

BACKGROUND RADIATIONS AND HAZARDS 1

MARK SCHEMES

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	2.5		1
a)ii)	The radiation dose from natural sources is much greater than from artificial sources.		1
b)i)	other factors may be involved	accept a specific suggestion eg they may be exposed to other types of radiation accept cannot be sure (in many cases) that the cause of death is radon (poisoning)	1
b)ii)	any one from: <ul style="list-style-type: none"> • different concentrations in different rooms • to average out daily fluctuations 	accept to find an average accept to make the result (more) reliable / valid do not accept to make more accurate on its own	1
b)iii)	average level (much) higher (in C and D) some homes have very high level (in C and D) or maximum level in some homes (in C and D) is very high	accept converse accept maximum level in A and B is low accept higher radiation levels (in C and D) for 1 mark	1 1
Total marks			6

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS				
a)i)	any one from: ☒ food / drink ☒ rocks / building materials ☒ cosmic rays / rays from space	accept correctly named example	1				
a)ii)	any one from: ☒ nuclear power / coal power (stations) ☒ nuclear accidents ☒ nuclear weapons testing	accept nuclear waste accept named accident eg Chernobyl accept named medical procedure which involves a radioactive source accept radiotherapy nuclear activity / radiation is insufficient do not accept CT scans	1				
a)iii)	different number of / fewer protons or different atomic number	accept does not have 86 protons accept only has 84 protons do not accept bottom number different reference to mass number negates this mark	1				
b)	168	accept 169 if clear, correct method is shown allow 1 mark for a correct dose ratio involving the spine eg 2:140 etc or ratio of days to dose is 1.2 or ratio of dose to days is 0.83	2				
c)i)	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Group A</td> <td style="text-align: center;">Group B</td> </tr> <tr> <td style="text-align: center;">JMO</td> <td style="text-align: center;">KLN</td> </tr> </table>	Group A	Group B	JMO	KLN	all correct any order within each group	1
Group A	Group B						
JMO	KLN						

c)ii)	similar (number) / same (number) / large (number)	accept the same specific number in each group eg three reference to other factors such as age is neutral	1
c)iii)	how many people in each group developed cancer	a clear comparison is required	1
c)iv)	Yes the benefit of having the scan is greater than the risk or the risk is (very) small (compared to the chance from natural causes) No no additional risk is acceptable	there are no marks for Yes or No the mark is for the reason accept the risk is much greater from natural causes	
Total marks			9

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	top and bottom boxes identified		1
b)	Medical (treatment) or X-rays	answer must be in table accept treatment for medical treatment	1
c)	15	allow 1 mark for correctly identifying 300 as the average dose	2
Total marks			4

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	top and bottom boxes identified		1
a)ii)	Medical (treatment) or X-rays	answer must be in table accept treatment for medical treatment	1
b)	15	allow 1 mark for correctly identifying 300 as the average dose	2
Total marks			4

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
	<p>1 mark for each correct line</p> <p>X-rays</p> <p>Cosmic rays</p> <p>Radon gas</p> <p>Are used to show broken bones.</p> <p>The radiation comes from outer space.</p> <p>Comes from soil containing a radioactive isotope of potassium</p> <p>Gives about 50 % of all background radiation</p>	<p>If more than 1 line has been drawn from a box in List A then all those lines are marked incorrect.</p>	
Total marks			3