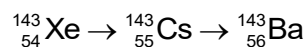


- 7 Nuclear fission products are usually radioactive and give rise to a series of radioactive products. Each decay product has its own half life, but eventually a stable nuclide is reached.

One such fission product and its decay products is shown as below:



The half-lives of Xenon-143 and Caesium-143 are 0.511 s and 1.79 s respectively.

- (a) Suggest why the number of Caesium-143 nuclei inside the nuclear reactor increases initially and decreases subsequently.

.....  
.....  
.....[2]

- (b) Explain why Xenon-143 does not decay faster when heated.

.....  
.....[1]

- (c) Suggest two reasons why a detector placed near to a sample of Xenon-143 would record a count rate much larger than the expected activity of Xenon.

1. ....  
.....

2. ....  
.....[2]

(d) Xenon-143 decayed to Caesium-143 through  $\beta$ -particle emission. Although a lead container was used to contain Xenon-143 and it provides adequate shielding for the  $\beta$ -particle emission, some X-ray radiation can be detected outside the lead container. Explain why.

.....  
.....  
.....  
.....  
.....[4]

[Total: 9]

### Section B

Answer **one** question from this Section in the spaces provided.

