



**NORTH SOUTH UNIVERSITY**  
*Department of Biochemistry & Microbiology*  
Mid & Final Assignment

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Section: 11

Course name: BIO103

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**First Assignment**

**Time: 16 hours (From Friday 9.00 AM to Saturday 1.00 AM)**

**(P.S. Late submission will not be accepted)**

**Answer the question:**

**Total marks: 10**

1. Explain the types of bond present in one glass of water? 1.5

**Answer:** The types of bond present in one glass of water is polar covalent bond and hydrogen bond. Polar covalent bond is a chemical bond. In polar covalent bond, atoms don't share electrons equally when they are participating in the bonds. One glass of water molecule or  $\text{H}_2\text{O}(\text{H}-\text{O}-\text{H})$  has two covalent bonds and both of them are polar. The oxygen atom carries a slight negative charge and each of the hydrogen atoms carries a slight positive charge. On the other hand, hydrogen bond is a weak attraction between a hydrogen atom and another atom taking part in a separate polar covalent bond. It is not a chemical bond because it doesn't make new molecules out of atoms like ionic bond and its weak attraction is a mutual attraction of opposite charges.

2. If the kidney cannot able to release excess water from our body, then which kind of solution our blood would become for our cells? 1

**Answer:** If the kidney cannot able to release excess water from our body, then hypotonic solution our blood would become for our cells. Tonicity is the effect of a solution on the osmotic movement of water. There are three types of tonicity solution and hypotonic is one of them. Therefore "HYPO" means less and if there are less amount of salt molecules than water outside the cell and there are more amount of salt molecules than water inside the cell, water will move into the cell to balance the level.

3. Explain adaptation with an analogy. 2

**Answer:** Adaptation is the process by which a certain type of organisms becomes better suited to survive in its environment. To explain the adaptation with an analogy, we can consider alligators hibernation in colder climates. Alligators are mainly cold blooded and can't generate their own body heat. For that reason, in colder climates they can't easily survive for their lower body heat and metabolism like warm blooded animals. That's why they go into hibernation. In their hibernation, they put their full body inside the water and only keep their mouth outside the water for breathing. When the temperature is higher, they return to the normal stage. Thus, the alligators survive in the colder climates by hibernation and this process is called adaptation.

4. Why in our body the enzymes work in a narrow range of pH? 1.5

**Answer:** Enzymes are proteins that catalyze biochemical reactions in our body. The pH of enzymes is mainly optimum pH. That's why minor pH changes impact its activity. If the value of pH is high, enzymes are destroyed and if the value of pH is low, enzymes activity will be lower. For that reason, the enzymes work in a narrow range of pH in our body.

5. If we fill a glass with water why a meniscus will form? 2

**Answer:** If we fill a glass with water, a meniscus will form because of cohesive and adhesive. If two same type of compound's molecules are attracted by each other, it is called cohesive and if one compound's molecules are attracted by the other compound's molecules, it is called adhesive. In water, hydrogen molecules have extreme level of attraction for each other. So, water is cohesive. On the other hand, water's molecules have also an attraction with other's molecules. So, water is also adhesive. For these behaviors of water, when we fill a glass with water, there creates a curved surface because glass molecules are even more polar than water molecules which is called meniscus. That's why if we fill a glass with water, a meniscus will form.

6. Why every organism will die after a certain age? 2

**Answer:** Every organism will die after a certain age for cell division and cell death theory. All organisms are made of cells. Living things can organize material into protoplasm which made by carbohydrates, fats, proteins, water and then organize protoplasm to make cell and organize cells to make a total living thing by cell division and cell death. The quantity of cell division and cell death mainly depends on organism's age. Considering the cell division and cell death of human, the quantity of cell division is twice than the quantity of cell death in the age of birth to 18 years. In the age of 19 years to 45 years or more, the quantity of cell division is equal to the quantity of cell death. In the age of 46 years or more to the end of organism's life, the quantity of cell death is twice than the quantity of cell division. Therefore, composition is different in different organisms but the theory of cell division and cell death is equivalent. That's why every organism will die after a certain age.