Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) (i) any **one** from:

- food / drink
- rocks / building materials
- cosmic rays / rays from space
  accept correctly named example

1

(ii) any **one** from:

- nuclear power / coal power (stations)
  accept nuclear waste
- nuclear accidents
  accept named accident eg Chernobyl
- nuclear weapons testing
  accept named medical procedure which involves a radioactive source
  accept radiotherapy
  nuclear activity / radiation is insufficient
  *do **not** accept CT scans*

1

(iii) different number of / fewer protons
accept does not have 86 protons
accept only has 84 protons
or
different atomic number
*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

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(c) (i)

Group A	Group B
J M O	K L N

all correct
any order within each group

1

(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

(iii) how many people in each group developed cancer
a clear comparison is required

1

(iv) *there are no marks for **Yes** or **No** the mark is for the reason*

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)
accept the risk is much greater from natural causes

No
no additional risk is acceptable

1

[9]

Q2.

(a) **L**

J

K

all 3 in correct order
*allow **1** mark for 1 correct*

2

(b) number of electrons = number of protons
accept amount for number

1

(c) neutrons
this answer only

1

(d) loses / gains electron(s)

1

[5]

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Q3.

(a) (i) (two) nuclei (of light elements) join

accept hydrogen atoms for nuclei

1

forming a larger / heavier nucleus / one

accept comparative term equivalent to larger

accept forms a helium (nucleus / atom) this mark only scores if fusion is in terms of hydrogen atoms

1

(ii) stars

accept a named star

e.g. the Sun

accept nebula

mention of planets negates answer

1

(b) (i) any **one** from:

- (currently) only experimental
- reaction does not last long enough
- use more energy than they produce

allow difficult to control

*do **not** allow inefficient on its own*

1

(ii) any **one** from:

- will give another source of energy
- unlimited fuel supplies / energy

accept unlimited hydrogen

- would not produce any radioactive waste

accept less radioactive waste

accept nuclear for radioactive

*do **not** accept toxic waste*

- want to show that it can be done

accept any sensible suggestion

*do **not** accept answers only in terms of fossil fuels or carbon dioxide*

1

[5]

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