

**Course Title: Medical Biochemistry II**  
**RAD 2<sup>nd</sup>, Sec A**

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**Class. Section A**

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**Max Marks: 50**

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**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.**

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

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

- i. Acyl CoA dehydrogenase
- ii. Adenosine deaminase
- iii. Nucleotidase
- iv. Gluconolactonase
- v. 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.

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### QN.1

**Ans.** The transfer of electron through through a series of electron doner and accepter . Generating energy that is ultimately used for synthesis of ATP as it occur in the mitochondrial inner memberan or choloropalst thylokid memberan. So metabolic proccess use NADH<sub>2</sub> and FADH<sub>2</sub> to transport electron..these electron are passed from NADH<sub>2</sub> or FADH<sub>2</sub> to memberan bonded electron carrier until they are Finlay given to oxegon resulting in the production of water. As electron are passed from one electron carrier to another hydrogen ion are tarnsported to the intermemberan space at three specific point in the chain. The tarnsportaion of hydrogen create a greater concentration of hydrogen ions in the inter memberan space than in the matrix which can then be used to drive ATP synthase and produce ATP ( a high energy molecules)

### QN.3

**Ans. Nucliotide.** Is any of a group molcul, that . when linked together, form the building blocks of DNA or RNA.composed of phasphate group.the base adnine,

cytosine, thymine, guanine and pentose sugar. In RNA the thymine base is replaced by uracil.

**Nucleoside.** A nucleoside consists of a nitrogenous base covalently attached to a sugar (ribose or deoxyribose) but without the phosphate group..

## **Differentiate between DNA and RNA**

### **DNA**

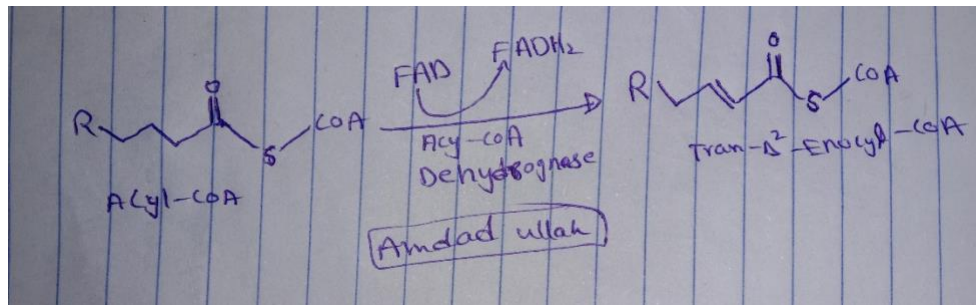
1. Life of DNA is long
2. DNA is self replicating
3. It is a long polymer chain
4. DNA produces regular helix
5. Quantity of DNA is fixed for cell
6. It is of two types. Intracellular and extracellular

### **RNA**

1. Life of RNA is short
2. It is synthesised from DNA when needed
3. RNA is short polymer
4. RNA produces secondary helix or pseudo helix
5. The quantity of RNA for cell is variable
6. It is of three types. M.RNA, t.RNA, r.RNA

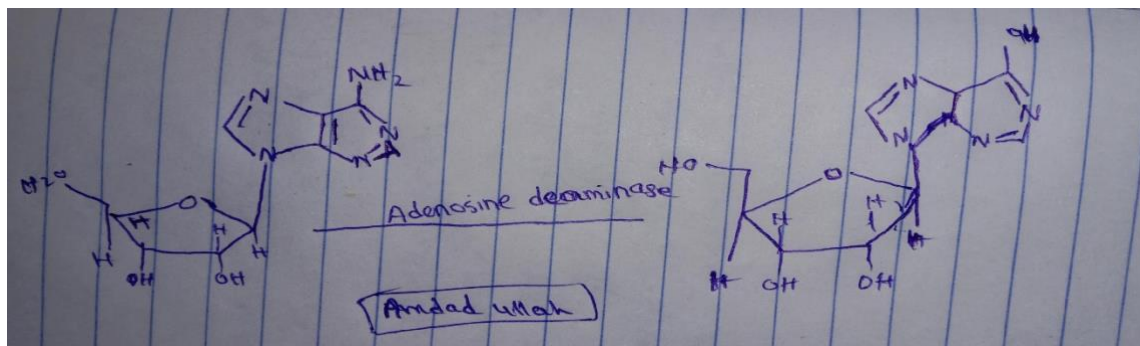
## QN.2

**Ans. Acyl-CoA Dehydrogenase** . Are a class of enzyme that function to catalyze the initial step in each cycle of fatty acids of beta oxidation in the mitochondria of cell



