4 Sodium-24 is a radioactive isotope.

(a) What are isotopes?

(2)

(b) Sodium-24 decays by emitting beta particles.

(i) Describe the nature of a beta particle.

(1)

(ii) Name a piece of equipment that can be used to detect beta particles.

(1)

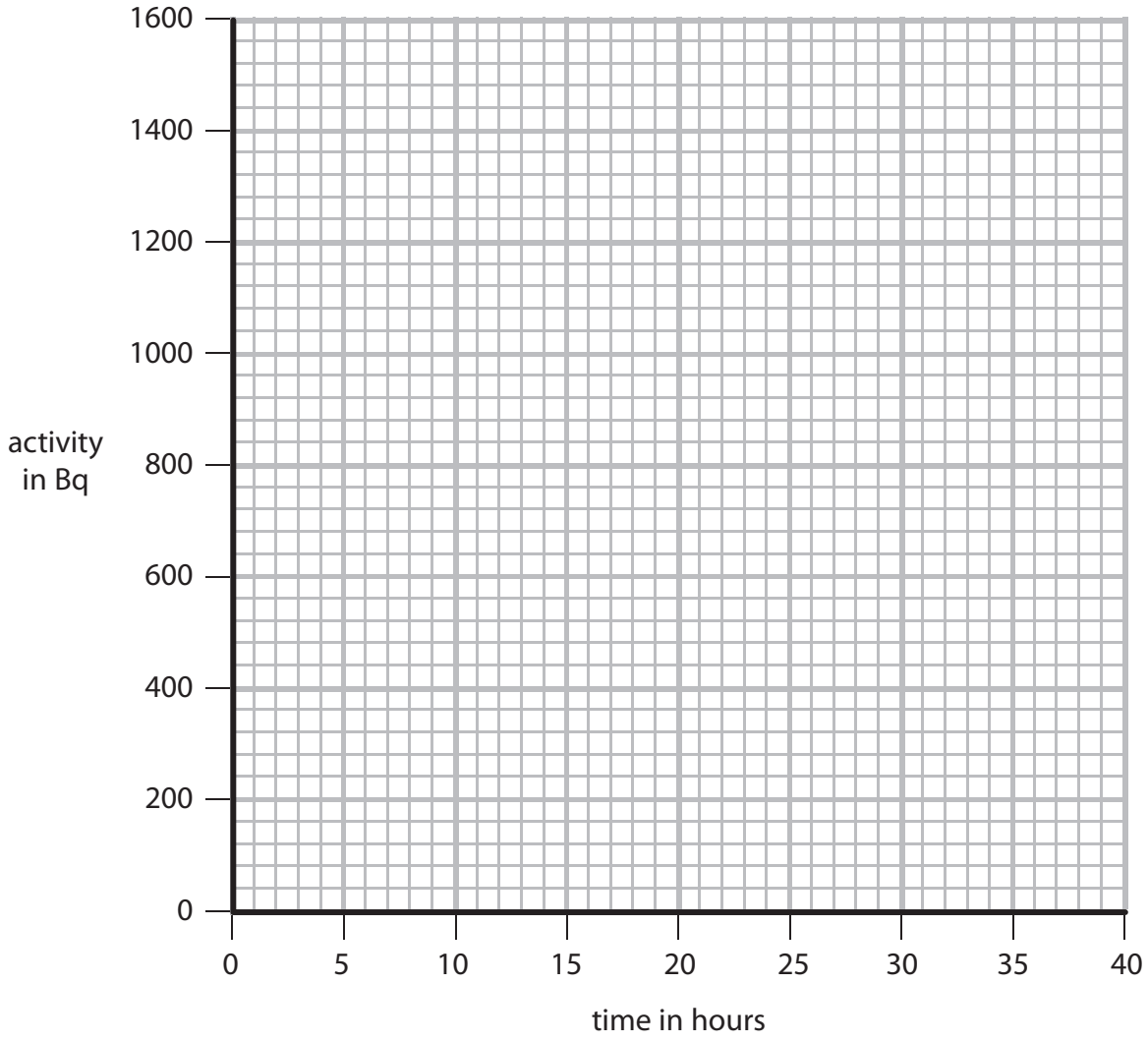
(iii) Describe how a detector can be used with sheets of lead, aluminium and paper to show that a sample of sodium-24 emits beta particles.

(2)

(c) A sample of sodium-24 has an activity of 1400 Bq.

On the axes, sketch a graph to show how the activity of this sample changes over the next 40 hours.
(the half-life of sodium-24 is 15 hours)

(3)



(d) Granite is a rock.

It contains a radioactive isotope of uranium that decays very slowly.

(i) Explain how scientists can use this radioactivity to find the age of a piece of granite.

(4)

(ii) Suggest why the age of a piece of granite could **not** be found using a uranium isotope with a half-life of 15 hours.

(2)

(Total for Question 4 = 15 marks)