

MARK SCHEME

GCSE

PHYSICS

AQA - TRIPLE SCIENCE

P4 - TEST 2

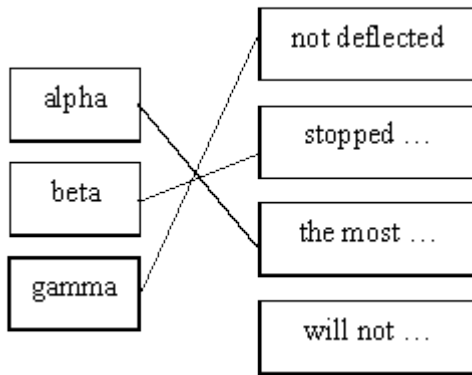
ATOMIC STRUCTURE

Beginner

Mark schemes

1.

(a) 3 lines correctly drawn



1 mark for each correct line if more than one line is drawn from a box in List A all lines from that box are wrong

3

(b) nucleus

*accept nuclei
do **not** accept nuclear*

1

(c) Y

*do **not** accept gamma*

any **two** from:

*do **not** accept other properties of gamma*

- least dangerous (inside the body)
*do **not** accept not dangerous
accept not as harmful as alpha
(inside the body)*
- least ionising
- penetrates through the body
*do **not** accept can be detected externally*
- is a gas / can be breathed in
*accept it is not a solid
(cannot score if Z chosen)
if X chosen can score this gas mark
if Z chosen can score **both** gamma marks*

1

2

(d) any **one** from:

*do **not** accept kills bacteria*

- longer shelf life
accept stays fresh longer / stops it going bad / mouldy
- food can be supplied from around the world
- wider market for farmers
- cost to consumers (may be) lower
- less likely to / will not get food poisoning
accept infection / disease / ill for food poisoning

1

[8]

2.

(a) presence of a radioactive source

*accept radioactivity **or** radioactive or radiation*

accept a named source

accept a named type of radiation ignore reference to relative levels

*do **not** accept thermal **or** heat radiation*

*do **not** accept nuclear waste*

1

(b) (i) gamma

accept correct symbol

1

(ii) alpha

accept correct symbol

1

[3]

3.

(i) radon (gas)

*do **not** accept gas*

1

(ii) background

1

[2]

4.

(a) nucleus

1

neutron

1

gamma rays

1

in this order only

(b) $\frac{25\,000\,000}{2\,400\,000}$

1

11

an answer of 10.4 with no working scores 1 mark

1

an answer of 11 scores 2 marks

(c) any **two** from:

- waste is radioactive
allow nuclear waste
- waste has a long half-life
allow waste remains dangerous for a long time
- waste is toxic
- waste needs to be buried
allow waste is difficult to dispose of
- risk of catastrophic accidents
allow named accident e.g. Fukushima, Chernobyl, Three Mile Island
- fuel is non-renewable

2

(d) **similarity:**

(carbon dioxide concentration and global temperature have) both increased

allow they both show a positive correlation

1

difference:

the carbon dioxide (concentration) continues to increase whereas temperature (increase) levels off

allow carbon dioxide (concentration) increases more quickly than temperature (increase)

1

[9]

5.

(a) dust

accept 'solid (s)'

1

space

accept 'from supernova / supernovum / supernovas'

1

(b) By atoms joining together

only one ticked or otherwise unambiguously identified

1

- (c) Milky Way (galaxy) 1
- (d) The answer depends on beliefs and opinions, not scientific evidence.
only one ticked or otherwise unambiguously identified 1

[5]

6.

