**RAD II and DT II**

**Final term**

**BIOCHEMISTRY**

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Write note on following questions each carries equal marks

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

Ans) Beta-oxidation consists of four steps:

1) Dehydrogenation catalyzed by acyl-CoA dehydrogenase, which removes two hydrogens between carbons 2 and 3.

2) Hydration catalyzed by enoyl-CoA hydratase, which adds water across the double bond.

3) Dehydrogenation catalyzed by 3-hydroxyacyl-CoA dehydrogenase, which generates NADH.

4) Thiolytic cleavage catalyzed beta-ketothiolase, which cleaves the terminal acetyl-CoA group and forms a new acyl-CoA which is two carbons shorter than the previous one.

2) Write down clinical significance of the following enzymes

Ans: a) Alkaline phosphatase

Alkaline phosphatase (ALP, ALKP, ALPase, Alk Phos) (EC 3.1.3.1), or basic phosphatase,[2] is a homodimeric protein enzyme of 86 kilodaltons. Each monomer contains five cysteine residues, two zinc atoms and one magnesium atom crucial to its catalytic function, and it is optimally active at alkaline pH environments.ALP has the physiological role of dephosphorylating compounds. The enzyme is found across a multitude of organisms, prokaryotes and eukaryotes alike, with the same general function but in different structural forms suitable to the environment they function in. Alkaline phosphatase is found in the periplasmic space of E. coli bacteria. This enzyme is heat stable and has its maximum activity at high pH.

b) Creatine kinase

Creatine kinase (CK), also known as creatine phosphokinase (CPK) or phosphocreatine kinase, is an enzyme (EC 2.7.3.2) expressed by various tissues and cell types. CK catalyses the conversion of creatine and uses adenosine triphosphate (ATP) to create phosphocreatine (PCr) and adenosine diphosphate (ADP). This CK enzyme reaction is reversible and thus ATP can be generated from PCr and ADP. In tissues and cells that consume ATP rapidly, especially skeletal muscle, but also brain, photoreceptor cells of the retina, hair cells of the inner ear, spermatozoa and smooth muscle, PCr serves as an energy reservoir for the rapid buffering and regeneration of ATP in situ, as well as for intracellular energy transport by the PCr shuttle or circuit

c) gamma-glutamyl transferase

Gamma-glutamyltransferase (also γ-glutamyltransferase, GGT, gamma-GT, Gamma-Glutamyl Transpeptidase is a transferase (a type of enzyme) that catalyzes the transfer of gamma-glutamyl functional groups from molecules such as glutathione to an acceptor that may be an amino acid, a peptide or water (forming glutamate). GGT plays a key role in the gamma-glutamyl cycle, a pathway for the synthesis and degradation of glutathione as well as drug and xenobiotic detoxification. Other lines of evidence indicate that GGT can also exert a pro-oxidant role, with regulatory effects at various levels in cellular signal transduction and cellular pathophysiology. This transferase is found in many tissues, the most notable one being the liver, and has significance in medicine as a diagnostic marker.

3) How many proteins are involve in 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 chemical created when the body breaks down substances called purines. Purines are normally produced in the body and are also found in some foods and drinks. Foods with high content of purines include liver, anchovies, mackerel, dried beans and peas, and beer.

Most uric acid dissolves in blood and travels to the kidneys. From there, it passes out in urine. If your body produces too much uric acid or does not remove enough of it, you can get sick. A high level of uric acid in the blood is called hyperuricemia.

5) How uric acid formation takes place in body?

Ans: Uric acid formation 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.