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

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Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Mark Schemes

Q1.

(a) (i) (atoms / elements with) the same number of protons but different numbers of neutrons

accept (atoms / elements with) different mass number but same atomic number

1

(ii) substances that give out radiation

accept alpha, beta or gamma for radiation

accept an unstable nucleus that decays

radioactive decay takes place is insufficient

1

(b) 85 years

± 2 years

*allow **1** mark for showing correct method on the graph*

2

(c) (i) a helium nucleus

accept 2 neutrons and 2 protons

accept $_2{}^4He$

*do **not** accept helium atom*

1

(ii) the rate of decay (of plutonium) decreases

accept fewer (plutonium) nuclei (to decay)

accept radioactivity decreases

1

less heat produced

*do **not** accept energy for heat*

1

(d) (i) (outside the body)

alpha (particles) cannot penetrate into the body

(inside the body)

1

(heat produced from decay) damages / kills cells / tissues

accept causes cancer for damages / kills cells / tissues

*accept **highly** toxic*

1

(ii) *any **one** from:*

- *worried same could happen again*
- *an accident may cause radiation to be spread around the Earth / atmosphere*
- *idea of soil contamination resulting from accident / release of radioactive material*
- *idea of negative effect on health resulting from accident / release of radioactive material*

accept any sensible suggestion

1

[10]

Q2.

(a) *146*

1

(b) *atomic number*

1

(c) (i) *alpha*

1

(ii) *number of protons changes*

accept atomic number changes

accept <u>loses or gains</u> protons

*do **not** accept protons with any other particle e.g. number of protons and neutrons changes incorrect*

*do **not** accept any reference to mass number*

1

[4]

Q3.

(a) *any **two** pairs from:*

- *nuclear model mass is concentrated at the centre / nucleus (1)*

  plum pudding model mass is evenly distributed (1)

  accept the nuclear model has a nucleus/the plum pudding model does not have a nucleus for 1 mark

- *nuclear model positive charge occupies only a small part of the atom (1)*

  plum pudding model positive charge spread throughout the atom (1)

  accept electrons in shells/ orbits provided a valid comparison is made with the plum pudding model
  *do **not** accept on its own*
  *do **not** accept electrons at edge of plum pudding*

- *nuclear model electrons orbit some distance from the centre / nucleus (1)*

  plum pudding electrons embedded in the (mass) of positive (charge) (1)

- *nuclear model the atom mainly empty space (1)*

  plum pudding model is a 'solid' mass (1)

to gain credit it must be clear which model is being described
*do **not** accept simple descriptions on the diagram without comparison*

4

(b) nucleus must be <u>positive</u> to deflect/ repel alpha particles

answers in terms of electrons/negative charge causing deflection
negates mark answers in terms of reflection negates mark

1

nucleus (very) small so few alpha particles deflected backwards

accept most of atom empty space so <u>most</u> pass through

1

(c) many/ 100 000 measurements taken

accept results for measurements accept data valid / reliable

1

findings could not be explained by plum pudding model

accept a specific finding that could not be explained
eg some alpha particles were deflected backwards

1

[8]