Radioactivity - Half Life

* Required

Email *

_____

What is your first and last name?

_____

Q1

A powder contains 400 mg of a radioactive material that emits α-particles.

The half-life of the material is 5 days.

What mass of that material remains after 10 days?

A 0 mg   **B** 40 mg   **C** 100 mg   **D** 200 mg
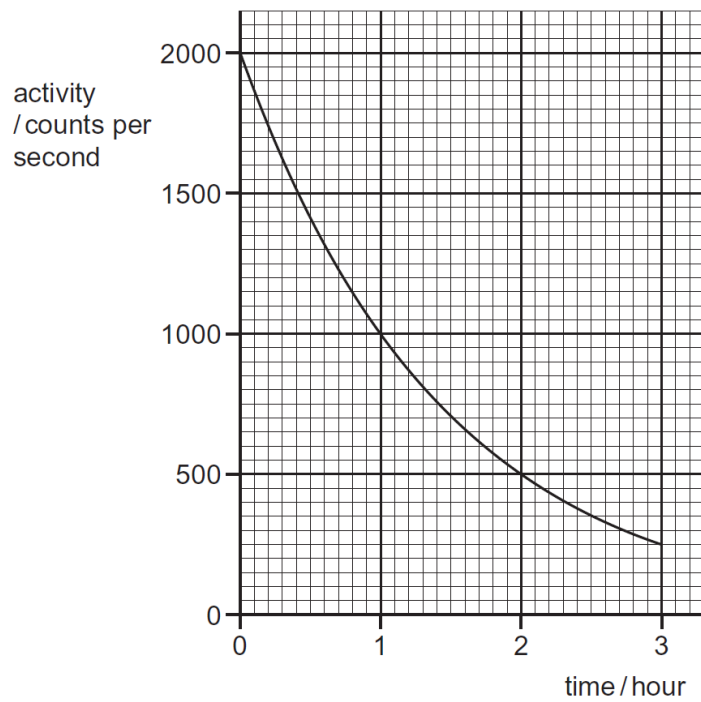
Q1 Answer   10 points

Mark only one oval.

◯ A

◯ B

◯ C

◯ D

Q2

The graph shows the activity of a radioactive source over a period of time.

What is the half-life of the source?

A $\frac{1}{2}$ hour   **B** 1 hour   **C** $1\frac{1}{2}$ hours   **D** 3 hours

Q2 Answers   10 points

Mark only one oval.

- ◯ A
- ◯ B
- ◯ C
- ◯ D

Q3

The table shows the count rates obtained from four radioactive sources. The measurements were taken at noon on four consecutive days.

Which source has the longest half-life?

	count rate/.counts per second			
	day 1	day 2	day 3	day 4
A	100	48	27	11
B	200	142	99	69
C	300	297	292	290
D	400	202	99	48

Q3 Answer   10 points

Mark only one oval.

A

B

C

D

Q4

A student is investigating how the radiation from a radioactive source changes with time.

The table shows the results from the detector.

time / min	count-rate / counts per min
0	340
2	180
4	100
6	60
8	40

The experiment is repeated by other students, who also measure the count-rate every two minutes.

The half-life of the source is known to be exactly two minutes.

Why is the measured count-rate **always** higher than half the previous value?

A   Radioactive emissions occur randomly with time.

B   The detector used is very close to the source.

C   There is background radiation present.
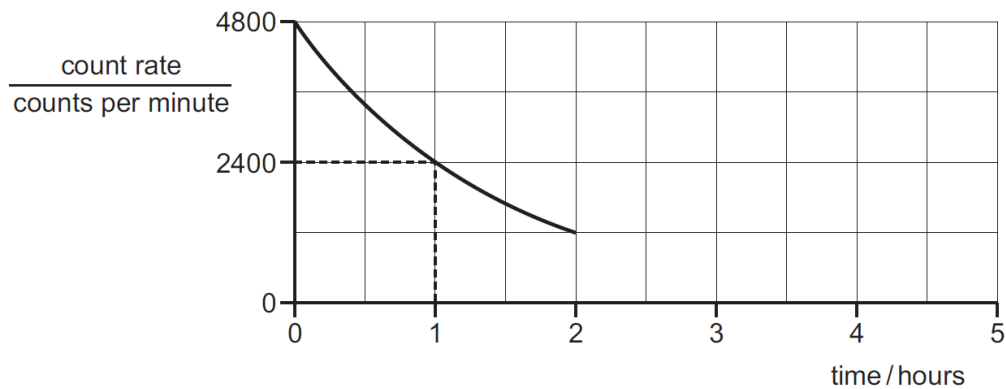
D   The radioactive source is decaying.

Q4 Answer   10 points

Mark only one oval.

A

B

C

D

Q5

The graph shows how the count rate on a detector due to a radioactive source changes with time.

What is the count rate at 5.0 hours?

A 960 counts per minute

B 600 counts per minute

C 150 counts per minute

D 0 counts per minute

Q5 Answer

Mark only one oval.

- ◯ A
- ◯ B
- ◯ C
- ◯ D

Q6

A radioactive source produces a count rate on a detector of 1600 counts/s.

After 32 hours the count rate has fallen to 100 counts/s.

Both count rates have been corrected for background radiation.

What is the half-life of the source?

A 2.0 hours   **B** 6.4 hours   **C** 8.0 hours   **D** 16 hours

Q6 Answer

Check all that apply.

☐ A
☐ B
☐ C
☐ D

Q7

The half-life of a radioactive substance is 10 minutes. A sample of the radioactive substance contains 2000 nuclei.

How many radioactive nuclei were in the sample half an hour earlier?

A 250   **B** 4000   **C** 6000   **D** 16 000

Q7 Answer

Mark only one oval.

○ A
○ B
○ C
○ D

Q8

The count rate from a radioactive isotope is recorded every hour. The count rate is corrected for background radiation.

The table shows the readings.

time / hours	0	1	2	3	4	5
corrected count rate counts / s	800	620	480	370	290	220

What estimate of the half-life of the isotope can be obtained from the readings in the table?

A between 1 and 2 hours

B between 2 and 3 hours

C between 3 and 4 hours

D between 4 and 5 hours

Q8 Answer

10 points

Mark only one oval.

A

B

C

D

Q9

The table shows the results of an experiment to find the half-life of a radioactive substance.

time/s	count rate from substance counts / second
0	150
60	120
120	95
180	75
240	60

What is the half-life of the substance?

A   60 seconds

B   120 seconds

C   180 seconds

D   240 seconds

Q9 Answer

10 points

Mark only one oval.

A

B

C

D

Q10

Which row shows the relative ionising effects and penetrating abilities of α-particles and β-particles?

	ionising effect	penetrating ability
A	α greater than β	α greater than β
B	α greater than β	α less than β
C	α less than β	α greater than β
D	α less than β	α less than β

Q10 Answer

10 points

Mark only one oval.

- ( ) A
- ( ) B
- ( ) C
- ( ) D