



1 Give the full electron configuration of the following atoms and ions.

a Cr atom  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$  (1)

b  $Cr^{3+}$  ion  $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3$  (1)

2 The complex  $[Cu(H_2O)_6]^{2+}$  reacts irreversibly with  $Na_4EDTA$ .

a Write an equation for the reaction.

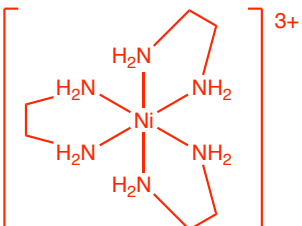
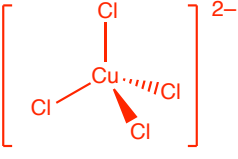


b Explain clearly why this reaction is irreversible.

for reverse reaction  $\Delta H$  is negligible  
as same number of similar bonds are broken and formed  
for reverse reaction  $\Delta S$  is very negative  
as go from 7 to 2 aqueous particles  
therefore  $\Delta G$  for reverse reaction is very positive

(5)

3 Complete the table about the following complex ions.

Complex	$[Ni(NH_2CH_2CH_2NH_2)_3]^{3+}$	$[CuCl_4]^{2-}$
Sketch of shape		
Name of shape	octahedral	tetrahedral
Bond angles	$90^\circ$	$109.5^\circ$
Ligand	$NH_2CH_2CH_2NH_2$	$Cl^-$
Co-ordination number	6	4
Oxidation state of metal	+3	+2