7 **(a)** The spontaneous decay of polonium is shown by the nuclear equation

$$^{210}_{84}\text{Po} \rightarrow ^{206}_{82}\text{Pb} + \text{X}.$$

For Examiner's Use

(i) State the composition of the nucleus of X.

.....

.....[1]

(ii) The nuclei X are emitted as radiation. State two properties of this radiation.

1. .....

.....

2. .....

.....
[2]

(b) The mass of the polonium (Po) nucleus is greater than the combined mass of the nuclei of lead (Pb) and X. Use a conservation law to explain qualitatively how this decay is possible.

.....

.....

.....[3]

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