

GPLUS EDUCATION

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BIOLOGY

RESPIRATION IN PLANTS

Single Correct Answer Type

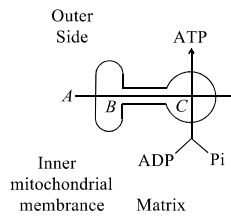
- In the electron transport system present in the inner mitochondrial membrane, complexes I and IV are respectively
 - NADH Dehydrogenase and FADH_2
 - NADH_2 and NADH Dehydrogenase
 - NADH Dehydrogenase and cytochrome-c oxidase complex
 - NADH dehydrogenase and ATP synthase
- In respiration incomplete oxidation of glucose is done under
 - Aerobic respiration
 - Anaerobic respiration
 - Both (a) and (b)
 - None of these
- The cellular respiration first takes place in the
 - Cytoplasm
 - Golgi bodies
 - ER
 - Lysosomes
- Which of the following scientist has given the scheme of glycolysis?
 - Gustav Embden *et. al*
 - Kreb *et. al*
 - Fritz Lipmann *et. al*
 - None of these
- Which metabolic pathway is a common pathway to both anaerobic and aerobic metabolism?
 - Glycolysis
 - EMP pathway
 - Both (a) and (b)
 - None of the above
- In mitochondria, enzyme cytochrome oxidase is present in
 - Outer membrane
 - Perimitochondrial space
 - Inner membrane
 - Matrix
- TCA cycle enzymes are present in
 - Cytoplasm
 - Inter membrane space of mitochondria
 - Mitochondrial matrix
 - Inner membrane of mitochondria
- Among the following, identify the substrate required for the only oxidative reaction that occurs in the process of glycolysis.
 - 3-phosphoglyceric acid
 - Glyceraldehyde 3-phosphate
 - Fructose-6-phosphate
 - Glucose-6-phosphate
- Aerobic respiration is
 - The process in which complete oxidation of organic substances in the absence of oxygen
 - The process in which complete oxidation of organic substances in the presence of oxygen
 - The process in which incomplete oxidation of organic substances in the absence of oxygen
 - The process in which incomplete oxidation of organic substances in the presence of oxygen
- What will happen, when glucose is administered orally?
 - Excretion
 - Digestion
 - Circulation
 - Respiration
- How many ATP molecules could maximally be generated from one molecule of glucose, if the complete oxidation of one mole of glucose to carbon dioxide and water yields 686 kcal and the useful chemical energy available in the high energy phosphate bond of one mole of ATP is 12 kcal?
 - Two
 - Thirty
 - Fifty seven
 - One
- In photosynthesis, NADPH_2 is formed but in respiration it forms during
 - HMP
 - ETS
 - Krebs' cycle
 - None of these
- Plants does not need specialised respiratory organ because

