

CHEM1611 Problem Sheet 3 (Week 3)

Work through the ChemCAL module "*Covalent Bonding*".

1. Metal atoms participate in many biological processes, often bonded to protein molecules. Complete the following table showing a number of metals, one property of each metal and the biological function for which the metal is important.

	Metal	Property which is important for biological activity	Biological function to which this property is relevant
(a)	Cu	Can exist in two oxidation states, +I and +II	
(b)	Zn		Structural role in determining protein shape
(c)	Fe		Oxygen transport in blood
(d)		Forms 'complexes' that can bind DNA	Cancer chemotherapy
(e)	Na	Small positive ion with low polarisability	

2. Use the following electronegativity information to predict the type of bonding that will occur between rubidium and oxygen and between silicon and oxygen; the formula of the compounds formed and the likely properties the compounds will show.

	Electronegativity
Oxygen	3.5
Silicon	1.8
Rubidium	0.8

3. Why are ionic solids generally brittle and metals malleable?
4. Give the Lewis structures, indicating each valence shell electron and all significant resonance contributors, for the following molecules.
- CH₄
 - SF₆
 - ClF₅
 - SF₄
 - NO₃⁻
 - CH₃CO₂⁻
 - O₃