

**I. For each statement given below, write 'true' or 'false'.**

1. Glucose is reduced and Oxygen is oxidised in aerobic cellular respiration.
2. Glycolysis is a common starting pathway for both aerobic respiration and fermentation.
3. Within the spectrum of visible light, violet light has a longer wave length than red light.
4. P₈₆₀ and P₇₀₀ molecules absorb different wave length because of a slight difference in their molecular structure.
5. Majority of the ATP molecules produced in aerobic respiration come from Oxidative Phosphorylation.
6. Since prokaryotic autotrophs lack chloroplast, they also do not have photosensitive pigments.
7. Only heterotrophs carry out cellular respiration as it is only the autotrophs that carry out photosynthesis.

II. Match the items listed in column 'A' with those listed in column 'B'**'A'****'B'**

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| 8. Photo systems are found in | A. Photophosphorylation |
| 9. Light – gathering pigment complex Associated with NADPH | B. substrate level phosphorylation |
| 10. Light – gathering pigment complex that splits H ₂ O | C. Oxidative phosphorylation |
| 11. Mechanism of ATP synthesis in electron transport chain system of aerobic respiration | D. stroma of chloroplast |
| 12. Another commonly used name for anaerobic respiration | E. thylakoid membranes on grana of chloroplast |
| 13. Mechanism of ATP synthesis in light reaction of photosynthesis | F. Pyruvate |
| 14. The raw material for Krebs's cycle produced by link reaction | G. Acetyl CoA |
| 15. Majority of the reduced NAD (NADH ⁺ H ⁺) are produced in | H. Fermentation |
| | I. Glycolysis |
| | J. Photosystem II |
| | K. Krebs's cycle |
| | L. Photosystem I |

III. For each question given below, choose the best answer from the four alternatives given.

16. At the end of aerobic cellular respiration, the carbon atoms in the glucose molecule, are now located in:-
A. lactic acid B. CO₂ C. ethanol D. Pyruvate
17. The primary photosynthetic pigment of all plants, algae and cyanobacteria is
A. chlorophyll 'a' B. Chlorophyll 'b' C. Carotenoids D. Xanthophylls

18. During chemiosmosis in aerobic respiration protons are pumped:-
 - A. From cytoplasm to the intermembrane space of Mitochondria
 - B. From the intermembrane space of mitochondria to cytoplasm
 - C. From the intermembrane space to the fluid matrix of mitochondria
 - D. From the Fluid matrix to the intermembrane space of mitochondria
19. What energy- rich organic molecule is produced at the end of Calvin cycle?
 - A. ATP
 - B. NADPH
 - C. pyruvate
 - D. None
20. Reduced NAD (NADH^+H^+) is **NOT** produced in one of the stages of aerobic respiration.
 - A. Glycolysis
 - B. Electron transport chain system
 - C. Kreb's Cycle
 - D. Link reaction
21. Kreb's cycle is a cyclical pathway because it starts and ends with a four carbon molecule known as:-
 - A. Citrate
 - B. Oxaloacetate
 - C. pyruvate
 - D. Malate
22. FADH_2 (reduced FAD) is produced only in
 - A. Glycolysis
 - B. Kreb's Cycle
 - C. Link reaction
 - D. Electron transport chain
23. The energy and reducing power needed to run calvin cycle are supplied by:-
 - A. Oxygen and water
 - B. RuBP and CO_2
 - C. ATP and NADPH
 - D. CO_2 and glucose
24. The electrons lost by chlorophyll 'a' of PSII, when it absorbs light, are replaced by electrons from
 - A. PSI
 - B. Chlorophyll 'b'
 - C. Photolysis of water
 - D. NADPH
25. Cyclic flow of electrons involves only PSI and produces
 - A. NADPH only
 - B. ATP only
 - C. both ATP and NADPH
 - D. CO_2 and NADPH
26. The maximum output of the electron transport chain is _____ ATP per NADH and _____ ATP per FADH_2 , respectively
 - A. 2; 2
 - B. 2; 3
 - C. 3; 2
 - D. 3; 1
27. One of the following is **NOT** true of link reaction;
 - A. CO_2 is produced
 - B. Coenzyme A reacts with acetyl
 - C. ATP produced by substrate level phosphorylation
 - D. Oxidation of pyruvate to produce N_4DH
28. Which of the following processes and molecules is **NOT** associated to the thylokoid membranes?
 - A. PS I and Ps II
 - B. ATP synthase
 - C. antenna complex
 - D. Calvin cycle
29. The first step for initiation of photosynthesis is:-
 - A. Photophosphorylation
 - B. Photolysis of water
 - C. excitation of electrons from chlorophyll molecules as a result of absorption of light
 - D. CO_2 fixation
30. Matrix is to mitochondria as _____ is to chloroplasts.
 - A. Cristae
 - B. Stroma
 - C. thylakoids
 - D. intermembrane space
31. Anaerobic pathway of pyruvate metabolism regenerates _____ so that the cell can continue to oxidise glucose.
 - A. Oxygen
 - B. CO_2
 - C. ATP
 - D. NAD^+
32. The enzyme that catalyses CO_2 fixation in C_4 pathway is
 - A. PEP carboxylase
 - B. Rubisco
 - C. RuBP carboxylase
 - D. 'B' and 'C'
33. In C_3 plants when O_2 levels are high and CO_2 levels are low _____ occurs.
 - A. Photorespiration
 - B. Photophosphorylation
 - C. Cyclic photophosphorylation
 - D. Non- cyclic photophosphorylation

