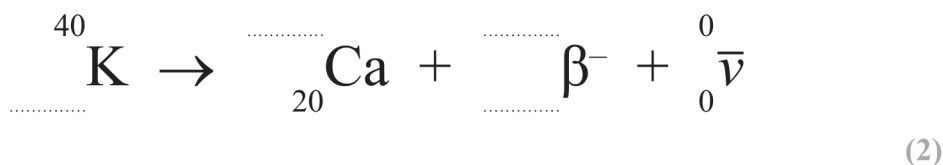


13 Potassium-40 (^{40}K) is a radioactive isotope. ^{40}K can decay by β^- emission.

(a) Complete the nuclear equation for the decay of ^{40}K by β^- emission.



(b) Occasionally ^{40}K decays by emitting a β^+ particle.

Give two similarities between a β^- particle and a β^+ particle.

(2)

(c) A fertiliser contains potassium chloride. The activity of a sample of the fertiliser due to radioactive potassium was 48.6 Bq.

It is claimed that the time t taken for the activity of the sample to fall below the background count rate would be more than 9×10^9 years.

Deduce whether this claim is correct.

background count rate = 0.42 Bq

half-life of ^{40}K = 1.25×10^9 years

(3)

(Total for Question 13 = 7 marks)