2 Alpha particles, beta particles and gamma rays have different properties.

(a) Complete the table by ticking the correct type of radiation for each property.

The first one has been done for you.

(2)

Property	Type of radiation		
	alpha particles	**beta particles**	**gamma rays**
most ionising	✓		
largest mass			
most penetrating			
highest speed			
negatively charged			

(b) The symbol for the structure of an alpha particle is

$$^{4}_{2}\alpha$$

(i) State the number of neutrons and the number of protons in an alpha particle.

(2)

number of neutrons .....

number of protons .....

(ii) Suggest why alpha radiation is more ionising than beta or gamma radiation.

(1)

.....

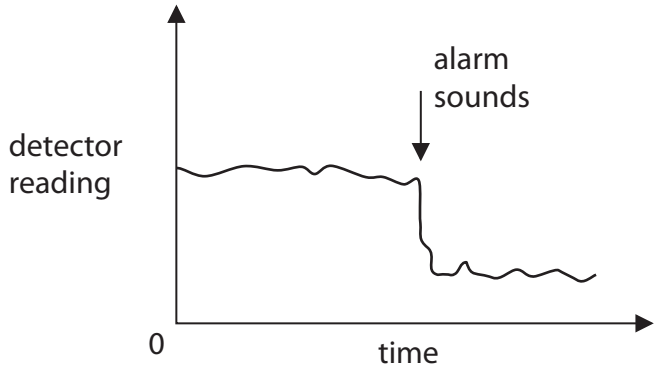
.....

(c) A smoke alarm contains a source of alpha particles and a detector.

The alpha particles reach the detector through a sample of air from the room.

The alarm sounds if there is a sudden drop in the detector reading.

This graph shows changes in the detector reading.



(i) Why is the detector reading never zero?

(1)

.....

.....

(ii) Why is the detector reading never constant?

(1)

.....

.....

(iii) Suggest why fewer alpha particles reach the detector if there is a fire.

(2)

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(Total for Question 2 = 9 marks)