1  

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

$b  \quad \frac{56}{26} \text{Fe}^{2+}$

b  What difference, if any, is there in the chemical properties of the isotopes $^{79}_{35} \text{Br}$ and $^{81}_{35} \text{Br}$? 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  $[\text{Ar}] 4s^1 3d^{10}$

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

3  

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

mass of electron = $9.1094 \times 10^{-31}$ kg

mass of proton = $1.6726 \times 10^{-27}$ kg

mass of neutron = $1.6749 \times 10^{-27}$ 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 $^{19}_{9} \text{F}$ in kg. Give your answer to the appropriate number of significant figures.

Avogadro constant (L) = $6.022 \times 10^{23}$

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