

**Marks 50**

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Write note on following questions each carries equal marks

1) Write down the 4 steps involved in beta oxidation?

ANS: Beta oxidation takes place in four steps: dehydrogenation, hydration, oxidation and thiolytic cleavage. Each step is catalyzed by a distinct enzyme.

Briefly, each cycle of this process begins with an acyl-CoA chain and ends with one acetyl-CoA, one FADH<sub>2</sub>, one NADH and water, and the acyl-CoA chain becomes two carbons shorter. The total energy yield per cycle is 7 ATP molecules (see below for details on the breakdown). This cycle is repeated until two acetyl-CoA molecules are formed as opposed to one acyl-CoA and one acetyl-CoA.

2) Write down clinical significance of the following enzymes

a) Alkaline phosphatase

ANS: Alkaline phosphatase (ALP) is an enzyme in a person's blood that helps break down proteins. The body uses ALP for a wide range of processes, and it plays a particularly important role in liver function and bone development. Using

an ALP test, it is possible to measure how much of this enzyme is circulating in a person's blood.

b) Creatine kinase



Thus **creatine kinase** is an important **enzyme** in such tissues. Clinically, **creatine kinase** is assayed in blood tests as a marker of damage of **CK**-rich tissue such as in myocardial infarction (heart attack), rhabdomyolysis (severe muscle breakdown), muscular dystrophy, autoimmune myositides, and acute kidney injury.

c) gamma-glutamyl transferase

ANS: **GGT** is usually the first liver **enzyme** to rise in the blood when any of the bile ducts that carry bile from the liver to the intestines become obstructed, for example, by tumors or stones. This makes it the most sensitive liver **enzyme** test for detecting bile duct problems

3) How many proteins are involved in the electron transport chain and how do electrons move in the electron transport chain?

ANS: The electron transport chain is a series of four protein complexes that couple redox reactions, creating an electrochemical gradient that leads to the creation of ATP in a complete system named oxidative phosphorylation. It occurs in mitochondria in both cellular respiration and photosynthesis. In the former, the electrons come from breaking down organic molecules, and energy is released. In the latter, the electrons enter the chain after being excited by light, and the energy released is used to build carbohydrates.

4) Write steps involve in uric acid formation?

ANS: **Uric acid** is a heterocyclic compound of carbon, nitrogen, oxygen, and hydrogen with the formula C<sub>5</sub>H<sub>4</sub>N<sub>4</sub>O<sub>3</sub>. It forms ions and salts known as **urates** and **acid urates**, such as ammonium acid urate. Uric acid is a product of the metabolic breakdown of purine nucleotides, and it is a normal component of urine. High blood concentrations of uric acid can lead to gout and are associated with other medical conditions, including diabetes and the formation of ammonium acid urate kidney stones

5) How uric acid formation takes place in body?

ANS: Purines are nitrogen-containing compounds, which are made inside the cells of your body (endogenous), or come from outside of your body, from foods containing purine (exogenous).

Purine breaks down into uric acid. Increased levels of uric acid from excess purines may accumulate in your tissues, and form crystals. This may cause high uric acid levels in the blood.

Uric acid formation may occur when the blood uric acid level rises above 7 mg/dL. Problems, such as kidney stones, and gout (collection of uric acid crystals in the joints, especially in your toes and fingers), may occur.