

Respiration -

It is an enzymatically controlled catabolic process that involve step wise oxidative breakdown of organic substance inside living cell & Energy is released in the form of ATP.

⊛ Respiration -

- 1) Biochemical Process
- 2) Energy released in Stepwise
- 3) Energy is trapped in the form of ATP
- 4) Many Intermediates are formed that are used in synthesis of organic comp
- 5) Each step is catalyzed by a enzyme

⊛ Combustion

- 1) Physiochemical
- 2) single step
- 3) ATP is not formed
- 4) No Intermediate
- 5) No enzyme

1

50% is used

in
↓
Biomolecule
Synthesis

Rest in Biological activity

↓
Absorption of minerals
Maintenance of cell permeability
cell division
Muscular contraction
Growth & Development

- ⊛ Both causes Breakdown of complex substances
- O₂ is used
 - Energy is released

⊛ Floating Respiration

⊛ Protoplasmic Respiration

* Most common Respiratory Substrate is

Glucose > fat > Protein

Not directly used

↓
Is converted into

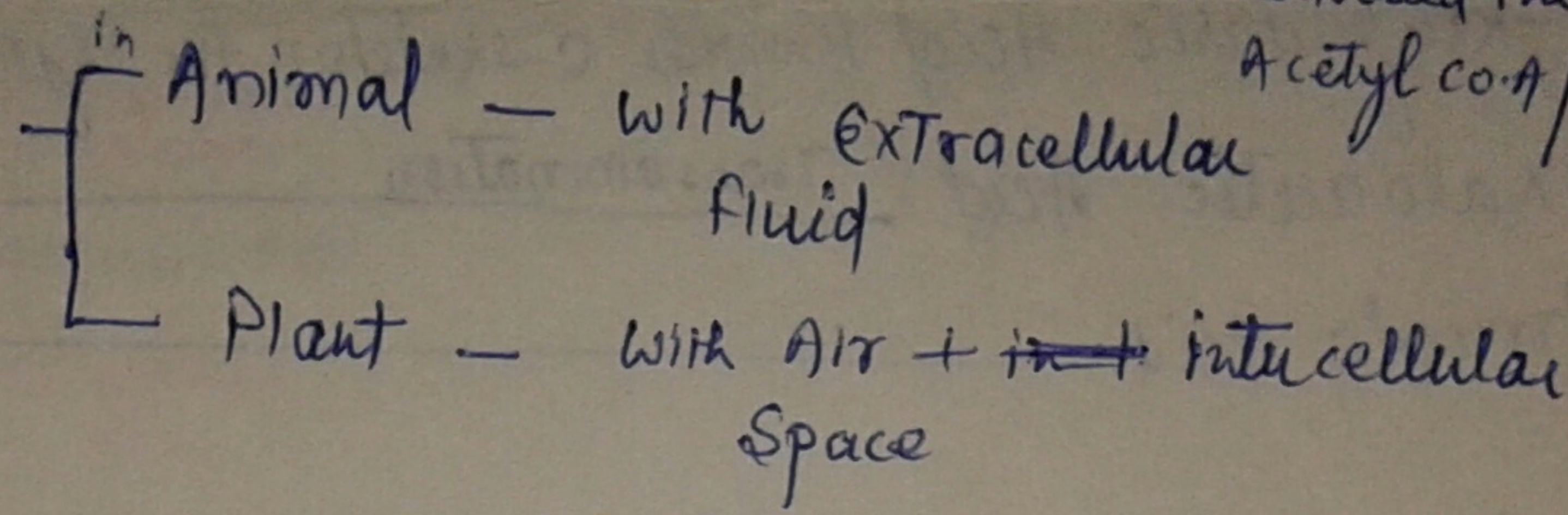
Acetyl co-A / Glyceraldehyde Phosphate

- Rarely
- as in Germination of Protein Rich seed

* Gaseous exchange

Animal - with extracellular fluid
Plant - with Air + ~~in~~ intercellular space

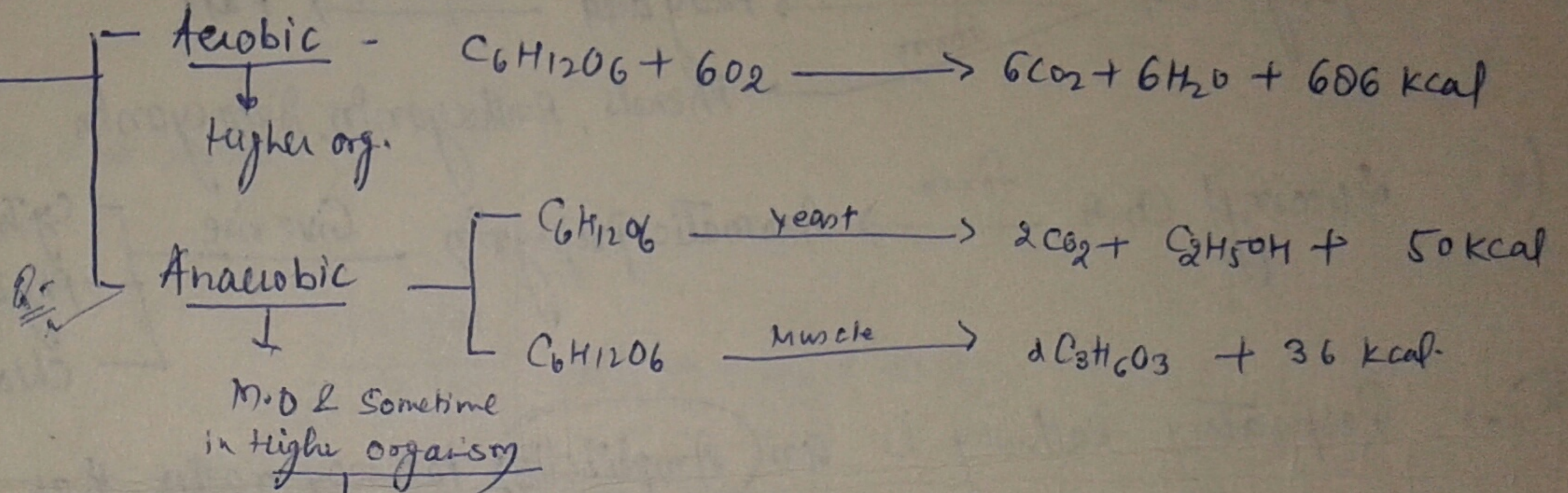
* Gaseous exchange



used ↓
 PSI converted into Acetyl Co-A / Glyceraldehyde phosphate
 - as in Germination of Protein Rich seed

Type of Respiration

2



Compensation Point —

It is minimum value of Light Intensity or CO_2 conc at which rate of photosynthesis is equal to respiration

