Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: Atomic Structure (Standard Demand)

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Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Mark Schemes

Q1.

(a) more than 10 000 times bigger

1

(b) the atom becomes a positive ion

1

the atom loses an electron

1

(c) beta radiation is only weakly ionising

1

(d) **Level 3:** The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.

5–6

Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.

3–4

Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1–2

No relevant content

0

Indicative content

- move the detector very close to the source
- record the count rate

- position the paper between the source and the detector
- record the new count rate
- alpha radiation will not penetrate through paper
- if the count rate with the paper is (significantly) less than without then the source emits alpha radiation

- remove the paper and position the aluminium between the source and the detector
- record the new count rate
- (alpha and) beta radiation will not penetrate through the aluminium
- if the count rate has (significantly) reduced compared with using paper then beta radiation is present
- if radiation penetrates through the aluminium then gamma radiation is present

- the experiment should be repeated and mean results calculated because

radioactivity is a random process

To access level 3, the candidate must use the paper sheet, the aluminium sheet and no sheet, and describe how the results would indicate the presence of alpha, beta or gamma radiation.

[10]

Q2.

(a) A = 206

1

(b) Z = 82

1

(c)

numbers must be in this order

89

1

39

1

(d) electromagnetic waves

1

(e) **Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.

5–6

Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

3–4

Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

1–2

No relevant content

0

Indicative content

<u>alpha radiation</u>
- an alpha particle is the same as a helium nucleus
- alpha is the least penetrating
- alpha is stopped by paper or skin
- alpha has the shortest range in air
- alpha will travel a few cm in air
- because alpha is most ionising
- because alpha has a charge of +2

<u>beta radiation</u>
- a beta particle is an electron (emitted from the nucleus)
- beta penetrates less than gamma and more than alpha
- beta is stopped by a thin sheet of aluminium
- beta has a shorter range than gamma
- beta will travel up to 1m in air
- because beta is more ionising that gamma and less ionising than alpha
- because beta has a charge of -1

gamma radiation

- gamma radiation is an electromagnetic wave
- gamma is the most penetrating
- gamma is reduced/stopped by several cm of lead or thick concrete
- gamma has the largest range in air
- gamma will travel very large distances in air
- because gamma is least ionising
- because is uncharged

to access level 3 the answer should compare alpha, beta and gamma radiation and provide some explanation of their properties

[11]