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

a Co atom ....….…… (1)

b Co^{2+} ion ....….…… (1)

2 The complex $[Pt(NH_3)_2Cl_2]$ exists as two stereoisomers.

a What are stereoisomers? ....…..….……

....….………

....….………

....….…… (2)

b Draw the cis stereoisomer, name its shape, ligand-Pt-ligand bond angles, give its co-ordination number and oxidation state of the platinum.

Name of shape = ...…....................

ligand-Pt-ligand bond angles = ...

Co-ordination number = ...

Oxidation state of Pt = ...

(5)

3 a A complex absorbs visible light at 582 nm. Calculate the energy gap between the d orbitals in J.
[Planck's constant is 6.63×10^{-34} Js and the velocity of light is 3.00×10^8 ms^{-1}]

....….………

....….………

....….………

....….………

....….…… (3)

b Calculate the energy gap between the d orbitals in kJ mol^{-1}.
[the Avogadro constant (L) is 6.022×10^{23} mol^{-1}]

....….………

....….………

....….…… (2)