Answers to questions on The nuclear atom

1.

Symbol of isotope	Number of protons	Number of electrons	Number of neutrons	Atomic number	Mass number
$^{9}_{4}Be$	**4**	**4**	**5**	**4**	**9**
$^{14}_{7}N$	7	7	7	**7**	**14**
$^{19}_{9}F^{-}$	**9**	10	**10**	**9**	19
$^{64}_{29}Cu^{2+}$	**29**	27	**35**	29	64
$^{79}_{35}Br^{-}$	**35**	**36**	44	**35**	**79**

2. i. (a) ^{125}I has 72 neutrons and ^{131}I has 78 neutrons.

(b) They will have slightly different physical properties e.g. molar mass, density and boiling point.(They also have different half-lives and ^{125} I is a gamma emitter and ^{131}I is a gamma and beta emitter).

(c) Their normal chemical properties are identical but their chemical properties due to their nuclear emissions are different.

ii. Nuclear contamination from the power plants contained radioactive iodine which could be absorbed into the thyroid of humans living nearby. Giving them normal iodine reduces the probability of the radioactive iodine being absorbed.

3. The total relative detector current = 4.345 + 83.789 + 9.501 + 2.365 = 100 so the readings can be used as percentages.

A_r(Cr) = [(4.345 x 50) + (83.789 x 52) + (9.501 x 53) + (2.365 x 54)] / 100 = 52.06

4. Let percentage of ^{79}Br be a so that the percentage of ^{81}Br = (100 − a)

$$\frac{(a \times 79) + [(100-a) \times 81]}{100} = 79.91$$

$2a$ = 8100-7991 = 109 so a = 54.50 and (100 – a) = 45.50

^{79}Br = 54.50% and ^{81}Br = 45.50%