- a) Each plant part takes care of its own gas exchange needs
 b) Plants do not need great demands for gas exchange
 c) Both (a) and (b)
 d) None of the above
14. Lactic acid is formed in
 a) Fermentation
 b) Glycolysis
 c) HMP pathways
 d) None of these
15. In which part of mitochondria does ATP synthesis occur?
 a) F_1
 b) F_0
 c) Cristae
 d) Inner membrane of mitochondria
16. In oxidative decarboxylation, enzyme used to
 a) Pyruvate decarboxylase
 b) Pyruvate dehydrogenase
 c) Pyruvate hydrogeneticase
 d) Pyruvate dehydrogeneticase
17. Select the wrong statement.
 a) When tripalmitin is used as a substrate in respiration, the RQ is 0.7
 b) The intermediate compound which links glycolysis with Krebs' cycle is malic acid
 c) One glucose molecule yields a net gain of 36 ATP molecules during aerobic fermentation
 d) One glucose molecule yields a net gain of 2 ATP molecules during fermentation
18. Enzymes found attached to inner membrane of mitochondria instead of matrix is/are
 a) Succinic Dehydrogenase
 b) Cytochrome oxidase
 c) Both (a) and (b)
 d) Malic Dehydrogenase
19. Four respiratory enzymes are given below. Arrange them in increasing order of the carbon number of the substrates on which they act.
 I. Enolase
 II. Aconitase
 III. Fumarase
 IV. Alcohol Dehydrogenase
 a) II, IV, III, I
 b) IV, I, II, III
 c) I, IV, III, II
 d) IV, I, III, II
20. Link enzyme in cellular respiration is
 a) Citrate synthetase
 b) Pyruvate Dehydrogenase
 c) Isocitrate Dehydrogenase
 d) Succinyl thiokinase
21. Beer and butter milk are products of fermentation by
 a) *Rhizopus stolonifer*
 b) *Caedobacter taeniospiralis*
 c) *Bacillus subtilis*
 d) *Saccharomyces cerevisiae*
22. Apparatus to measure rate of respiration and respiratory quotient is
 a) Auxanometer
 b) Potometer
 c) Respirometer
 d) Manometer
23. Acetyl Co-A binds to oxaloacetic acid to form
 a) Formaldehyde
 b) Citrate
 c) Acetate
 d) Isocitrate
24. In fermentation NADH is oxidised to NAD^+ in rate
 a) Fast
 b) Slow
 c) Usual
 d) None of these
25. Last electron acceptor in respiration is
 a) Oxygen
 b) Hydrogen
 c) Carbon dioxide
 d) NADH
26. In animal cells, like muscle, during exercise when O_2 is inadequate for cellular respiration, pyruvic acid is reduced into lactic acid by
 a) O_2
 b) Carboxylation
 c) Lactate dehydrogenase
 d) None of the above
27. Glucose break down takes place in fermentation
 a) Partially
 b) Completely
 c) According to substrate
 d) None of these
28. Plants need one of the following for ATP formation
 a) N and P
 b) N and Cu
 c) N and Ca
 d) K
29. First vitamin to be produced through fermentation process using a wild bacterium was

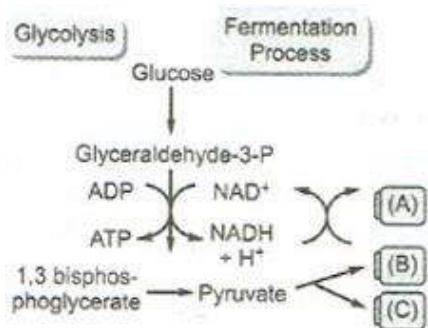
- a) Vitamin-D b) Vitamin-C c) Vitamin- B₁₂ d) Vitamin-B₂
30. Fate of pyruvic acid during aerobic respiration is
 a) Lactic acid fermentation b) Alcoholic acid fermentation
 c) Oxidative decarboxylation d) Oxidative phosphorylation
31. In respiration, respiratory substances can be used
 a) Carbohydrate b) Protein c) Organic acid d) All of these
32. In oxidative decarboxylation, only a carbon molecule of pyruvic acid is get oxidised, other two carbon molecule goes to form
 a) Acetyl Co-A b) CO₂ c) Citric acid d) Both (a) and (b)
33. Enzymes of electron transport system are present in
 a) Inner mitochondrial membrane b) Matrix
 c) Intermembranous space d) Endoplasmic reticulum
34. Fungi are dependent on dead and decaying matter for feeding, it is called
 a) Saprophytes b) Halophytes c) Xerophytes d) Nanophytes
35. Which of the following reaction does not take place in the cell organelle, that is referred to as 'Power house of the cell'?
 a) Glycine Decarboxylation b) Glyceraldehyde 3-phosphate dehydrogenation
 c) Fumaric acid hydration d) Cytochrome oxidation
36. Which of the following is true regarding glycolysis?
 I. Takes place in cytosol
 II. Produces no ATP
 III. Has no connection with electron transport chain
 IV. Reduces two molecules of NAD⁺ for every glucose molecule processed
 Choose the correct option
 a) Only I b) I, II and III c) I and II d) None of these
37. The reaction which is catalysed by a protein that is not found in the matrix of mitochondria is
 a) Conversion of pyruvic acid to acetyl coenzyme-A b) Oxidative Decarboxylation of α-ketoglutaric acid
 c) Oxidation of Succinic acid d) Cleavage of Succinyl coenzyme-A
38. All enzymes of TCA cycle are located in the mitochondrial matrix except one, which is located in inner mitochondrial membranes in eukaryotes and in cytosol in prokaryotes. This enzyme is
 a) Lactate Dehydrogenase b) Isocitrate Dehydrogenase
 c) Malate Dehydrogenase d) Succinate Dehydrogenase
39. Identify enzyme A in the given reaction of Kreb's cycle

