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- Assignment; 1a. What are coenzymes
b. Differentiate between fat and water soluble vitamins
c. Describe niacin in relation to its coenzymic function

Answer;

1a. Coenzymes are Non-protein organic cofactors. Coenzymes assist **enzymes** in turning substrates into products. They can be used by multiple types of **enzymes** and change forms. Specifically, coenzymes function by activating **enzymes**, or acting as carriers of electrons or molecular groups. **Examples of coenzymes** are nicotineamideadenine dinucleotide (NAD), nicotineamide adenine dinucleotide phosphate (NADP), and flavin adenine dinucleotide (FAD). These three **coenzymes** are involved in oxidation or hydrogen transfer. Another is **coenzyme A (CoA)** that is involved in the transfer of acyl groups.

The main function of the coenzyme during catalysis is to act as intermediate carriers of transferred electrons or functional groups in a reaction.

b. Fat Soluble vitamins.

Water soluble vitamins

Soluble in fat	Soluble in water
Absorbed along with other lipids	Absorption is simple
Requires carrier protein	no requirement of carrier protein
Stored in liver	not stored, excreted in urine
Deficiency manifests only when stores are depleted	Deficiency manifests immediately as there is no storage
Toxicity; hypervitaminosis may result	Toxicity is unlikely since excess is excreted
Single large dose may prevent deficiency	Regular dietary supply is required
Examples include vitamins A, D, E AND K	Examples include vitamins B Complex and C

C. 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. NAD and NADP are coenzymes that are part of the energy production system of the body. One way to **increase NAD** is by getting more vitamin B3 (niacins) in the diet.

The coenzyme forms of nicotinic acid are NAD and NADP. These compounds assist dehydrogenase enzymes in the catabolism of fat, carbohydrates, and amino acids, and in the enzymes involved in synthesis of fats and steroids and other vital metabolites. Nicotinamide is from the niacin vitamin. The NAD⁺ coenzyme is involved with many types of oxidation reactions where alcohols are converted to ketones or aldehydes. It is also involved in the first enzyme complex 1 of the electron transport chain.