Atoms and radiation – *Mark scheme*

1. (a) (i) half / ½ / 50% 1

accept 1 (part) in 2 (parts) 1

(ii) (the) food (we eat) is radioactive 1

accept because of the food (we eat)
accept we breathe in radon
radon in the air is neutral

(b) higher in village B 1

by 6 units *allow 1 mark for correctly obtaining a height difference of 180(m)/ 4 times higher – this refers to height and not radiation levels* 2

accept for 3 marks in village A it is 2 units (extra) and in village be it is 8 units (extra)

allow 1 mark for a correct radiation calculation based on incorrect height readings

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2. A β / beta
B γ / gamma
C α / alpha *for 1 mark each*

[3]

3. (a) (i) gamma hardly ionises the air 1

accept does not ionise
accept gamma radiation is not charged
*do **not** accept answers in terms of danger of gamma or other properties*

(ii) half-life (too) short 1

accept need frequent replacement; 'it' refers to curium-242

(iii) (two) fewer neutrons 1

accept different numbers of neutrons if a number is specified it must be correct

*do **not** accept more neutrons unless curium-244 is specified*

(b) (i) gamma 1

accept correct symbol

(ii) both absorbed by the metal / steel / weld 1

only scores if (b)(i) is correct
accept cannot pass through the metal / steel / weld

(c) (i) put source into water at **one** point on bank 1

accept the idea of testing different parts of the river bank at different times

see if radiation is detected in polluted area 1

accept idea of tracing

(ii) 2.7 (days) 2

*allow **1** mark for showing correct use of the graph*

[9]