$$\text{OAA} + \text{Acetyl Co} - \text{A} + \text{H}_2\text{O} \xrightarrow{\text{A}} \text{Citric acid} + \text{Co} - \text{A}$$

 a) Oxaloacetate synthetase b) Citrate synthetase
 c) Aconitase d) Dehydrogenase
40. The enzymes for TCA cycle are present in
 a) Plastids b) Golgi complex
 c) Mitochondria d) Endoplasmic reticulum
41. Which one of the following is the terminal electron acceptor?
 a) Molecular CO₂ b) Molecular O₂ c) Molecular H₂ d) NADPH₂
42. In electron transport system, which of the following acts as a final hydrogen acceptor
 a) Oxygen b) Hydrogen c) Calcium d) Ubiquinone
43. If a starving plant is provided with glucose, the rate of respiration would
 a) First rise then fall b) Become constant c) Decrease d) Increase
44. Which one is product of aerobic respiration?
 a) Malic acid b) Ethyl alcohol c) Lactic acid d) Pyruvic acid
45. Given below the diagrammatic presentation of ATP synthesis in mitochondria. Identify A-C and Choose the correct option accordingly



- a) A – H⁺, B – F₁, C – F₀
 b) A – 3H⁺, B – F₀, C – F₁
 c) A – 2H⁺, B – F₀, C – F₁
 d) A – 5H⁺, B – F₁, C – F₀
46. In Krebs' cycle,
 a) ADP is converted into ATP
 b) Pyruvic acid is converted into CO₂ and H₂O
 c) Glucose is converted into CO₂
 d) Pyruvic acid is converted into ATP
47. Decline in the activity of the enzyme Hexokinase by glucose-6-phosphate is caused by
 a) Non-competitive
 b) Competitive inhibitors
 c) Allosteric modulators
 d) Denaturation of enzyme
48. In which of the following reactions of glycolysis, oxidation takes place?
 a) Glucose 6-PO₄ to fructose 6-PO₄
 b) Glyceraldehydes 3-phosphate to 1, 3-diphosphoglycerate
 c) 1,3-diphosphoglycerate to 3-phosphoglycerate
 d) 2-phosphoglycerate to phosphoglycerate
49. During conversion of pyruvic acid into acetyl Co-A, pyruvic acid is
 a) Oxidized b) Reduced c) Isomerized d) Condensed
50. During anaerobic respiration in yeast
 a) H₂O and CO₂ are end-products
 b) CO₂ , ethanol and energy are end-products
 c) CO₂ , and H₂O are end-products
 d) CO₂ , acetic acid and energy are end-products
51. Choose the correct combination of A and B according to NCERT text book.
 All living organisms need ...A... for carrying out daily life activities and is obtained by ...B... of macromolecules
 a) A-oxygen; B-reduction b) A-energy; B-reduction
 c) A-energy; B-oxidation d) A-oxygen; B-oxidation
52. Most of the biological energy is supplied by mitochondria through
 a) Breaking of proteins b) Reduction of NADP⁺
 c) Breaking of sugars d) Oxidising TCA (tricarboxylic acid) substrate
53. Chemiosmotic mechanism of ATP production in aerobic respiration was given by
 a) Krebs b) Calvin c) Hatch and Slack d) Peter Mitchell
54. Choose the correct combination of labeling the molecules involved in the pathway of anaerobic respiration in yeast



