Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

(a) (i) **K** and **L**

both answers required either order

1

(ii) (1) same number of protons

accept same number of electrons

accept same atomic number

1

(2) different numbers of neutrons

1

(b) (i) 90

1

(ii) 140

1

(c) alpha (particle)

reason may score even if beta or gamma is chosen

1

mass number goes down by 4
or
number of protons and neutrons goes down by 4
or
number of neutrons goes down by 2

*candidates that answer correctly in terms of why gamma **and** beta decay are not possible gain full credit*

1

atomic / proton number goes down by 2
or
number of protons goes down by 2

*accept an alpha particle consists of 2 neutrons and 2 protons for **1** mark*

*accept alpha equals $^{4}_{2}He$ or $^{4}_{2}\alpha$ for **1** mark*

an alpha particle is a helium nucleus is insufficient for this mark

1

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Q2.

(a) gamma will pass through the body

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it refers to gamma

or

alpha will not pass through the body

answers must relate to the body

accept skin for body

1

gamma is only slightly ionising

accept gamma causes less damage to cells / tissue

or

alpha is heavily ionising

*do **not** accept gamma causes no damage to cells*

less harmful is insufficient

1

(b) (i) (both graphs show an initial) increase in count-rate

accept both show an increase

1

(ii) only the right kidney is working correctly

1

any **two** from:

*if incorrect box chosen maximum of **1** mark can be awarded*

reference to named kidney can be inferred from the tick box

- count-rate / level / line for right kidney decreases (rapidly)
  it decreases is insufficient
- count-rate / level / line for left kidney does not change
  it does not change is insufficient
- radiation is being passed out / into urine - if referring to right kidney
- radiation is not being passed out - if referring to the left kidney

2

(c) (i) time taken for number of nuclei to halve

or

time taken for the count-rate to halve

1

(ii) short half-life – the level of radiation (in the body) decreases rapidly

it refers to short life isotope

1

to a safe / very small level

or

a long half-life – the radiation remains in the body / for a long time

level of radiation remains high

answers in terms of damage eg cancer are insufficient

1

[9]

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