34. The mechanism of coupling the energy releasing redox reaction of electron transport chain and the energy requiring process of ATP synthesis (by ATP synthase) through the formation of proton gradient is known as
 A. Photolysis B. chemiosmosis C. osmosis D. gluconeogenesis
35. Carbon fixation in C_3 plants is catalysed by _____
 A. PEP carboxylase C. RuBP- carboxylase (rubisco)
 B. NAD – dehydrogenase D. phosphogluco isomerise.
36. Which of the following processes is carried out more efficiently by C_4 plant than by a C_3 plant?
 A. Light absorption C. CO_2 fixation
 B. Photolysis of water D. Chemiosmosis
37. Which of the following stages in cellular respiration can take place in the absence of oxygen?
 A. Electron transport B. Glycolysis C. Kreb's cycle D. Link reaction
38. When muscle cells are in short supply of oxygen, which of the following compound would be accumulated?
 A. Ethanol B. Acetic acid C. Lactic acid D. Carbon dioxide
39. One of the following **is not** the stage of cellular respiration
 A. Calvin cycle B. Glycolysis C. Electron transport D. Kreb's cycle
40. One of the following is not true about photo system II
 A. Its reaction centre molecule is P_{680}
 B. It passes its excited electrons to photo system I.
 C. The energy lost from its excited electrons reduces NADP.
 D. It replenishes its lost electrons from photolysis of water.
41. Which of the following substances **is NOT** necessary for photosynthesis to take place?
 A. Chlorophyll B. Carbondioxide C. Oxygen D. water
42. The molecule of which pigment is located in the reaction centre of photosystems?
 A. Chlorophyll 'a' B. Chlorophyll 'b' C. Carotenoid D. Accessory pigment
43. Which of the following groups of plants carry out light dependent and light- independent reactions of photosynthesis in separate cells?
 A. $C - 3$ plants B. $C - 4$ plants C. CAM plants D. plants without chlorophyll
44. During aerobic respiration, what is the route through which protons return from mitochondrial inter – membrane space back to its matrix?
 A. Proton pump B. ATP – synthase C. NAD – dehydrogenase D. Coenzyme Q
45. Cells immediately use the energy that electrons lose as they pass along the chain of electron carriers to:-
 A. Produce ATP B. pump protons C. run the ATP – synthase molecule D. reduce NAD
46. Which of the following happens in both cyclic and non - cyclic photophosphorylation?
 A. ATP is formed C. NADP is reduced
 B. Oxygen is generated D. water molecule splits.
- IV. Short answer.**
47. Suppose a cell has oxidised 20 glucose molecules to produce energy by aerobic respiration
- How many ATP (net gain only) and NADH molecules are produced during glycolysis stage only (1 pt)
 - How many ATP, NADH and $FADH_2$ molecules are produced in Kreb's cycle only (1 point)
 - How many molecules of ATP, NADH and CO_2 are produced in link reaction only? (1 point)
 - What is the total number of ATP molecules produced from the Oxidation of the 20 glucose molecules?

Bonus question

- Where does in prokaryotic cell
- Kreb's cycle take place
 - Electron transport chain system take place

ANSWER SHEET

NAME _____ SECTION _____ ROLL NO _____

II. True or False	
1	
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II. Matching	
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I. Choose									
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