- a) A – Ethanol, B – CO₂, C – Acetaldehyde
 b) A - CO₂, B – Ethanol, C- Acetaldehyde
 c) A - CO₂, B - Acetaldehyde, C- Ethanol
 d) A – Ethanol, B - Acetaldehyde, C - CO₂
55. Which of the metabolites is common to respiration mediated breakdown of fats, carbohydrates and proteins?
 a) Glucose-6-phosphate
 b) Fructose, 6-bisphosphate
 c) Pyruvic acid
 d) Acetyl Co-A
56. In succulent plants like Opuntia, the RQ value will be
 a) Less than one
 b) More than one
 c) Infinite
 d) Zero
57. The pyruvic acid formed during glycolysis is oxidized to CO₂ and H₂O in a cycle called
 a) Calvin cycle
 b) Nitrogen cycle
 c) Hill reaction
 d) Krebs' cycle
58. Respiratory enzymes are present in the following organelle
 a) Peroxisome
 b) Chloroplast
 c) Mitochondrion
 d) Lysosome
59. An ATP molecule is structurally most similar to a molecule of
 a) RNA nucleotide
 b) DNA nucleotide
 c) Amino acid
 d) Fatty acid
60. Read the following and choose the option containing correct pair
 I. DCMU Herbicide Inhibitor of non-cyclic electron transport
 II. PMA Fungicide Reduce transpiration
 III. Colchicine Alkaloid Causes male sterility
 IV. Soilrite Sodium alginate Encapsulation of somatic embryos
 a) I and II
 b) I and III
 c) II and III
 d) II and IV
61. Oxidation of one molecule of NADH gives rise to
 a) 3 ATP molecules
 b) 12 ATP molecules
 c) 2 ATP molecules
 d) 1ATP molecule
62. Aerobic respiratory pathway is appropriately termed as
 a) Catabolic
 b) Parabolic
 c) Amphibolic
 d) Anabolic
63. In alcohol fermentation,
 a) There is no electron donor
 b) Oxygen is the electron acceptor
 c) Triose phosphate is the electron donor, while acetaldehyde is the electron acceptor
 d) Triose phosphate is the electron donor, while pyruvic acid is the electron acceptor
64. In respiration breaking down of glucose with oxygen is known as
 a) Oxidation process
 b) Reduction process
 c) Oxidation-oxaloacitination process
 d) All of the above
65. Net gain of ATP molecules per hexose during aerobic respiration is
 a) 12
 b) 18
 c) 36
 d) 30
66. Which of these are respiratory poisons or inhibitors of electron transport chain?
 a) Cyanides
 b) Antimycin-A
 c) Carbon monoxide
 d) All of these
67. Kreb's cycle is completed with the formation of
 a) Citric acid
 b) Oxaloacetic acid (OAA)
 c) Succinic acid
 d) Malic acid

