NAME: ……..……..

SCHOOL:……

DATE: .....

RADIOACTIVITY

INSTRUCTIONS TO CANDIDATES

*Answer **ALL** questions in this paper in the spaces provided.*

1. M grammes of a radioactive isotope decayed to 5 grammes in 100 days. The half – life of the isotopes is 25 days.

   (a) What is meant by half – life? (1mks)

   ……

   ……

   (b) Calculate the initial mass M of the radioactive isotope

   (2mks)

2. 384 g of radio-active element was reduced to 48g in 540 days. **Determine** the half-life of **X**.

(3marks)

3. (a) **Write** an equation to show how $^{234}_{92}U$ decays by emission of an α - particle to form thorium.

(1mk)

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(b) **Give two** uses of radioactive isotopes. (2mks)

……

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4. (a) **State two** differences between chemical and nuclear reactions. (2mks)

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(b) Below is a radioactive decay series starting from $^{214}_{83}Bi$ and ending at $^{206}_{82}Pb$. Study it and answer the questions that follow;

$$^{214}_{83}Bi \xrightarrow{Step\ I} {}^{210}_{81}Ti \xrightarrow{Step\ II} {}^{210}_{82}Pb$$

$$\downarrow Step\ III$$

$$^{206}_{82}Pb \xleftarrow{Step\ V} {}^{210}_{84}Po \xleftarrow{Step\ IV} {}^{210}_{83}Bi$$

(i) **Identify** the particles emitted in steps III and V (2mks)

III …….

V ……

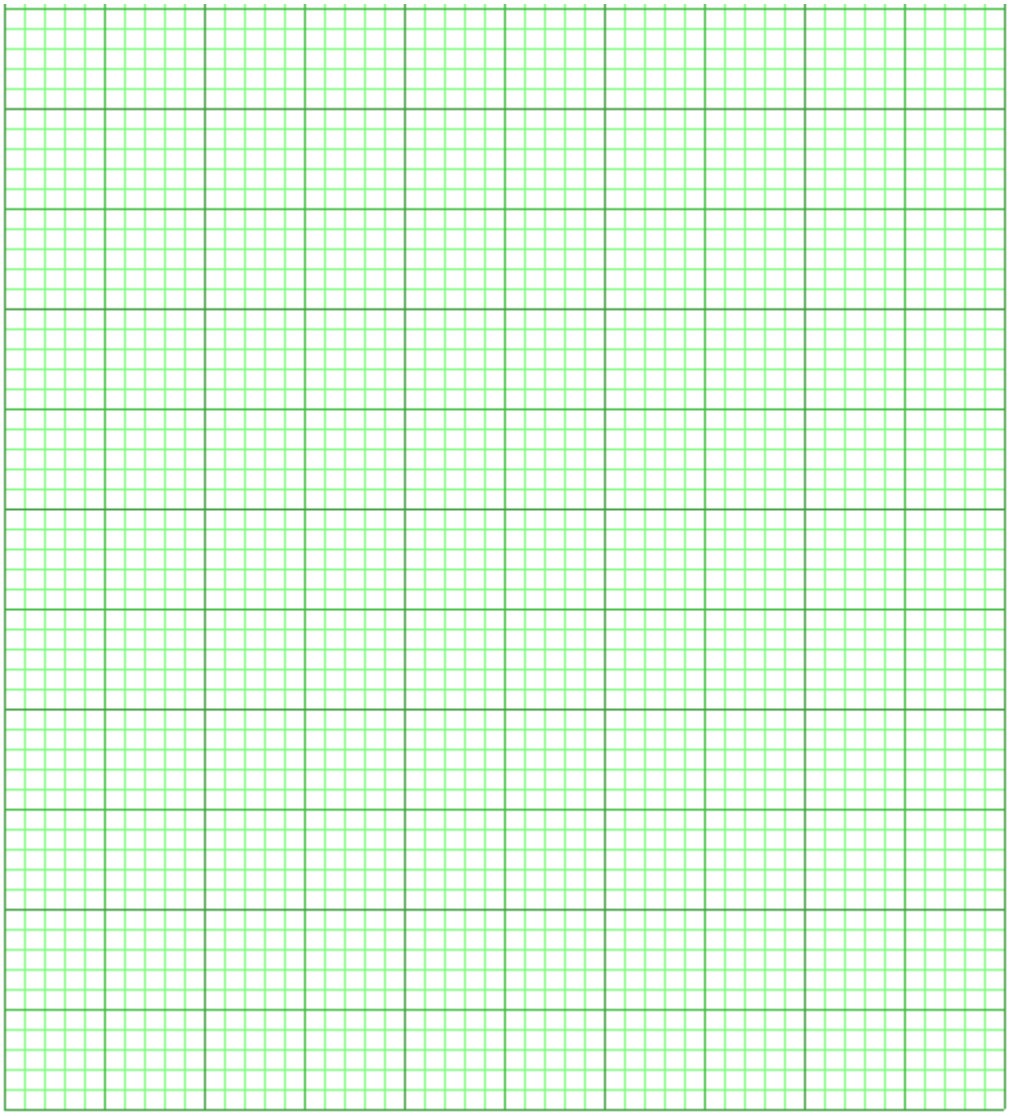
(ii) **Write** the nuclear equation for the reaction which takes place in step I. (1mk)

……..

(c) The table below gives the percentage of a radioactive isotope of Bismuth that remains after decaying at different times.

Time (min)	0	6	12	22	38	62	100
Percentage of Bismuth	100	81	65	46	29	12	3

(i) On the grid provided below, plot a graph of the percentage of Bismuth remaining (vertical axis) against time. (3mks)



(ii) Using the graph determine the :-

I. Half – life of the Bismuth isotope. (1mk)

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II. Original mass of the Bismuth isotope given that the mass that remained after 70 minutes was 0.16g. (2mks)

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(d) **State two** medical uses of radioactive isotopes. (1mk)

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