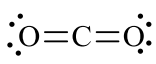
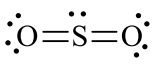
Marks 12

- Complete the following table.

Molecule	CO_2	SO_2
Draw a Lewis structure		
Name the molecular geometry	**linear**	**bent (approx 120°)**
Does the molecule have a dipole moment? Give a reason for your answer.	**No. The molecule is linear so the dipoles in the C=O bonds cancel each other out.**	**Yes. The molecule is bent so the dipoles in the S=O bonds do not cancel each other out.**
Give the hybridisation of the central atom.	***sp***	***sp*^{2}**

Comment on the relative strength of a π-bond in carbon dioxide compared to a π-bond in sulfur dioxide.

The π-bond is stronger in CO_2 because the overlapping orbitals (2*p* in C and 2*p* in O) are of similar size allowing maximum overlap. In SO_2, the 3*p* orbital in S is bigger than the 2*p* orbital in O so the overlap is not as good.

Both oxides dissolve in water to give a weak acid. Choose one of the oxides and write balanced equations representing the formation of the corresponding weak acid and the dissociation of the acid into ions.

$SO_2(g) + H_2O(l) \rightarrow H_2SO_3(aq) \rightarrow H^+(aq) + HSO_3^-(aq)$

$CO_2(g) + H_2O(l) \rightarrow H_2CO_3(aq) \rightarrow H^+(aq) + HCO_3^-(aq)$

Use one of the molecules/ions from the above equations to illustrate the concept of resonance.