Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1		i	activity decreases quickly / little radiation emitted after a few half-lives / doesn't stay radioactive for too long / does not emit radiation for too long✓ Less damage to tissue / organs / cells ✓	2 (2 × AO 1.2)	**DO NOT ALLOW** no radioactivity after 64 hours **IGNORE** side effects unqualified **Examiner's Comments** This question was challenging for all the candidates. Many candidates did not understand the term halflife, and there were many answers suggesting that the radioactivity would only be present for 64 hours. It was expected that candidates would explain that the damage caused to the body related to tissue or organs or cells. Vague responses did not score. **Assessment for learning** Candidates should have the opportunity to write explanations using and applying their knowledge to novel situations.
		ii	**Any two from:** (some) side-effects are temporary **AW** ✓ (idea that) benefits outweigh the risks **AW** ✓ other (radioactive) isotopes have more harmful side-effects ✓ other (radioactive) isotopes have longer half-lives ✓	2 (2 × AO 3.2a)	**IGNORE** reference to short half-life without qualification **Examiner's Comments** This explanation question was also found to be challenging for all the candidates. Many vague responses were observed. Some candidates answered it in terms of half-life which did not answer the question set. A significant number of candidates scored 1 mark, either for identifying that the side-effects were temporary, or for giving an answer in terms that it is better to suffer the side-effects and treat the liver cancer. Very

					few responses combined these ideas. Another way of answering this question was in terms of why other radioactive isotopes would not be suitable.
			Total	**4**	
2			D	1 (AO 1.1)	**Examiner's Comments** This question proved challenging, with only a very small majority of the candidates understanding the process of fusion. The incorrect answers were generally either A or B, perhaps indicating that candidates were confusing the terms 'fission' and 'fusion'.
			Total	**1**	
3			D ✓	1 (AO1.1)	**Examiner's Comments** Many candidates were confused between nuclear fission in a power station and nuclear fusion occurring in the Sun. **Misconception** Understanding the difference between fission and fusion. Understanding the processes in a nuclear power station.
			Total	**1**	