

13 This question is about the use of radioactivity to treat tumours.

A horse has a tumour near one eye.

The tumour is several centimetres across.

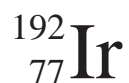
A vet treats the tumour using radiotherapy.

The vet puts an isotope called iridium-192 into the tumour.

Iridium-192 emits beta particles.



(a) Iridium-192 is written using this symbol



(i) How many protons does a nucleus of iridium-192 contain?

(1)

(ii) How many neutrons does a nucleus of iridium-192 contain?

(1)

(b) Iridium-191 is a different isotope of iridium.
What are isotopes?

(2)



- (c) When iridium-192 decays, a beta particle is emitted and the iridium changes into platinum.

Complete the nuclear equation that shows this decay.

(2)



- (d) The tumour in the horse is several centimetres across.
Explain why beta radiation is more suitable than alpha or gamma radiations for this treatment.

(3)

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- (e) The energy from the beta radiation is expected to destroy the cells in the tumour over a period of several weeks.

(i) The most suitable half-life for the radioactive source would be

(1)

- ☐ A 75 minutes
- ☐ B 75 hours
- ☐ C 75 days
- ☐ D 75 years

(ii) Explain your choice.

(2)

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(Total for Question 13 = 12 marks)

