Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: GCSE Triple Science Atomic Structure (High Demand Questions)

Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

(a) $^{206}_{82}Pb$

2

(b) alpha radiation is highly ionising

1

causing an increased risk of cancer
or
organ failure
or
radiation sickness / poisoning
or
mutation of genes / DNA
or
damage to cells / tissues / organs
allow kill cells

1

until the radioactive material is removed / excreted
allow all the alpha radiation is absorbed by the body
or
activity of radioactive material reaches / approaches background radiation levels
ignore references to half-life

1

(c)
*an answer of 1.16 × 10^{-3} (g) scores **3** marks*

$\frac{414}{138} = 3$ (half-lives)

1

$1.45 \times 10^{-4} \times 2 \times 2 \times 2$

1

$= 1.16 \times 10^{-3}$ (g)
or
= 0.00116 (g)

1

[8]

Q2.

(a) smoke absorbs / stops alpha radiation

allow alpha particles for alpha radiation
alpha radiation does not reach the detector is insufficient

1

(b) alpha radiation is not very penetrating
allow alpha particles for alpha radiation

or
alpha radiation does not penetrate skin
allow alpha radiation does not travel very far (in air)

1

(c) beta and gamma radiation will penetrate smoke
allow beta and gamma radiation will not be stopped by smoke

1

no change (in the count rate) would be detected
allow the change detected (in the count rate) would be too small

1

(d) (a long half-life means) the count rate is (approximately) constant
allow activity of source is (approximately) constant

or
a short half-life means the count rate decreases quickly

1

until 1.3 half-lives the count rate is above 80 per second
allow after 1.3 half-lives the count rate is below 80 per second

or
until 1.3 half-lives the count rate is above the threshold for the smoke alarm to be activated

or
after 1.3 half-lives the smoke alarm will be activated all the time
so don't have to replace source or smoke detector is insufficient

1

(e) **Level 2:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.

3–4

Level 1: Relevant points (reasons / causes) are identified, and there are attempts at logically linking. The resulting account is not fully clear.

1–2

No relevant content

0

Indicative content

- short half-life or half-life of a few hours
- (short half-life means) less damage to cells / tissues / organs / body
- low ionising power
- (low ionising power means) less damage to cells / tissues / organs / body
- highly penetrating
- (highly penetrating means) it can be detected outside the body
- emits gamma radiation

[10]