***Biochemistry Free Response***

**1.** The unique properties of water make life on Earth possible.

**a)** Select three properties of water and for each property **identify**, **define** and **explain** the property in

terms of the chemical/physical nature of water.

**b)** **Describe** how water affects the functioning of living organisms by **explaining** each of the following:

**(i)** the ability of water to moderate temperature within living organisms and in organisms’

environments.

**(ii)** the movement of water from the roots up and out the leaves of plants .

**(iii)** the role of water as a medium for the metabolic processes of cells.

**2.** All life on Earth is carbon based. Our carbon basis allows for the formation of complex molecules.

**a)** Atomically speaking, what allows the element carbon to be the backbone of many large, complex macromolecules.

**b)** Pick three of the four groups of complex carbon based molecules (*macromolecules*) and for each:

**(i)** **discuss** the structural components of the macromolecule.

**(ii)** **discuss** two examples of molecules that belong to each of the groups that you chose and briefly **describe** their function.

**c)** All of these groups of macromolecules are created from *monomers* joining to form *polymers*.

**Describe** and **explain** the process that joins these molecules.

**3.** Proteins – large complex molecules – are major building blocks of all living organisms.

**Discuss** each of the following in relation to proteins:

**a)** the chemical composition and levels of structure of proteins with a specific example of each.

**b)** the roles of DNA and RNA in protein synthesis.