

Enzymes

Introduction, classification & characteristics of Enzymes. Salient features of active site of Enzymes. Mechanism of Enzyme action, factors affecting enzyme action, coenzymes & cofactors, specificity of Enzyme action, Enzyme Inhibitors.

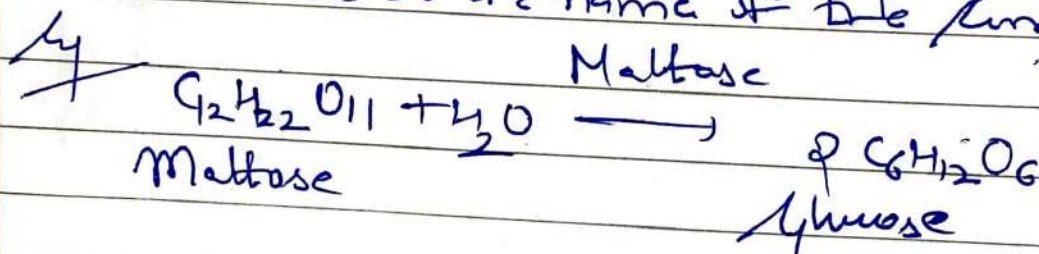
Enzymes

All biological reactions are catalysed by special catalysts called enzymes.

Thus, enzymes are defined as biological catalysts. An enzyme facilitates a biochemical rxn by providing alternate lower activation energy pathways.

Nomenclature:

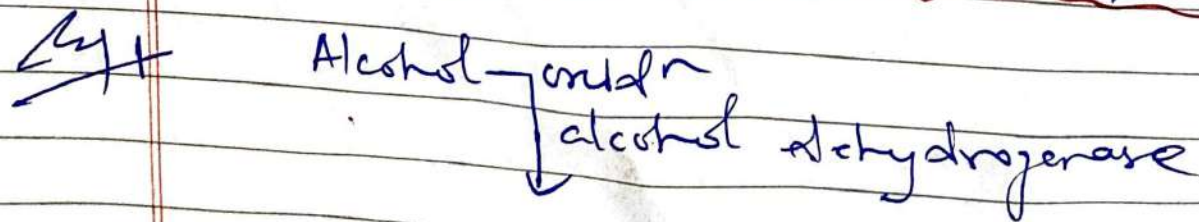
A common method of naming enzymes is to add the suffix ase to the name of the compound.



Starch (Amylum) Amylase

Systematic Names:

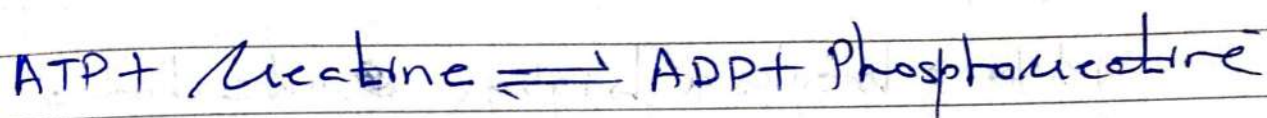
The systematic names of the enzyme consists of two parts. The first part contains the name of the substrate while second part indicates the nature of the rxn it uses -ase as the suffix.



Ex 2 In a case of bimolecular rxn, the first part contains the name of both the substrates separated by

All Enzymes are protein in nature except ribozyme (RNA in nature).

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^{ATP:} Enzyme: Creatine phosphotransferase

Classification of Enzymes

1/ Oxido-reductase:

They catalyse oxidation-reduction reactions.

Transfer of electrons takes place from one molecule to another.

Ex: Redox reactions.

2/ Transferases:

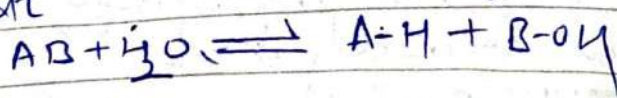
Transferases catalyse the transfer of functional group from one substrate to another.



Ex: Kinase transfer phosphate group.

3/ Hydrolases:

They catalyse hydrolytic reactions, in which a substrate is hydrolysed into two simpler products. During hydrolysis, hydrogen atom from water enters one of the products while the hydroxyl group ends up in the other part.



4
lipase breaks a triglyceride into glycerol + fatty acid.

Trypsin breaks peptide bond following lysine + arginine.

5
Lyases: breaking of various chemical bonds by means other than hydrolysis. They catalyse the reactions involving the removal of a group leaving a double bond or the addition of a group to a double bond.

C-C
C-O
C-N
C-S
6
Pyruvate decarboxylase turns pyruvic acid into ethanol + CO₂.

7
Isomerase:
Isomerase control the conversion of one isomer of a compound to another isomer of the same compound.



8
Glucose-6-phosphate is converted into fructose-6-phosphate by hexosephosphate isomerase.

9
Ligases:

This group of enzymes catalyse rxns in which new chemical bonds are formed. ATP provides the energy to make new chemical bonds.

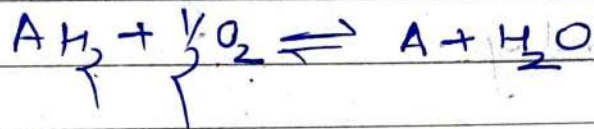
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DNA + RNA ligases control synthesis of nucleic acid.

1

Oxidase

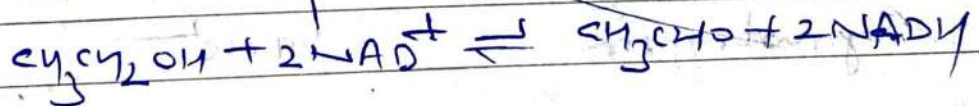
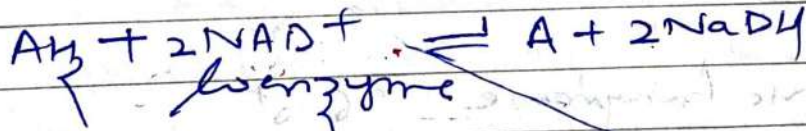
Carbohydrates, fats & proteins are Oxidized by Oxygen, the Enzymes which catalyses these rxn's are oxidase

by phenol + O₂ $\xrightarrow{\text{phenoloxidase}}$ quinones



Dehydrogenase

Dehydrogenase catalytic bc oxidises substrate by transferring hydrogen to coenzyme such as NAD^+



2

41 Transphosphorylase

Transphosphorylation
D-glucose + ATP $\xrightarrow{\text{Transphosphorylation}}$

D-glucose-6-phosphate
+ ADP

Q92 - Trans Acetylase + ADP
Acetyl CoA can transfer the acetyl gr to
choline forming acetylcholine + CoA