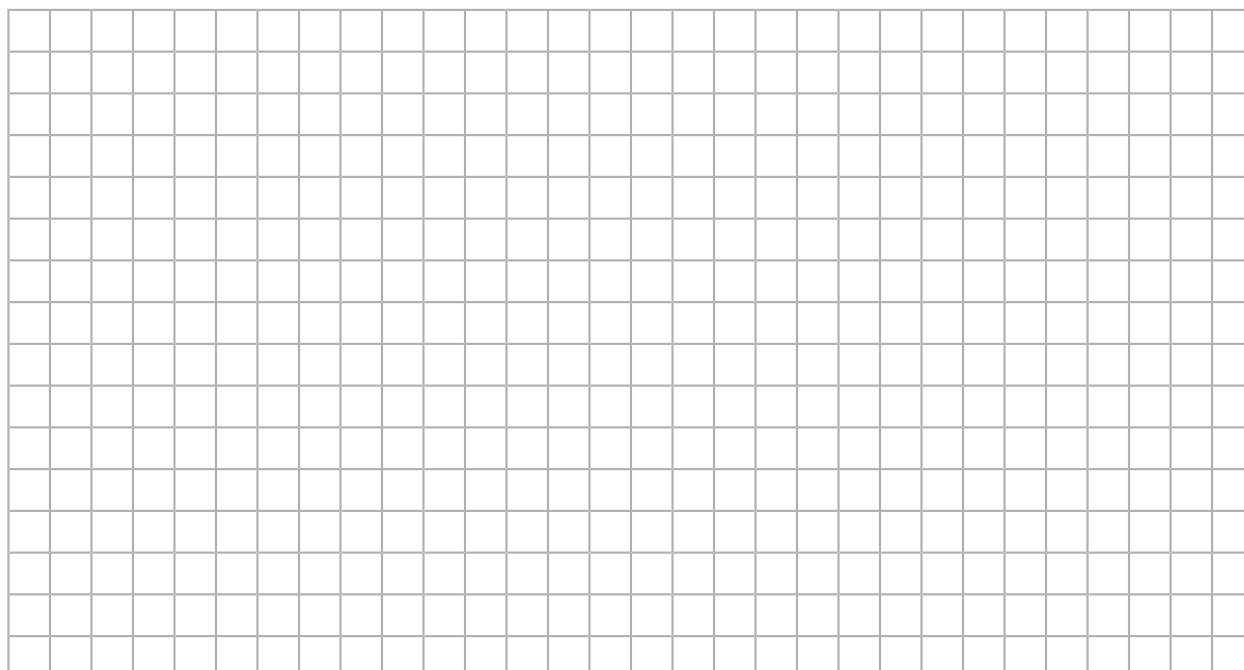
(c) Radioactive sources change with time.

The table below shows data collected for a radioactive source.

Time (hours)	0	1	2	3	4
Counter Rate (counts/sec)	700	480	350	210	175

Plot a half-life graph on the graph paper below.

(3)



(d) Calculate the radioactive half-life of the material.

(1)

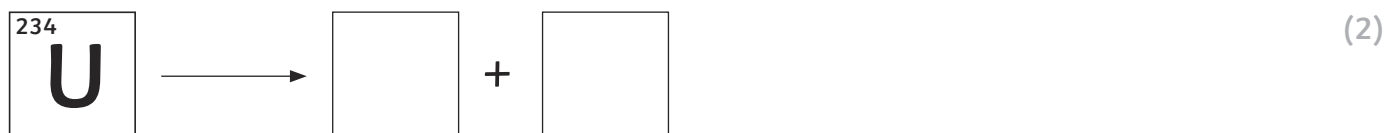
(e) The activity of a different radioactive sample is 880Bq. After three hours, its activity has fallen to 55Bq.

Calculate its half-life.

(2)

(Total for Question 6 = 8 marks)

7. (a) Complete the following alpha decay of uranium 234 .



(b) State the type of decay that increases the charge of the nucleus.

(1)

(c) Complete the sentences by selecting the correct words from the box below.

(4)

neutron positron increases decreases charge mass

_____ emission _____ the charge of the nucleus whereas
 _____ emission decreases the _____ of the nucleus.

(Total for Question 7 = 7 marks)

8. (a) How do radioactive irradiation and contamination differ?

(2)

(b) Why are gamma radiation tracers used instead of beta and alpha?

(2)

(c) The three types of ionising radiation are alpha, beta and gamma.

Describe how alpha and beta particles differ and give an example of an everyday use.

(5)

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(Total for Question 8 = 9 marks)

TOTAL FOR PAPER = 50 MARKS