7 Radon is a radioactive gas. One isotope of radon, $^{220}_{86}Rn$, decays to polonium, Po, by emitting an alpha particle.

(a) Complete the nuclear equation for the decay of radon.

(2)

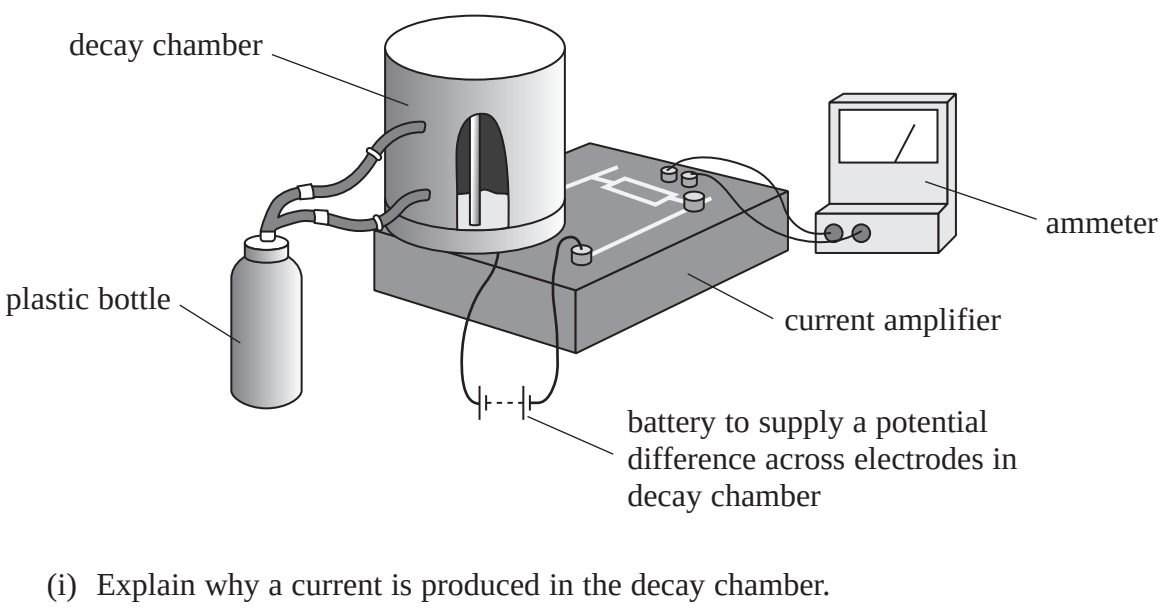
$$^{220}_{86}Rn \rightarrow \text{.....}Po + \text{.....}\alpha$$

(b) Radon is produced in the ground and escapes into the atmosphere.

Explain why this is a safety hazard.

(2)

(c) The diagram shows apparatus for monitoring the decay of radon in the laboratory. Radon gas is produced in the plastic bottle from the decay of radium. A small amount of radon is then inserted into the decay chamber by squeezing the plastic bottle.
A current is produced between two electrodes inside the chamber. This current is amplified and recorded by the ammeter.



(i) Explain why a current is produced in the decay chamber.

(2)

(ii) A teacher is demonstrating the operation of the decay chamber to her class. She squeezes the bottle to introduce radon into the chamber.

She claims that within 450 s the activity of the radon in the chamber will be less than 1% of its initial value.

Assess whether her claim is correct.

half-life of radon = 55.6 s

(3)

(Total for Question 7 = 9 marks)