Light compensation point —

- Shade plant = 2.5 — 100 ft
- Sun " = 100 — 400 ft

CO_2 compensation point —

- C_3 — 50 — 100 ppm
- C_4 — 5 — 10 ppm

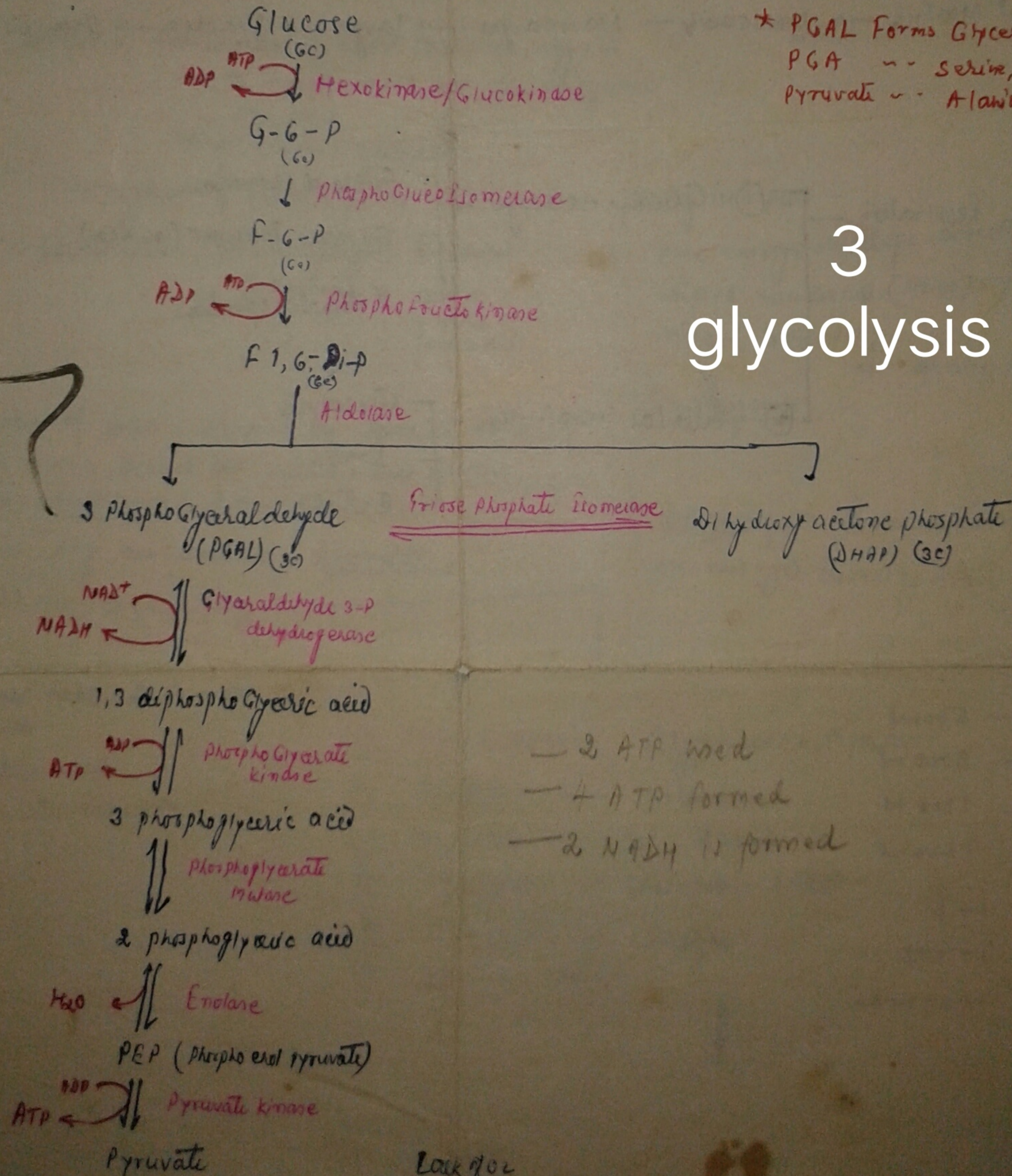
cannot continue for long because —

- (1) yield little energy
- (2) more substrate is used so little left for growth
- (3) End product in high conc may be toxic
- (4) many physiological processes (active mineral absorption, protoplasmic streaming) are linked in higher org.

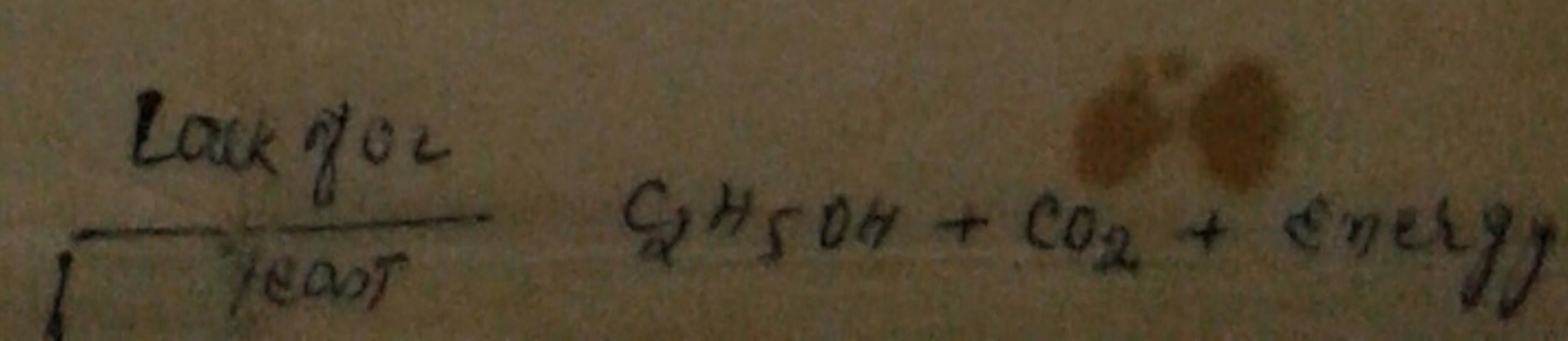
- is — * Means sugar splitting & is often called as Embden, Meyerhof & Parman (EMP) Pathway Scientist.
- Glycolysis is the 1st stage in the breakdown of Glucose, occurring in cytoplasm of cell is common to all organisms.
 - In anaerobic org it is the only process in Respiration
 - In Glycolysis, Glucose undergo partial oxidatⁿ to form 2 Molecule of Pyruvic acid
 - Also known as oxidative Anabolism as linked with Anabolism of fat & A-acid

