

Each question from 1 to 10 carries 1 score.

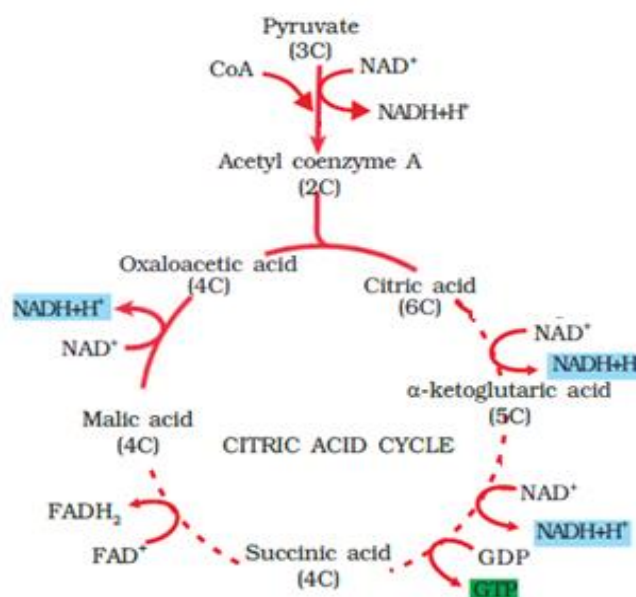
- 1) Tricarboxylic acid cycle was first elucidated by _____
- 2) The final hydrogen acceptor in ETS of aerobic respiration is _____
- 3) Name the enzyme which converts sucrose into glucose.
- 4) How many ATP are produced by the oxidation of one molecule of NADH & one molecule of FADH₂?
- 5) EMP pathway is commonly called as _____
- 6) Name the five carbon compound produced during Krebs cycle.
- 7) Name the compound which receives electrons both from Complex I & Complex II during ETS.
- 8) Where does Glycolysis occur within a cell?
- 9) Name the pathway which is common to both aerobic & anaerobic respiration.
- 10) Name the mobile carrier molecule which transfer of electrons between complex III and IV in ETS.

Each question from 11 to 20 carries 2 scores.

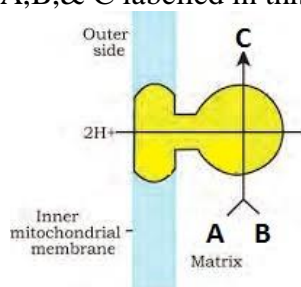
- 11) Differentiate between Photophosphorylation and Oxidative phosphorylation
- 12) Explain the process of alcohol fermentation in Yeast cells? Name the enzyme that catalyses this reaction.
- 13) Point out the step in which a substrate level phosphorylation takes place during Krebs cycle.
- 14) Pyruvic acid produced by glycolysis is handled by different cells in three major ways. Which are they?
- 15) During vigorous exercise, when oxygen is inadequate for cellular respiration the muscle cells respire anaerobically. Explain this process. Name the enzyme that catalyses this reaction.
- 16) What are respiratory substrate? Give examples.
- 17) Differentiate between Aerobic respiration and Anaerobic respiration.
- 18) How many NADH & FADH₂ are produced when one molecule is Pyruvate is oxidised during Krebs cycle.
- 19) Mention the four crucial events of aerobic respiration.
- 20) During Glycolysis, there is one step where NADH + H⁺ is formed from NAD⁺.
Point out the step in which NADH + H⁺ is formed.

Each question from 21 to 25 carries 3 scores.

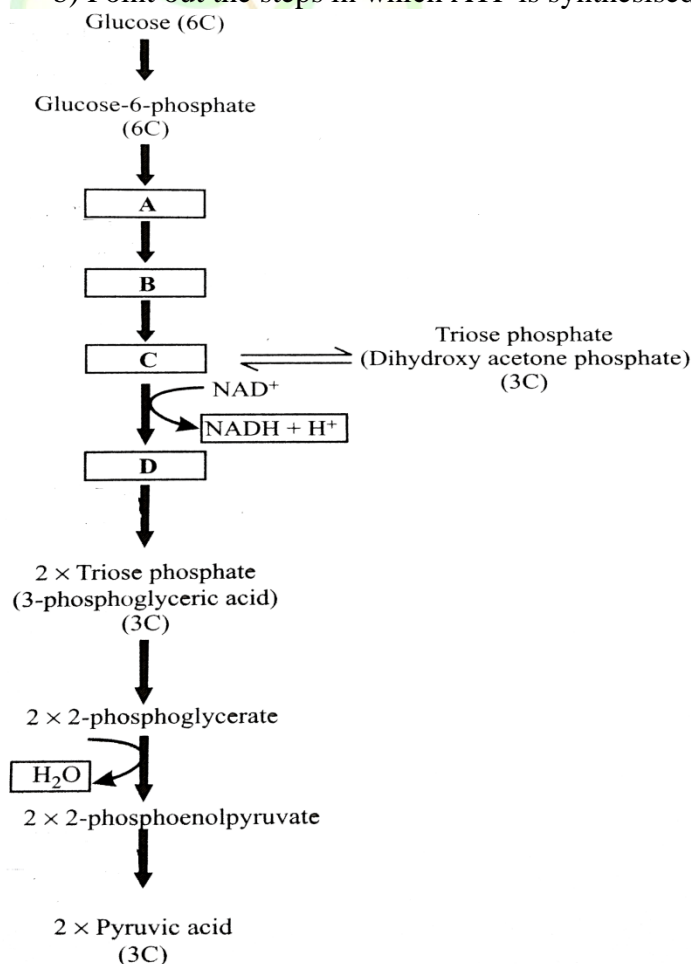
- 21) The diagram given below is a schematic representation of Krebs cycle starting from Pyruvic acid.
 - a) Point out the steps where decarboxylation reactions takes place.
 - b) Name the enzyme which catalyses the condensation of acetyl coenzyme A with oxaloacetic acid.



