SL & HL Questions on Covalent bonding

1. Explain why the bond between two oxygen atoms in oxygen gas is a double bond whereas the bond between two nitrogen atoms in nitrogen gas is a triple bond.

2. Explain why a proton in water, $H^+(aq)$ is often written as $H_3O^+(aq)$.

3. Explain why the carbon to carbon bond in ethyne, C_2H_2, is stronger and shorter than the carbon to carbon bond in ethene, C_2H_4.

4. Explain why there are two different carbon to oxygen bond lengths in a molecule of ethanoic acid.

5. Use information in Section 8 of the IB chemistry data booklet to explain why a carbon to chlorine bond is polar.

6. Explain why a white precipitate is formed when silver nitrate solution is added to a solution of potassium chloride but not when silver nitrate solution is added to tetrachloromethane.

7. Carbon dioxide is a linear molecule. It contains two carbon to oxygen double bonds at 180° to each other. Explain why the C=O bonds are polar and yet the molecule is non-polar.

8. Explain why water in a beaker heats up quickly in a microwave oven whereas when the same volume of tetrachloromethane, $CCl_4(l)$, is placed in the beaker and the microwave switched on for the same length of time there is no increase in the temperature of the tetrachloromethane.