

Half Life 2 MS

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	2.7 (days)	allow 1 mark for showing correct use of the graph	2
b)	put source into water at one point on bank see if radiation is detected in polluted area or put source into water at three points on bank (1) see if radiation is detected downstream of factory or farmland or sewage treatment works (1)	accept the idea of testing different parts of the river bank at different times accept idea of tracing	1 1
Total marks			4

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	3 fewer neutrons	accept fewer neutrons accept different number of neutrons do not accept different number of electrons	1
a)ii)	electron from the nucleus	both points needed	1
a)iii)	32 (days)	allow 1 mark for clearly obtaining 4 half-lives	2
a)iv)	has a much longer half-life	accept converse answers in terms of iodine-131 accept it has not reached	1

	little decay happened / still in the atmosphere	one half-life yet accept it is still decaying	1
b)	any two from: <input type="checkbox"/> some children developed TC before 1986 <input type="checkbox"/> some children (after 1986) that developed TC did not live in highly contaminated areas <input type="checkbox"/> the (large) increase can (only) be explained by (a large increase in) radiation as caused by Chernobyl <input type="checkbox"/> all areas would be contaminated (and raise the risk of TC) <input type="checkbox"/> no evidence (of effect) of other variables	marks are for reasons	2
c)	People not exposed (to the radiation but who were otherwise similar)	accept people not affected (by the radiation)	1
d)	any two from: <input type="checkbox"/> produce no pollutant / harmful gases <input type="checkbox"/> produces a lot of energy for a small mass (of fuel) or is a concentrated energy source <input type="checkbox"/> it is reliable or it can generate all of the time <input type="checkbox"/> produces only a small volume of (solid) waste	answers should be in terms of nuclear power and not why we should not use other fuels accept named gas or greenhouse gases do not accept no pollution accept amount for mass accept high energy density accept amount for volume	2
Total marks			11

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	15 (hours)	accept any answer between 14.8 and 15.2 inclusive	1
a)ii)	15 (hours) or their (b)(i)		1
b)i)	americium-241 has a long half life		1
Total marks			3

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	3500	no tolerance	1
a)ii)	adjusted age correctly obtained from the graph adjusted age +50	accept values between 3700-3800 inclusive accept their (c)(i) used correctly to obtain an adjusted age from the graph second mark can only be scored if first mark awarded if no working shown an answer between 3750-3850 inclusive scores both marks note: any line or mark made on the graph counts as working out	2
Total marks			3

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	200 to 50	accept either order	1
a)ii)	5.3	accept values between 5.2 and 5.4	1
a)iii)	5.3	accept values between 5.2	1

	or their (a)(ii)	and 5.4	
b)i)	Make the conveyor belt move more slowly		1
b)ii)	lead		1
c)	Exposure increased the content of some types of vitamin.		1
Total marks			6