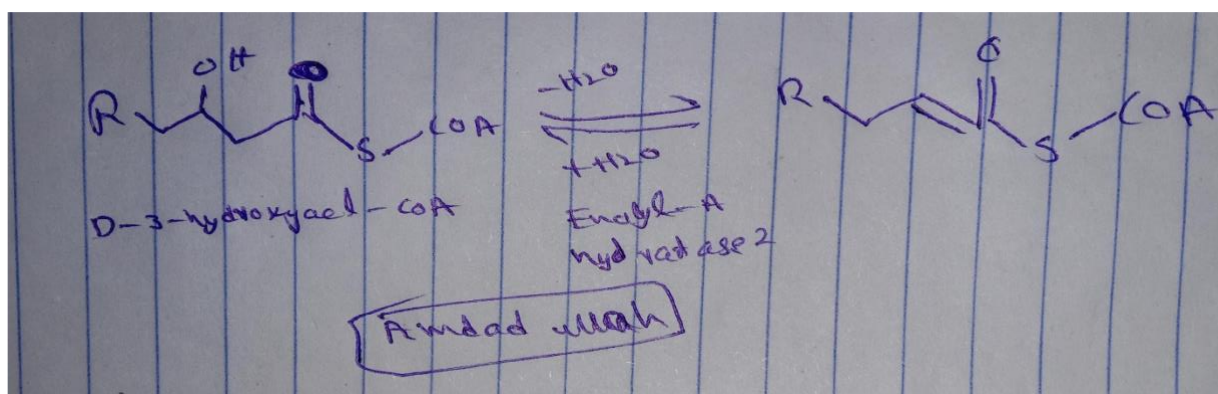
## Adenosine deaminase (ADA)

. Is a metalloenzyme involved in metabolic degradation of 6-aminopurine nucleosides.



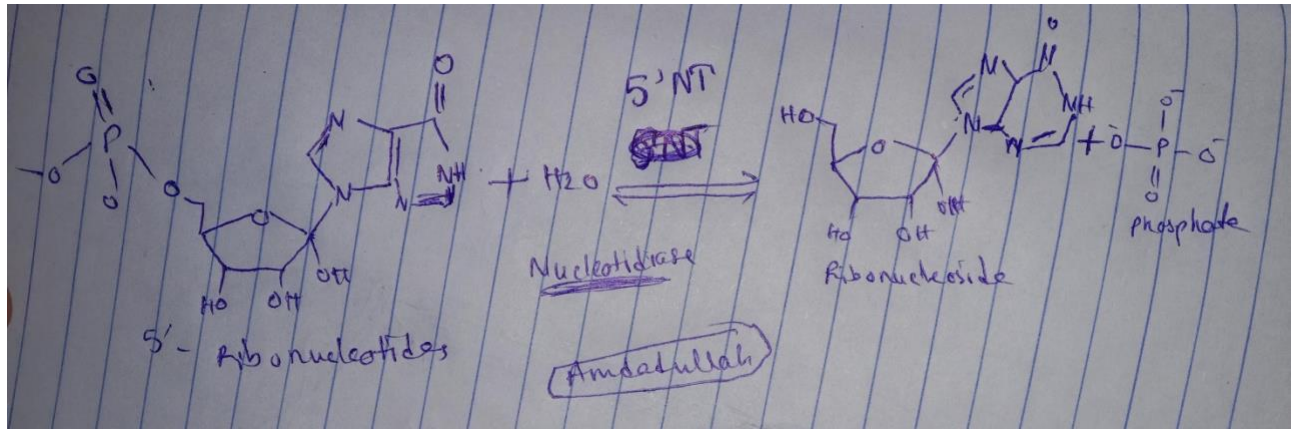
## Enoyl-CoA hydratase

. Enoyl-CoA hydratase catalyzes the second step in the physiologically important beta-oxidation Pathway of fatty



acids metabolism.

