CLASS XI BIO CH 12

Set 4 – Respiration in Plants (Advanced Conceptual / NEET-Level MCQs)

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1. In aerobic respiration, most of the ATP is produced during —
A) Glycolysis B) Krebs cycle C) Electron transport chain D) Link reaction

2. Which of the following statements about glycolysis is *incorrect*?
A) It occurs in cytoplasm B) It requires oxygen C) It yields pyruvate D) It produces a net gain of 2 ATP

3. The enzyme hexokinase catalyses —
A) Glucose → Glucose-6-phosphate B) Fructose → Fructose-6-phosphate C) Pyruvate → Acetyl CoA D) Glucose → Fructose

4. When muscles perform vigorous exercise under limited oxygen, the end product formed is —
A) Ethanol B) Lactic acid C) CO_2 D) Acetyl CoA

5. The Krebs cycle is amphibolic because it —
A) Involves both catabolic and anabolic reactions B) Occurs only in mitochondria C) Produces ATP D) Occurs in both aerobic and anaerobic respiration

6. The enzyme responsible for conversion of fumarate to malate is —
A) Fumarase B) Malate dehydrogenase C) Succinate dehydrogenase D) Aldolase

7. NADH and $FADH_2$ act as —
A) Oxidising agents B) Reducing agents C) Coenzymes D) Enzymes

8. The function of oxygen in aerobic respiration is to —
A) Accept electrons and form water B) Oxidise NADH C) Break glucose D) Form ATP directly

9. The number of ATP molecules generated per glucose molecule by substrate-level phosphorylation during glycolysis and Krebs cycle is —
A) 1 B) 2 C) 4 D) 6

10. During ETS, electrons move from —
A) High to low redox potential B) Low to high redox potential C) ATP to ADP D) NADH to NAD^+

11. Cyanide inhibits respiration by —
A) Blocking cytochrome oxidase B) Blocking NADH dehydrogenase C) Inhibiting F_0F_1 ATPase D) Preventing pyruvate formation

12. The enzyme responsible for phosphorylation at substrate level in Krebs cycle is —
A) Succinyl CoA synthetase B) Succinate dehydrogenase C) Malate dehydrogenase D) Citrate synthase

13. The total number of decarboxylation reactions during complete oxidation of one glucose molecule is —
A) 2 B) 4 C) 6 D) 8

14. Which process takes place both in plants and animals?
A) Photosynthesis B) Respiration C) Nitrogen fixation D) Transpiration

15. Respiratory quotient (RQ) value less than 1 indicates —
A) Carbohydrate respiration B) Fat or protein as substrate C) Anaerobic respiration D) Organic acid respiration

16. The total number of oxygen molecules required for complete oxidation of one glucose molecule is —
A) 4 B) 6 C) 8 D) 10

17. In the absence of oxygen, the electron transport chain —
A) Stops B) Continues normally C) Produces more ATP D) Produces more CO_2

18. In the ETS, which complex transfers electrons from NADH to ubiquinone?
A) Complex I B) Complex II C) Complex III D) Complex IV

19. Which of the following pairs of reactions directly yield ATP?
A) 1,3-BPG → 3-PG and Succinyl CoA → Succinate B) Glucose → G6P and Pyruvate → Acetyl-CoA C) Fumarate → Malate and Malate → Oxaloacetate D) All of these

20. The energy released per molecule of glucose completely oxidised is approximately —
A) 2870 kJ/mol B) 3870 kJ/mol C) 1870 kJ/mol D) 4800 kJ/mol

21. The enzyme cytochrome oxidase is located in —
A) Inner mitochondrial membrane B) Outer mitochondrial membrane C) Matrix D) Cytoplasm

22. Uncouplers of oxidative phosphorylation (like DNP) act by —
A) Destroying proton gradient B) Inhibiting ETS C) Inhibiting ATP synthase D) Increasing oxygen consumption

23. Which of the following directly yields NADH?
A) Glycolysis B) Link reaction C) Krebs cycle D) All of these

24. Which intermediate of the TCA cycle is used in amino acid synthesis?
A) α-Ketoglutarate B) Citrate C) Malate D) Fumarate

25. Which of the following reactions does not release CO_2?
A) Glycolysis B) Link reaction C) TCA cycle D) Fermentation

26. The energy from oxidation of one mole of glucose is used to form approximately —
A) 38 ATP B) 40 ATP C) 32 ATP D) 36 ATP