68. Where is ATP synthesised in glycolysis?
 a) When 1, 3 di PGA is changed into 3PGA
 b) When glucose is converted into glucose-6-phosphate
 c) Both (a) and (b)
 d) When, 1, 6 diphosphate is broken in triose phosphate
69. Maximum number of ATP is obtained from
 a) Glucose b) Palmitic acid c) Malic acid d) β -amino acid
70. Glycolysis takes place in
 a) All living cells b) Eukaryotic cells only
 c) Prokaryotic cells only d) None of these
71. Krebs' cycle begins with the reaction
 a) Citric acid + acetyl Co-A b) Oxaloacetic acid + pyruvic acid
 c) Oxaloacetic acid + citric acid d) Oxaloacetic acid + acetyl Co-A
72. Co-Factor required for formation of acetyl Co-A is
 a) TPP b) Lipoic acid c) Mg^{2+} , Co-A d) All of these
73. In anaerobic respiration in plants
 a) Oxygen is absorbed b) Oxygen is released
 c) Carbon dioxide is released d) Carbon dioxide is absorbed
74. The respiratory quotient (RQ) of some of the compounds are 4,1 and 0.7. These compounds are identified respectively as
 a) Malic acid, palmitic acid and tripalmitin b) Oxalic acid, carbohydrate and tripalmitin
 c) Tripalmitin, malic acid and carbohydrate d) Palmitic acid, carbohydrate and oxalic acid
75. The enzyme is used to catalysed when condensation of acetyl group with oxaloacetic acid and to yield citric acid
 a) Citrate permeate b) citrate synthase c) Citrate burate d) Citrate maliate
76. The respiratory quotient (RQ) of a germinating castor seed is
 a) Equal to one b) Greater than one c) Less than one d) Equal to zero
77. Glycolysis
 I. causes partial oxidation of glucose (one molecule) to form 2-molecules of pyruvic acid and 2 ATP as net gain
 II. takes place in all living cells
 III. uses 2 ATP at two steps
 IV. scheme was given by Gustav Embden, Otto Mayerhof and J Parnas
 Choose the correct option containing appropriate statements from the above
 a) I, II and III b) I, II and IV c) I, II, III and IV d) Only I
78. During oxidative phosphorylation, the net gain of ATP is
 a) 40 b) 38 c) 34 d) 30
79. Decarboxylation is involved in
 a) Electron transport system
 b) Glycolysis
 c) Krebs' cycle
 d) Lactic acid fermentation
80. Alternate name of TCA cycle is
 a) Kreb's cycle b) Grab's cycle c) Mayerhoff cycle d) Embden cycle
81. A businessman of 80 kg weight requires 4800 kcal energy daily. How many ATP molecules and glucose molecules does he require to produce this much energy?
 a) 20 molecules of glucose and 384 molecules of ATP
 b) 40 molecules of glucose and 264 molecules of ATP
 c) 18 molecules of glucose and 657 molecules of ATP
 d) 20 molecules of glucose and 460 molecules of ATP

99. Identify the specific group, which carries out the following biochemical reaction:
 Aspartic acid + α -ketoglutaric acid \rightarrow Oxaloacetic acid + Glutamic acid
 a) Synthetases b) Peptidases c) Transaminases d) Lyases
100. Which of following is connecting link between glycolysis and Krebs' cycle?
 a) Pyruvic acid
 b) Isocitric acid
 c) Acetyl Co-A
 d) Phosphoglyceric acid
101. Which one of the following reactions is an example of oxidative Decarboxylation?
 a) Conversion of succinate to fumarate b) Conversion of fumarate to malate
 c) Conversion of pyruvate to acetyl Co-A d) Conversion of citrate to isocitrate
102. If O₂ is not present, yeast cells break down glucose to
 a) CO₂ + H₂O b) CO₂ + Lactic acid c) C₂H₅OH + H₂O d) C₂H₅OH and CO₂
103. How many ATP is released respectively when NADH and FADH₂ molecules get oxidised?
 a) 3 ATP, 2 ATP b) 2 ATP, 3 ATP c) 5 ATP, 4 ATP d) 3 ATP, 5 ATP
104. Release of energy by breaking down of C-C bond of various organic molecules by oxidation process for cellular use is known as
 a) Respiration b) Photorespiration
 c) Oxidative phosphorylation d) Combustion
105. Krebs' cycle was discovered by Krebs in pigeon muscles in 1940. Which step is called gateway step/link reaction/transition reaction in respiration?
 a) Glycolysis b) Formation of acetyl Co-A
 c) Citric acid formation d) ETS terminal oxidation
106. Correct sequence of electron acceptor of ATP synthesis is
 a) cyt-a, a₃, b, c b) cyt-b, c, a, a₃ c) cyt-b, c, a₃, a d) cyt-c, b, a, a₃
107. The number of ATP produced when a molecule of glucose undergoes fermentation
 a) 4 b) 36 c) 2 d) 38
108. Oxidative decarboxylation is
 a) Pyruvic acid is oxidised to carbon dioxide b) Pyruvic acid is subsidised to oxygen
 c) Pyruvic acid is oxidised to oxygen d) Pyruvic acid is subsidised to carbon dioxide
109. An example of Pasteur's effect is
 a) *Penicillium* b) *Pinnularia* c) *Saccharomyces* d) *Nostoc*
110. Fermentation is
 a) Anaerobic respiration b) Incomplete oxidation of carbohydrate
 c) Complete oxidation of carbohydrate d) None of the above
111. Citric acid cycle is the alternate name of which of the following?
 a) HMP shunt b) Glycolysis c) TCA cycle d) Calvin cycle
112. When one molecule of glucose is completely oxidized during aerobic respiration, how many molecules of carbon dioxide are released due to Tricarboxylic acid cycle?
 a) One b) Two c) Three d) Four
113. Fat prior to its oxidation associate with
 a) Cyclic AMP b) Co-A c) GMP d) ATP
114. The RQ value of oxalic acid is
 a) 1.0 b) 0.7 c) 4 d) ∞
115. Energy currency of cell is
 a) Mitochondria b) Chloroplast c) ATP d) Glucose
116. Break down process is also called
 a) Catabolism b) Anabolism c) Both (a) and (b) d) All of these
117. The energy-releasing metabolic process in which substrate is oxidized without an external electron acceptor, is called