**Nucliotides.** Is an enzymes which is involved in the hydrolysis of nucliotide to form nuclioseoid and a phosphate .due to this role nucleotidase is known as



hydrolatic enzyme..

**Gluconolactonase.**is an enzymes that catalyzes the chemical reaction D- glucono -1,5 lactone +H2o D gluconate

## QN.5

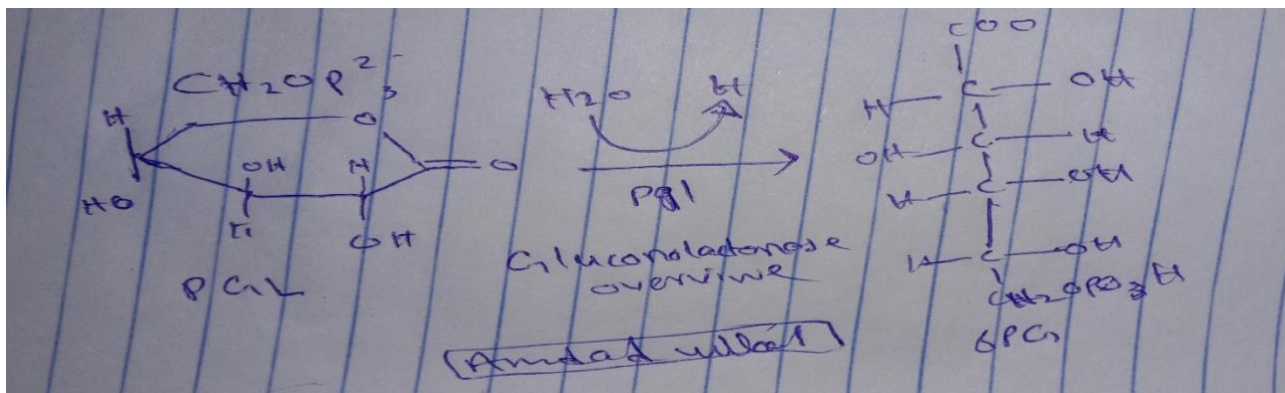
### Ans . Carnitine shuttle system

The carnitine shuttle system represents a mechanism by which long chain fatty acids, which are impermeable to the mitochondrial membrane, are transported into the mitochondrial matrix for the purpose of beta-oxidation and energy production...

### Function

. It is responsible for transferring of long chain fatty acids across the barrier of the inner mitochondrial membrane to gain access to the enzymes of beta-oxidation .

. In living cell carnitine is required for the transport of fatty acids from the cytosol into the mitochondria during the breakdown of lipid (fats) for the generation of metabolic



energy.

. It is widely available is a nutritional supplement

## **Beta oxidation of lipid**

. Def. Beta oxidation is the catabolic process by which fatty acids molecule are broken down to generate acetyl coenzyme A.

### **Steps.**

**Occurance.** Beta oxidation of fatty acids occur in mitochondria

**Substrate.** Free fatty acids .H<sub>2</sub>O

**Product.** One acetyl COA, one NADH and One FADH<sub>2</sub>.  
For every removal of two carbon group from the carbon

### **Stage involved in betaoxidtion**

.three stage are involved in betaoxidtion

. Activation of fatty acids occur in cytoplasm

.Transport of fatty acids into mitochondria

.Betaoxidtion in the mitochondrial matrix

## QN.4

**Ans.** The HMP pathway is also called Warburg – Dickens - Horecker's pathway . It is used by heterofermentative lactic acid bacteria . *Bacillus* spp , and *Pseudomonas* spp . Ribose phosphate . Ribose phosphate can be used for synthesis of ribose and deoxyribose nucleotides in nucleic acid..

### **Enzyme used in PPP Pathway**

#### *Enzyme involved in oxidative phase*

. *Glucose 6 phosphate Dehydrogenase*

. *Gluconolactonase*

. *6- phosphogluconate Dehydrogenase*

#### *Enzyme involved in non oxidative phase*

. *ribose 5-phosphate 3-epimerase*

. *isomerase enzyme*

. *Epimerase enzyme*

. *Transketolase enzyme*

. *Transaldolase enzyme*

( *The end* )