- 22) The metabolic pathway through which the electron passes from one carrier to another is called as Electron Transport System or ETS.
- Mention the site of ETS in Mitochondria.
 - Name the four different complexes through which electrons are transported.
 - Out of these complexes which complex receives the electrons generated during oxidation of succinate in TCA cycle?
- 23) The end product of Glycolysis, Pyruvic acid undergoes a very important reaction before entering into Krebs cycle.
- Explain the reaction.
 - Name the enzyme which catalyses this reaction.
 - Name the mineral ion which activates this enzyme.
- 24) Given below diagram shows the structure of complex V present on the inner membrane of mitochondria.
- Which are the two major components, of this complex. .b) Explain the function of this complex.
 - Identify A,B,& C labelled in this diagram



- 25) Given below is the schematic diagram of Glycolysis in which some steps are missing.
- Identify the compounds A,B,C & D
 - Point out the steps in which ATP is synthesised & ATP is utilised.



ANSWERS

- 1) Hans Krebs.
- 2) Oxygen.
- 3) Invertase.
- 4) NADH produces 3 molecules of ATP & FADH₂ produces 2 molecules of ATP.
- 5) Glycolysis.
- 6) α -ketoglutaric acid.
- 7) Ubiquinone.
- 8) Cytoplasm.
- 9) Glycolysis.
- 10) Cytochrome-c.
- 11) During photophosphorylation light energy is utilised for the production of proton gradient required for phosphorylation. It takes place within Chloroplast. In oxidative phosphorylation the energy from oxidation-reduction reactions is utilised for the production of proton gradient. It takes place within Mitochondria.
- 12) In yeast cells, glucose undergoes glycolysis to form Pyruvic acid which is then converted into CO₂ and ethanol. The enzymes that catalyse these reactions are Pyruvic acid decarboxylase and Alcohol dehydrogenase.
- 13) A substrate level phosphorylation takes place during the conversion of succinyl-CoA to succinic acid. In this step a molecule of GTP is synthesised.
- 14) Lactic acid fermentation, Alcoholic fermentation and Aerobic respiration.
- 15) When muscle cells respire anaerobically, Pyruvic acid is reduced to Lactic acid. Enzyme is Lactate dehydrogenase
- 16) The compounds that are oxidised during respiration are known as respiratory substrates. Usually carbohydrates are oxidised to release energy, but proteins, fats and even organic acids can be used as respiratory substances in some plants, under certain conditions.
- 17)

Aerobic respiration	Anaerobic respiration
<ul style="list-style-type: none"> • It is the process of complete oxidation of organic substances in the presence of oxygen • It releases CO₂ & water • Large amount of energy is present in the substrate. 	<ul style="list-style-type: none"> • It is the process of incomplete oxidation of organic substances in the absence of oxygen • It releases CO₂, water & Ethanol / Lactic acid • Only less amount of energy is present in the substrate.

- 18) 3 molecules of NADH & 1 molecule of FADH₂.
- 19) Glycolysis, Link reaction, Krebs cycle and Electron transport system.
- 20) When 3-phosphoglyceraldehyde (PGAL) is converted to 1, 3-bisphosphoglycerate (BPGA).
- 21) a - Decarboxylation of Pyruvate to Acetyl-coA, Decarboxylation of citric acid to alpha-ketoglutaric acid, Decarboxylation of alpha-ketoglutaric acid to Succinic acid.
b - Citrate synthase.
- 22) a – Inner mitochondrial membrane.
b - Complex I- NADH dehydrogenase, Complex II – Succinate dehydrogenase, Complex III.- Cytochrome *bc*1 complex, Complex IV Cytochrome *c* oxidase
c- Complex II – Succinate dehydrogenase.
- 23) a) Pyruvate, enters into the mitochondrial matrix and undergoes oxidative decarboxylation to form a 2C compound Acetyl CoA.
b) This reaction is catalysed by the enzyme Pyruvic dehydrogenase. c) Mg²⁺
- 24) a) F₀ & F₁ are the two components of ATP Synthase.
b) The F₁ headpiece is a peripheral membrane protein complex and contains the site for synthesis of ATP from ADP and inorganic phosphate. F₀ is an integral membrane protein complex that forms the channel through which protons cross the inner membrane. The passage of protons through the channel is coupled to the catalytic site of the F₁ component for the production of ATP.
- 25) a) A - fructose-6-phosphate. B - fructose 1, 6-bisphosphate.
C - 3-phosphoglyceraldehyde. D - 1, 3-bisphosphoglycerate.
b) ATP is utilised in the conversion of Glucose into Glucose 6-phosphate and second in the conversion of Fructose 6-phosphate to Fructose 1, 6-bisphosphate.
ATP is produced during the conversion of 1, 3-bisphosphoglycerate to 3-phosphoglyceric acid and during the conversion of PEP to Pyruvic acid.

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