**Course Title: Medical Biochemistry II**

**DT 2nd, Sec A**

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**Max Marks: 50**

**Note: There are FIVE questions, each carry 10 marks with grand total of 50 marks**

**ATTEMPT all questions**

**Avoid copy paste material, as it may deduct your marks**

Q1. Explain the process of “ATP synthesis coupled with electron flow”.

Q2. Write the reactions that are catalyzed by the following enzymes.

* + 1. Acyl CoA dehydrogenase
    2. Adenosine deaminase
    3. Nucleotidase
    4. Gluconolactonase
    5. Enoyl-CoA hydratase

Q3. Define nucleotide, nucleoside and differentiate between DNA and RNA.

Q4. Why Dickens and Horecker’s Pathway is called HMP pathway. Enlist the enzymes used in PPP Pathway.

Q5. What is the function of carnitine shuttle system? Write down the stages and steps involved in Beta oxidation of Lipids.

Q1?

ANSWER:

The ATP synthase- which is directly responsible for ATP synthesis, is the equivalent of an F-type ATP - dependent proton pump working in reverse,the flow of protons down their electrochemical gradient through this pump drives the condensation of P1 and ADP.

The free energy derived from the passage of electrons through complexes 1,111 and 1v is harvested by being coupled to the generation of a proton gradient across the inner mitochondrial membrane.

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Q 2 ?

ANSWER:

REACTIONS THAT ARE CATALYZED BY THE ENZYMES:

1> Acyle -coA dehydrogenase:

ACADS are a class of enzymes that function to catalyze the initial step

In each cycle of fatty acid B-oxidation in the mitochondria of cells.

2> ADENOSINE DEAMINASE:

It involved in purine metabolism- ADA irrversibly deaminated adenosine,convertig it to the related nucleoside inosine by the subinstitution of the amino group by a keta group.

3> NUCLEOTIDASE:

It plays a catalytic role in the hydrolysis process, and it converts a number of different nucleotide molecules .when nucleotidase is involved in catalysing the hydrolysis of a nucleotide.

4> GLUCONOLACTONASE:

It is an enzyme that catalyze the chemical reaction D-glucono -1,5-lactone + H2O D- gluconate.

5> ENOYL-COA HYDRATES:

It catalyzes the secnd step beta oxidation pathway of fatty acid metabolism.

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Q 3 ?

ANSWER:

NUCLEOTIDE:

A compound consisting of a nucleoside lined to a phosphate group. Nucleotide form the basic structural unit of nucleic acids such as DNA.

NUCLEOSIDES:

Nucleosides are glycosylamines that can be thought of as nucleotides without a phosphate group. A nucleoside consists of simply of a nucleobase and five-carbon sugar whereas a nucleotide is composed of a nucleobase a five-nucleotide sugar, and one or more phosphate groups.

DIFFERENCE BETWEEN DNA AND RNA.

DNA RNA

1> DNA is double - stranded. 1> RNA is single stranded.

2> DNA uses the bases of 2> RNA uses adenine , uracil, cytosine,

Adenine , thymine , cytosine , and guanine.

And guanine.

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Q 4 ?

ANSWER:

DICKENS AND HORCKER'S PATHWAY CALLED HMP PATHWAY:

The pentose phosphate pathway (also called the phosphogluconate pathway and the hexose monophosphate shunt) is a metabolic pathway parallel to glycolysis. It generates NADPH and pentose as well as ribose 5- phisphate , a precursor for the synthesis of nucleotide.

ENZYMES USED IN PPP PATHWAY:

Glucose-6-phisphate dehydrogenase is the rate-controlling enzyme of the pathway. It is allostrically stimulated by NADP+ and strongly inhibited by NADPH. An NADPH- utilizing pathway forms NADPH+, which stimulate glucose -6-phosphate dehydrogenase to produce more NADPH. This step is also inhibited by acytyle coA.

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Q 5 ?

ANSWER:

FUNCTIONS OF CARNITINE SHUTTLE SYSTEM:

It is responsible for transffering long chain fatty acids across the barrier of the inner mitochondrial membrane to gain access to the enzymes of beta oxidation . The fatty acid(carnitine) is transported into the matrix by a transporter protein in the inner mitochondrial membrane.

STAGES INVOLVED IN BETA OXIDATION:

1> Activation of fatty acids occuring in the cytoplasm.

2> Transport of fatty acids into mitochondria.

3> Beta oxidation in the mitochondrail matrix.

STEPS IN BETA OXIDATION:

Beta oxdation takes place in four steps:

=>Dehydrogenation

=>Hydration

=>Ixydation

=>Thyolisis.

Each step is catalized by a distinct enzyme. Briefly, each cycle of this process begins with an acetyle -coA chain and end with one acetyl-coA,one FADH2 ,one NADH and water, and the acyle-coA chain becomes two carbons shorter.

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