**Discussion**

**Question#1**

Dehydration occurs when water is lost from the body. Dehydrationwill cause the production of concentrated urine. In case of dehydration kidneys compensate the loss by retaining more water which will result in concentrated and darker urine.

**Question#2**

Water loading will produce dilute urine if the person does not have any disease of the kidney. Increase water absorption will occurs in the bloodstream. The blood volume will increase which increases glomerular filtration rate and in excess production of dilute urine.

**Question# 3**

Dehydration is a process when there is not much water present in a body. Dehydration can be mild, moderate and severe. In dehydration, the blood becomes more concentrated. Through the posterior pituitary gland, the hypothalamus releases the antidiuretic hormone. ADH then send signals to the kidneys to recover water from urine which will result in decreased plasma osmolarity and an increase in osmolarity of urine.

**Question #4**

Water overloading is defined as a condition where there is so much water present in the body of a person. In water overloading, there will be less secretion of ADH which will cause more water to be excreted and due to which urine osmolarity decreases.

**Question# 5**

In dehydration, the hypothalamus releases ADH through the posterior pituitary gland which then sends signals to the kidney to recover more water from urine. This will result in blood plasma dilution and decrease osmolarity. In the case of water overloading, there will be less production of ADH by the pituitary gland. More water will be excreted from the kidney and osmolarity of plasma will increase.

**Question #6**

Plasma osmolality is defined as a ratio of solutes to water in blood. No significant changes in osmolarity of plasma was seen in this experiment because it is only affected by water and not any other food.

**Question #7**

The reason to maintain osmolarity of plasma within normal limits is because it is important in maintaining cell volume and excitability. When it is not in the normal range it will interfere with the excitability and volume of the cell. It also affects blood pressure therefore when plasma osmolality is not in normal limit then it will lead to low or high blood pressure.

**Question #8**

My predictions are following

**Prediction#1**

In water overload urine volume was higher which was correct.

**Prediction #2**

Decrease osmolarity of urine in dehydration which was not correct

**Prediction # 3**

The osmolarity increases, urine become concentrated which was correct

**Prediction # 4**

Osmolarity of plasma increase in dehydration which is also correct.

**Application**

**Question#1**

Caffeinated beverages are a normal part of lifestyle. These beverages have diuretic effect. Caffeinated beverages inhibit ADH secretion, which results in less reabsorption of water and more water is excreted by the kidney.

**Question #2**

As caffeinated beverages inhibit ADH secretion which causes less reabsorption of water. The osmolarity of the urine will decrease as more water will be excreted by kidneys.

**Question # 3**

In diabetes insipidus, there is a less level of ADH. This result in a rapid loss of water from the body and result in extreme thirst. This is a reason due to which patients with diabetes insipidus need to drink large amounts of water to recover the water loss in the form of urine. If these patients will not conserve enough water then severe dehydration will occur.

**Question # 4**

Rehydration should occur gradually. When a person with severe dehydration is given pure water then plasma osmolarity will decrease very quickly. This will result in a shift of electrolyte and will significantly alter cellular function which can even be fatal.