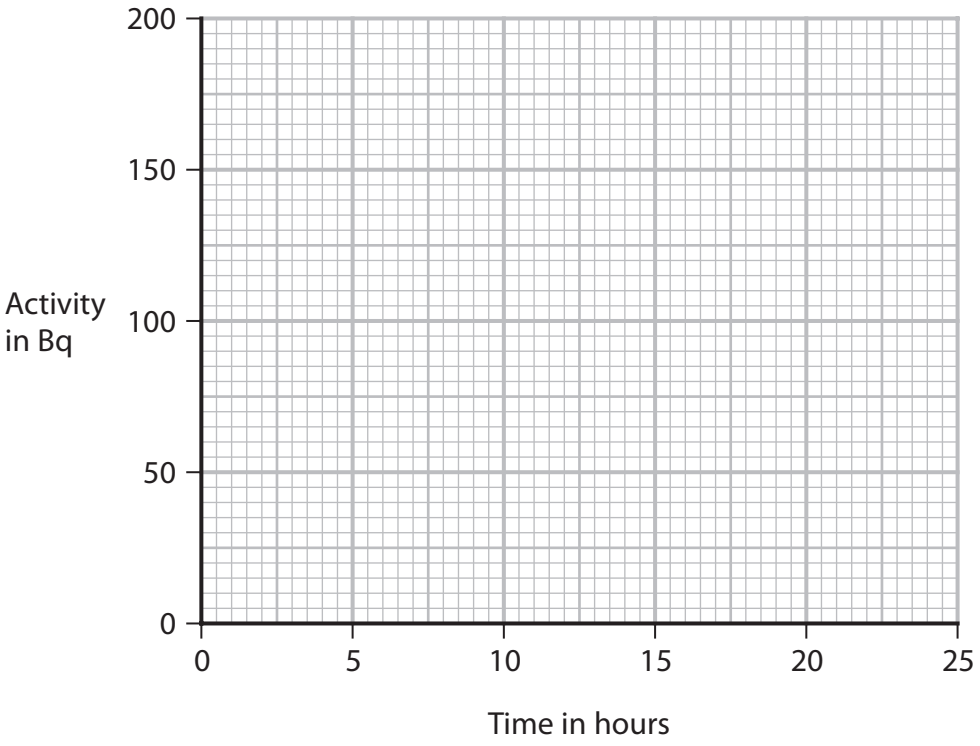
11 Technetium-99m is an isotope of the element technetium.

(a) Technetium-99m has a half-life of 6 hours.

A sample of technetium-99m has an initial activity of 160 Bq.

Complete the graph to show how the activity of this sample of technetium-99m changes over a period of 24 hours.

(3)



(b) Technetium-99m has a half-life of 6 hours and can be used as a medical tracer.

It is injected into a patient's blood and moves around the patient's body.

Technetium-99m emits gamma radiation, which is used to locate the position of the tracer in the patient's body.

(i) Technetium-99m does not exist naturally.

Suggest why technetium-99m is usually made at the hospital where it is used.

(1)

(ii) Explain why technetium-99m is an effective isotope to use as a medical tracer.

(2)

(c) The gamma radiation emitted by technetium-99m is potentially harmful to humans.

Discuss the risks of using technetium-99m to doctors and to patients.

(3)

(Total for Question 11 = 9 marks)