

## Answer on Question #54232 – Chemistry – General chemistry

### Question:

Calculate the expected mass of one mole of  $^{31}\text{P}$  (phosphorus) atom given that the Avogadro constant equals  $6.0225 \times 10^{23}$ , the mass of one electron equals  $9.1091 \times 10^{-28}$  grams, the mass of the one proton equals  $1.6725 \times 10^{-24}$  grams and the mass of one neutron equals  $1.6748 \times 10^{-24}$  grams.

so far I have:

$$9.1091 \times 10^{-28} \times 15$$

$$1.6725 \times 10^{-24} \times 15$$

$$1.6748 \times 10^{-24} \times 16$$

is this correct.

### Answer:

$^{31}\text{P}$  has 15 protons, 16 neutrons and 15 electrons. This is correct.

Total mass of 1 atom equals:

$$m = (26.7968 + 25.0875) \times 10^{-24} \text{ g} + 0.0137 \times 10^{-24} \text{ g} = 51.8980 \times 10^{-24} \text{ g}$$

Thus, the mass of 1 mole is:

$$m(1 \text{ mole}) = m \times N_A = 51.8980 \times 10^{-24} \text{ g} \times 6.0225 \times 10^{23} = 31.2555 \text{ g}$$