* PGAL Forms Glycerol that form Fat
 PGA ~ ~ Serine, cystine, Glycine
 Pyruvate ~ ~ Alanine

3 glycolysis



- 2 ATP used
- 4 ATP formed
- 2 NADH is formed



Citric Acid Cycle: -

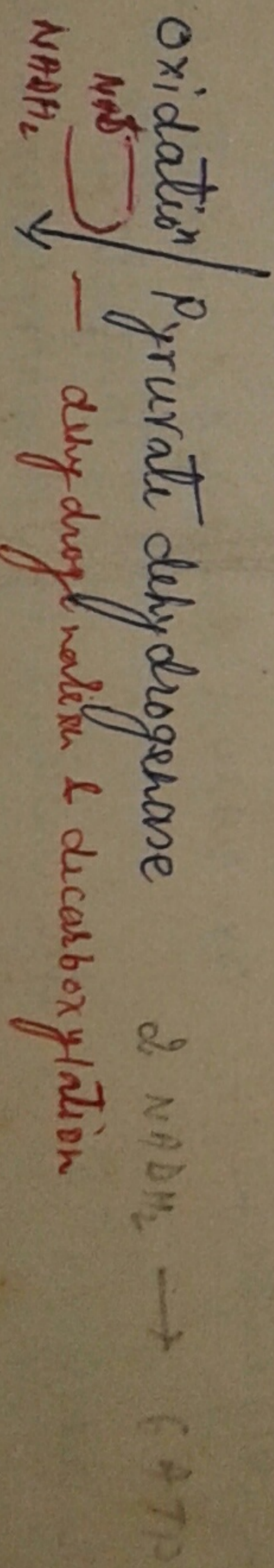
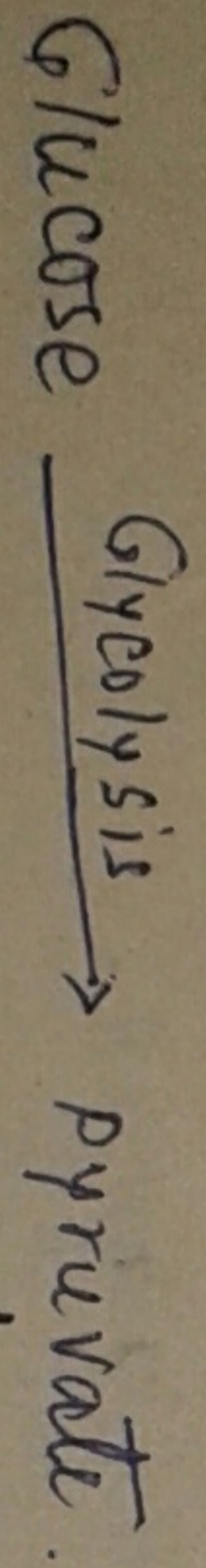
TCA cycle

Also called - TCA (Tricarboxylic acid) cycle

- Krebs cycle (1937)

- * It occurs in mitochondria of eukaryotes and cytosol of prokaryotes.
- * It is used to oxidize the pyruvate formed during the glycolysis into CO_2 & H_2O .
- * It also oxidize Acetyl CoA (arising from Fatty acid degradation) & (Amino acid degradation)
- * Succinate dehydrogenase, the only membrane bound enzyme in krebs cycle is embedded in inner mit membrane in eukar & in P. membrane in prokaryotes.
- * TCA cycle is a 3 step process which oxidises organic fuel into CO_2 along with ATP production.

Step-(1) - Production of Acetyl CoA -



This process is called oxidative decarboxylation as it involves oxidation as well as CO_2 liberation.

Step-(2) - Citric Acid Cycle: -

This process is called oxidative decarboxylation as it involves oxidation as well as CO_2 liberation

Step-(2)- Citric acid cycle: -

This cycle carries out oxidation of Acetyl Groups from acetyl coA to CO_2 with production of $4e^-$ pairs which are stored initially in the reduced e-carrier NADH & FADH_2 .

This cycle has 8 stage -

