

Question number	Answer	Notes	Marks
7 (a)	idea of radiation from sources in the environment; idea that background is ever present/all around;	allow idea of 'no other sources present'	2
(b) (i)	time taken; and either of for the (radio)activity to halve; for half of the (radioactive) nuclei / atoms/ isotope /mass to decay;	allow "how long it takes" reject "half the time" allow count rate for activity ignore substance	2
(ii)	evidence of graph used correctly; 3.8 (days);	i.e. line drawn across from 600 to curve and down to time axis allow full marks for 3.8-3.85	2
(c)	4 (for alpha nucleon number); 2 (for alpha proton number); 86 (for Rn proton number);	ECF for incorrect alpha proton number then multiplied by 3	3
(d)	any TWO from: MP1. idea of irradiation of internal organs; MP2. alphas are {highly/very/most} ionizing; MP3. causes mutations/cancer;	allow idea that there is no 'dead skin' layer for alphas to penetrate allow 'damages tissue' or 'damages cells/DNA'	2

(Total for Question 7 = 11 marks)