1 a Identify the particle that contains two more protons, two fewer neutrons and the same number of electrons as an atom of $^{54}_{24}\mathrm{Cr}$.

$^{54}_{26}\mathrm{Fe}^{2+}$

b What difference, if any, is there in the chemical properties of the isotopes $^{79}_{35}\mathrm{Br}$ and $^{81}_{35}\mathrm{Br}$. Explain your answer.

no difference

same electron configuration / number of electrons

2 a Give the full electron configuration of the following atoms and ions.

P atom **$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$**

Ni^{2+} ion **$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^8$**

b Complete electron configuration of the following atoms and ions.

Cu atom [Ar] **$4s^1\ 3d^{10}$**

Cr^{3+} ion [Ar] **$3d^3$**

3 a Find the mass of one atom of $^{19}_{9}\mathrm{F}$ in kg given the following data. Give your answer to the appropriate number of significant figures.

mass of electron = 9.1094×10^{-31} kg
mass of proton = 1.6726×10^{-27} kg
mass of neutron = 1.6749×10^{-27} kg

$[9 \times 9.1094 \times 10^{-31}] + [9 \times 1.6726 \times 10^{-27}] + [10 \times 1.6749 \times 10^{-27}] = 3.1811 \times 10^{-26}$ kg (5sf)

b Find the mass of one mole of atoms of $^{19}_{9}\mathrm{F}$ in kg. Give your answer to the appropriate number of significant figures.

Avogadro constant (L) = 6.022×10^{23}

$3.1811 \times 10^{-26} \times 6.022 \times 10^{23} = 0.01916$ kg (4sf)