7 **(a)** State what is meant by a fundamental particle.

.....

..... [1]

(b) A nucleus X has 14 nucleons and p protons. The ratio of charge to mass for nucleus X is $4.1 \times 10^7\,\text{C kg}^{-1}$.

(i) Determine p.

p = ... [3]

(ii) Nucleus X undergoes β^- decay to form nucleus Z.

Complete the equation representing this decay.

$$^{14}_{\ldots\ldots}\text{X} \rightarrow {}^{\ldots\ldots}_{\ldots\ldots}\text{Z} + {}^{\ldots\ldots}_{\ldots\ldots}\ldots\ldots + {}^{\ldots\ldots}_{\ldots\ldots}\ldots\ldots$$

[3]

(c) A sample of a radioactive substance emits particles that are positively charged and have a continuous range of kinetic energies.

State and explain whether the nuclei in the sample are undergoing α-decay, β^+ decay or β^- decay.

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.....

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.....

.....

..... [2]

[Total: 9]