CHEM1612 (Chemistry Pharmacy 1B) - November 2004

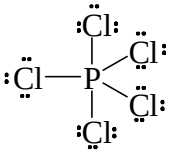
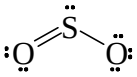
2004-N-2

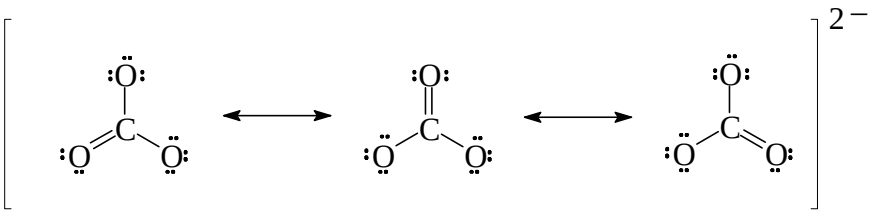
- $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$
- 12

  2

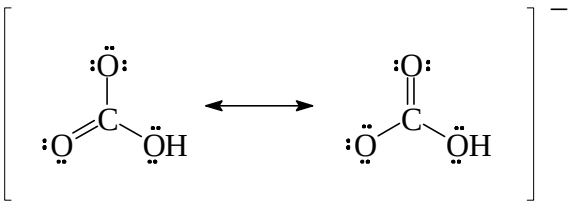
  0

  7

	sp^3d	trigonal bipyramidal	non-polar
	sp^2	bent	polar



The CO_3^{2-} ion is resonance stabilised as shown. The true structure is none of the above, but rather an average of all of them, so all C=O bond lengths are the same.



The HCO_3^- ion is also resonance stabilised, but the bond between the C–OH is not involved in the resonance contributers. That bond is therefore a normal C–O single bond length, whilst the other two C=O bonds are identical (and a bit shorter).

2004-N-3

- 342 kJ mol^{-1}
- –5.99 °C

2004-N-4

- $\Delta G° = \Delta H° - T\Delta S° = -142$ kJ mol^{-1} at 298 K.
  As $\Delta G°$ is negative, the reaction is spontaneous.

  To the left (reactants)

  9.17×10^{24} atm^{-1}

  $T > 1056$ K

2004-N-5

- –78.2 kJ mol^{-1}
- –351 kJ mol^{-1}

2004-N-6

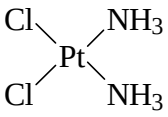
- 5.78

  2×10^{-5} M^2

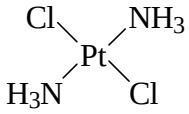
  Blood is buffered by a CO_3^{2-} / HCO_3^- buffering system which resists changes in pH.

2004-N-7

- 0.0114 M
- $4NO_3^-(aq) + 4H^+(aq) + 3S(s) \rightarrow 4NO(g) + 2H_2O(l) + 3SO_2(g)$
-



cis-diamminedichloroplatinum(II)



trans-diamminedichloroplatinum(II)

2004-N-8

- 1.5 V
- 1.6×10^{37}

2004-N-9

- 50.3 mg
- 0.017 M
- pentaaquachlorochromium(III) chloride

  ammonium iron(III) sulfate-6-water

  $Na_3[CoCl_6]$

  $Al(NO_3)_3 \cdot 9H_2O$

  KNO_2

  potassium hydrogen sulfate

2004-N-10

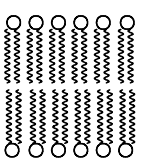
- Rate = $k[A]^2[B]$

  $k = 289\ M^{-2}\ hr^{-1}$

  $7.66 \times 10^{-2}\ M\ hr^{-1}$

2004-N-11

- Cell membranes are composed of phospholipid bilayers.



  Naphthol Yellow S is water soluble, so does not pass through the cell membrane - the hydrophilic region of the lipid bilayer acts as an impermeable barrier. Martius Yellow is non-polar so may pass through the cell membrane. It can either disrupt the function of the cell membrane itself, or pass into the cell and damage the various parts of the liver cells.

blood	red blood cells	water/plasma
milk	casein	water
cell	nucleus, ribosomes, etc	cell fluid/ctyoplasm