27. The number of ATP formed from one molecule of $FADH_2$ during ETS is —
A) 1 B) 2 C) 3 D) 4

28. If the RQ value of a substrate is 0.7, it indicates that the substrate is —
A) Carbohydrate B) Fat C) Protein D) Organic acid

29. Which one is *not* an example of substrate-level phosphorylation?
A) Conversion of phosphoenolpyruvate to pyruvate B) Succinyl-CoA to succinate C) Oxidation of NADH D) None of these

30. The role of NAD^+ in respiration is to —
A) Accept hydrogen and electrons B) Supply energy C) Release CO_2 D) Act as a substrate

31. The process that is inhibited when cyanide is added to respiring cells —
A) Electron transport B) Glycolysis C) Fermentation D) Substrate-level phosphorylation

32. The hydrogen carriers in ETS are —
A) NADH and $FADH_2$ B) NAD^+ and ATP C) CO_2 and O_2 D) Pyruvate and Acetyl CoA

33. Each turn of the TCA cycle yields —
A) 3 NADH, 1 $FADH_2$, 1 ATP B) 2 NADH, 1 $FADH_2$, 1 ATP C) 3 NADH, 2 $FADH_2$, 1 ATP D) 4 NADH, 1 $FADH_2$, 2 ATP

34. The final product of complete oxidation of one molecule of glucose is —
A) CO_2 and H_2O B) CO_2 and Ethanol C) Lactic acid D) Pyruvate

35. The overall efficiency of aerobic respiration is about —
A) 20% B) 40% C) 60% D) 80%

36. ATP is formed from ADP and inorganic phosphate by —
A) ATP synthase B) Dehydrogenase C) Kinase D) Oxidase

37. The ETS in mitochondria results in —
A) Proton accumulation in intermembrane space B) Proton flow into matrix C) Proton gradient in cytoplasm D) None

38. The main function of Krebs cycle is —
A) Production of NADH and $FADH_2$ B) Production of glucose C) Conversion of pyruvate to CO_2 D) Formation of ATP

39. The step that connects anaerobic and aerobic respiration is —
A) Formation of acetyl CoA B) Formation of pyruvate C) Formation of CO_2 D) Formation of lactate

40. Which of the following represents a redox pair?
A) NAD^+/NADH B) FAD/$FADH_2$ C) Both A and B D) ATP/ADP

41. Which enzyme catalyses the oxidation of malate to oxaloacetate?
A) Malate dehydrogenase B) Succinate dehydrogenase C) Fumarase D) Aldolase

42. The enzyme that converts citrate to isocitrate is —
A) Aconitase B) Isocitric dehydrogenase C) Citrate synthase D) Fumarase

43. The number of oxygen atoms in one molecule of acetyl-CoA is —
A) 1 B) 2 C) 3 D) 4

44. The compound that enters the TCA cycle from glycolysis is —
A) Acetyl CoA B) Pyruvate C) Malate D) Glucose

45. During respiration, hydrogen is removed by —
A) Dehydrogenases B) Decarboxylases C) Oxidases D) Synthases

46. The enzyme that adds phosphate group without using ATP is —
A) Kinase B) Phosphorylase C) Isomerase D) Dehydrogenase

47. Which of the following is an anaplerotic reaction?
A) Conversion of pyruvate to oxaloacetate B) Conversion of pyruvate to acetyl-CoA C) Conversion of succinate to fumarate D) Conversion of fumarate to malate

48. The common intermediate between carbohydrate, fat, and protein metabolism is —
A) Acetyl CoA B) Pyruvate C) α-Ketoglutarate D) Malate

49. The number of molecules of CO_2 produced from one glucose in Krebs cycle is —
A) 2 B) 4 C) 6 D) 8

50. The complete oxidation of one mole of glucose releases about —
A) 2870 kJ energy B) 3870 kJ C) 1870 kJ D) 5000 kJ

✅ Answer Key (Set 4)

1-C, 2-B, 3-A, 4-B, 5-A, 6-A, 7-B, 8-A, 9-C, 10-A,
11-A, 12-A, 13-C, 14-B, 15-B, 16-B, 17-A, 18-A, 19-A, 20-A,
21-A, 22-A, 23-D, 24-A, 25-A, 26-A, 27-B, 28-B, 29-C, 30-A,
31-A, 32-A, 33-A, 34-A, 35-B, 36-A, 37-A, 38-A, 39-A, 40-C,
41-A, 42-A, 43-B, 44-A, 45-A, 46-B, 47-A, 48-A, 49-B, 50-A.