**Course Title: Medical Biochemistry II**

**DT 2nd, Sec A**

**Student Name: Malik Saqib Ali**

**Student ID: 15814**

 **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”

ATP synthesis coupled with electron flow

ATP synthase moves hydrogen ions that were pumped out of the matrix by the electron transport chain back into the matrix the energy from the influx of proton into the matrix is used to generate ATP by phosphorylation of ADP. The movement of ions across the selective permeable membrane and down their electrochemical gradient is called chemiosmosis. The transfer of electron through a series of electron donor and acceptor, generating energy that is ultimately for the synthesis of ATP. Thus ATP synthesis is coupled with electron flow.

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

* + 1. Acyl CoA dehydrogenase

FAD+ accept hydrogens from a fatty acyl CoA in the first step. A double bond is produced between the α and β –carbon and an enoyl–CoA is formed in the presence of Acyl CoA dehydrogenase and produced one FADH2. It dehydrogenates the fatty acid chain again, thereby forming a double bond between β carbon and the oxygen molecule .produces one NADH

* + 1. Adenosine deaminase

 Adenosine or nucleoside is converted into inosine with the liberation

 Ammonia in the presence of adenosine deaminase enzyme

* + 1. Nucleotidase:

In the presence of nucleotides enzyme adenisie monophosphate is converted into adenosine and inorganic phosphate

* + 1. Gluconolactonase:

 It is also called 6- phosphoglucolactonase hydrolase

 It convert 6-phosphoglucolactone into 6-phosphogluconate

* + 1. Enoyl-CoA hydratase

Water molecule will adds across the double bond and a β-hydroxyl acyl CoA is formed in the presence of enoyl –CoA hydratase

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

Nucleotide: It is a macromolecule which contains the following three molecules

1. Pentose sugar
2. Nitrogenous base: there are two types of nitrogenous, bases purine and pyrimidine
3. Phosphate group

Nucleoside: they are nitrogenous base with sugar molecule

Adnine + sugar = adenosine

Guanine + sugar = guanosine

Thyamine + sugar = thymidine

Cytosine + sugar = cytidine

Uracil + sugar = uradine

Difference between DNA and RNA:

|  |  |
| --- | --- |
| DNA | RNA |
| Stand for deoxyribo nucleic acid | Stand for ribo nucleic acid |
| Chiefly Found in nucleus | Found in cytoplasm |
| Double stranded | Single stranded |
| Deoxy ribose sugar is present | Ribose sugar is present |
| Nitrogenous bases are adenine , guanine, cytosine , thiamine  | Nitrogenous bases are adenine , guanine, cytosine , uracil |

Q4. Why Dickens and Horecker’s Pathway is called HMP pathway. Enlist the

Why HMP pathway:

HMP stands for

H hexose

M mono

P phosphate

This pathway start from glucose-6-phosphate as glucose is a six carbon compound and one phosphate group is attached on the carbon number six so we use hexose for six and mono for one it means that glucose have a phosphate group on the carbon number six that’s why it is called HMP pathway

Name of enzyme used in PPP pathway

There are two phases in PPP/HMP pathway

Oxidative phase enzyme:

1. Glucose-6-phosphate dehydrogenase
2. 6-phosphogluconolactotone hydrolase / gluconolactonase
3. 6-phosphoglucolactonase dehydrogenase

Non oxidative phase:

1. Isomerase enzyme
2. Epimerase
3. Transketolase
4. Transladolase
5. transketolase

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

carnitine shuttle system:

It is responsible for transferring long-chain fatty acid across the barrier of the inner mitochondrial membrane to gain access to the enzyme of beta oxidation .the fatty acid carnitine is transported into the matrix by transporter protein in the inner mitochondrial membrane

Stages involved in beta oxidation of lipid:

1. Activation of fatty acid present in the cytoplasm
2. Transport of fatty acid into mitochondria
3. Beta oxidation in the mitochondrial matrix