**1a. What are coenzymes:**

* A coenzyme is an organic non-protein compound that binds with an enzyme to catalyze a reaction. Coenzymes are often broadly called cofactors, but they are chemically different. A coenzyme cannot function alone, but can be reused several times when paired with an enzyme.

**b. Differentiate between fat and water soluble vitamins:**

|  |  |
| --- | --- |
| **FAT SOLUBE VITAMINS** | **WATER SOLUBLE VITAMINS** |
| * Soluble in fat
 | * Soluble in water
 |
| * Requires carrier protein
 | * Doesn’t require carrier protein
 |
| * Stored in the liver
 | * Excreted in the urine
 |
| * Absorption is along with other lipids
 | * Absorption is simple
 |
| * Deficiency manifests only when the stores are depleted
 | * Deficiency manifests as there is no storage
 |
| * Toxicity-Hypervitaminosis may result
 | * Unlikely, since excess is excreted
 |
| * Eg: A,D,E,K
 | * Eg; B complex and C
 |

**c. Describe niacin in relation to its coenzymic function:**

Vitamin B3, generally referred to as niacin, is a water-soluble vitamin. This vitamin can generally be found in two distinctive forms, namely nicotinic acid and nicotinamide. These substances are used by the body to form the coenzymes NAD and NADP. Niacin coenzymes degrade carbohydrates, fats, proteins and alcohols and synthesize fatty acids and cholesterol. They play a role in cell signaling.Niacin assists functions of the nervous and digestive system. It plays a role in food metabolism and in the formation of red blood cells and skin. NAD and NADP are coenzymes that are part of the energy production system of the body. This system works by means of oxidation and reduction (redox) reactions. Niacin deficiency occurrence causes many symptoms, such as fatigue, headaches, dry skin, loss of appetite, ulcers and emotional instability. On rare occasions (mainly in developing countries) people may experience severe deficiency, which leads to a condition known as pellagra. This conditions is commonly characterized by the 4 D's: dermatitis, diarrhoea, dementia and death. Pellagra literally means raw skin. The conditions was named this because the skin of a patient develops a dark pigmented rash on areas exposed to bright sunlight.Niacin is part of a range of foods, for example meat, fish, bread, yeast, nuts, seeds, soy beans, potatoes, dried fruit, tomatoes and peas. Milk, green-leaved vegeatbles and coffe and tea also provide some niacin. Cereals may be fortified with niacin. Some foods, such as corn, may release niacin upon cooking. Before cooking corn only contains bound, unavailable niacin.