Question 5

QUESTION	ANSWERS	EXTRA INFORMATION	MARK	AO / SPEC. REF.
05.1	**Level 3:** detailed description of chain reaction and function of control rods, including absorption of neutrons to reduce rate of emitted neutrons causing fissions, or ratio 1:1		5–6	AO2 4.4.4.1
	Level 2: detailed description of chain reaction and some understanding of control rods shown.		3–4	
	Level 1: Simple description of chain reaction, or control rods.		1–2	
	No relevant content.		0	
	Indicative content • Neutron absorbed by nucleus of nuclear fuel (uranium/ plutonium). • Nucleus splits into two smaller nuclei releasing energy and 2–3 further neutrons. • Fission neutrons can fission other nuclei and the reaction progresses into a chain reaction. • Control rods are made of cadmium or boron. • They can absorb neutrons without undergoing fission. • Rods are inserted in the reactor core deep enough to cause one further fission for each nucleus that splits/ to control the reaction.			
05.2	Advantage: • Very high power output Disadvantage: • Nuclear waste difficult to store safely • Large decommissioning costs • Risks of nuclear disasters, e.g. Fukushima/Chernobyl		1 1	AO1 4.1.3 4.4.2.4
05.3	Tick in the box with the third option: (✓) Nuclear fusion is the merging of two light nuclei to form a heavier nucleus. The mass of the product nucleus is smaller than the combined mass of the two lighter nuclei.		1	AO1 4.4.4.2
TOTAL			**9**	