Working with the Avogadro number and Moles

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| N/B for this exercise 1 Mole = 6.02x1023 |

1. Calculate the number of atoms in
2. 35.5g chlorine atoms b) 27g aluminium c) 3.1g Phosphorus d) 336g iron

e) 48g magnesium f) 1.6g oxygen atoms g) 0.4g oxygen atoms

h) 216g silver.

1. How many grams of Zinc contain
2. 1 x1010 atoms
3. 6x 1020 atoms
4. How many grams of aluminium contain
5. 2 x 1023 atoms
6. 6 x1020 atoms
7. What mass of carbon contains
8. 6 x 1010 atoms
9. 2 x 1021  atoms
10. Write down
11. The mass of calcium that has the same number of atoms as 12g of magnesium
12. The mass of silver that has the same number of atoms as 3g aluminium
13. The mass of zinc with the same number of atoms as 1g of helium
14. The mass of sodium which has the same number of atoms as 39g potassium
15. A is a group 3 element

3.62g contains 3.11 x 1022 atoms

 Calculate the RAM of A and suggest the identity of the element

1. B is in group 5

5g contains 4.013 x 1022 atoms

 Calculate the RAM of B and suggest it’s identity

1. C is a group 1 ion

2.45g contains 1.735 x 1022 atoms

 Calculate the RAM of the element and suggest a formula for the ion.

1. D is a group 7 element

5.44g contains 4.61 x 1022 **Molecules** of D

 Calculate the RAM of the **Element** and suggest the identity of D

Harder Examples

1. Imagine a shop is having a sale. The sale price of titanium is 1 billion (109) atoms for 1p. How much would you pay for 1mg (1 x 10-3g) of titanium

(hint 1mg of titanium contains how many moles?...... how many atoms......and the price)

1. Ethanol, C2H6O, is the alcohol in alcoholic drinks. If you have 9.2g of ethanol, how many species of the following do you have
2. Ethanol molecules
3. Carbon atoms
4. Hydrogen atoms
5. Oxygen atoms
6. A car releases about 5g of nitrogen oxide (NO) into the air for each mile driven. How many molecules of NO are emitted per mile

( hint Mass.......moles.......no of molecules)

1. How many molecules of water are there in 1dm3 of water

(hint the density of water =1g/cm3, volume of water.....mass of water..... moles)

1. How many molecules of sucrose (C12H22O11 ) in a 1 kg bag of sugar.