

Question number	Answer	Notes	Marks
1 (a) (i)	uranium/plutonium;	allow chemical symbols	1
(ii)	(particles) formed <b>after</b> fission/ <b>after</b> U breaks up;  plus any <b>one</b> from: - neutron; daughter nuclei; named products;	do not allow after decay  allow gamma (radiation)	2
(iii)	MP1 they are (still) radioactive/ emit ionising radiation /eq;  MP2 they last for a very long time/have a long half-life/eq;	allow harmful to people/environment	2
(iv)	it slows down neutrons/eq;	ignore absorbs neutrons	1
(v)	any two ideas from: - MP1 fewer neutrons would be absorbed;  MP2 fission rate would increase / / (reactor) become critical ;  MP3 too much energy produced (too fast);  MP4 meltdown of core/reactor;	more neutrons available  the reaction would go out of control do not accept "turns into a bomb"  meltdown of 'it'	2

(b) (i)	773(K);		1
	<p>(ii) substitution; rearrangement; evaluation; e.g.</p> $\frac{8.4}{773} = \frac{P_2}{1170}$ $P_2 = \frac{8.4 \times 1170}{773}$ <p>13 (MPa)</p>	<p>no mark for the equation</p> <p>rearrangement and substitution in either order</p> <p>12.7</p> <p>allow ecf from (b)(i) for all 3 marks</p> <p>if calculation seen with °C for T<sub>1</sub> instead of K, then max mark = 2</p> <p>answer of 19.7 (MPa) with no working = 1 mark</p> <p>total marks = 12</p>	3