- (a) 95 1
- (b) alpha 1
accept correct symbol

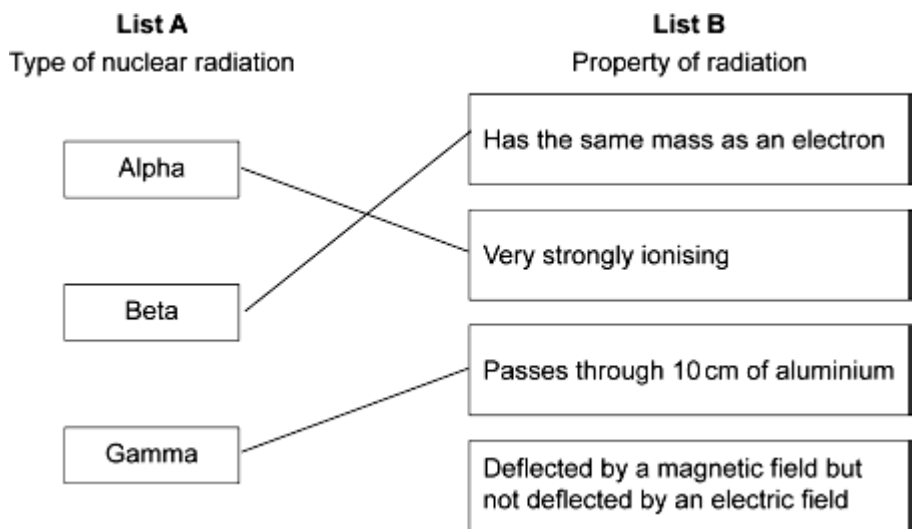
- (c) any **two** from:
- radiation is outside the body
accept detector is on ceiling or high up the wall
 - radiation will not reach (living) cells
accept radiation cannot pass through the body / skin
 - radiation absorbed by the air
accept cannot pass through the plastic casing
*do **not** accept because it is alpha radiation – unless qualified*
*do **not** accept does not give off harmful substance*
*do **not** accept cannot pass through building materials etc*

2

- (d) less (than) 1

[5]

7. (a) 1 mark for each correct line



if more than 1 line is drawn from any box in List A, none of those lines gain any credit

3

(b) (i) (the detector) reading had gone down
'it' equals detector reading
accept the reading in the table is the smallest
accept 101 is (much) lower than other readings / a specific value eg 150
do not accept this answer if it indicates the readings are the thickness

1

more beta (particles / radiation) is being absorbed / stopped
accept radiation for beta particles / radiation
accept fewer particles being detected

1

(ii) six years

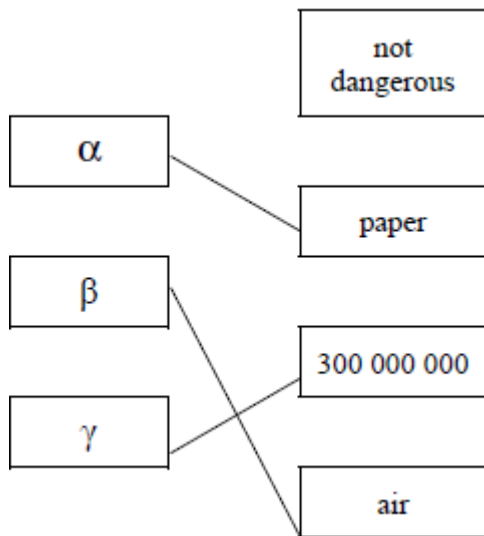
1

(iii) alpha would not penetrate the cardboard
accept the basic property – alpha (particles) cannot pass through paper / card
accept alpha (particles) are less penetrating (than beta)
range in air is neutral

1

[7]

8. (a) 3 correct lines drawn



*any box in list A with 2 or more lines,
all lines for that box do not score*

3

(b) radiation damages our cells

accept radiation can cause cancer

accept kills cells

accept changes DNA / causes mutations

accept dangerous / poisonous / harmful / toxic

accept so precautions can be taken

1

(c) it can pass through the human body

1

(d) (i) 6 (hours)

no tolerance

1

(ii) 6 (hours)

accept their (d)(i)

1

[7]

- 9.** (a) top and bottom boxes identified 1
- (b) Medical (treatment)
- or** X-rays
- answer must be in table*
- accept treatment for medical treatment* 1
- (c) 15
- allow 1 mark for correctly identifying 300 as the average dose* 2

[4]