- a) glycolysis b) Fermentation c) Aerobic respiration d) Photorespiration
118. How many times ATP is utilised in glycolysis?
 a) 2 b) 3 c) 4 d) 5
119. Aerobic respiration takes place in
 a) Mitochondria b) Ribosome c) Glogi body d) Both (a) and (b)
120. Sequence of events in Kreb's cycle is
 a) Acetyl Co-A → Citrate → Pyruvate → Oxaloacetic acid ← fumarate ← Malate ← Succinate α-ketoglutarate
 b) Acetyl Co-A → Citric acid → α-ketoglutarate acid → Oxaloacetic acid ← Malic acid ← Fumaric acid ← Succinic acid
 c) Acetyl Co-A → Citric acid → Malic acid Oxaloacetic ← Oxaloacetic acid Succinic ← α-ketoglutaric acid ←
 d) All are wrong
121. Which of the following is a 4-carbon compound?
 a) Oxaloacetic acid b) Phosphoglyceric acid
 c) Ribulose bisphosphate d) Phosphoenol pyruvate
122. An example of non-competitive inhibition is
 a) The inhibition of succinic Dehydrogenase by Malonate b) Cyanide action on cytochrome oxidase
 c) Sulpha drug on folic acid synthesizing bacteria d) The inhibition of Hexokinase by glucose 6-phosphate
123. What is the net ATP molecules gain, when 4 molecules of glucose undergo anaerobic respiration in plant?
 a) 8 ATP b) 20 ATP c) 144 ATP d) 16 ATP
124. Chemiosmosis hypothesis given by Peter Mitchell proposes the mechanism of
 a) Synthesis of NADH b) Synthesis of ATP c) Synthesis of FADH₂ d) Synthesis of NADPH
125. Glycolysis
 a) Takes place in the mitochondria
 b) Produces no ATP
 c) Has no connection with electron transport chain
 d) Reduce two molecules of NAD⁺ for every glucose molecule processed
126. Citric acid cycle is also known as
 a) Tricarboxylic acid cycle b) Oxidative decarboxylation
 c) Fermentation cycle d) Both (a) and (b)
127. Instantaneous source of energy is
 a) Protein b) Lipid c) Fats d) Glucose
128. Before entering into the respiratory pathway fats breakdown into
 a) Fatty acid and glycerol b) Fatty acid and ascorbic acid
 c) Fatty acid and ascorbic acid d) Fatty acid and amino acid
129. In which of the following reactions of glycolysis, a molecule of water is removed from the substrate?
 a) Fructose-6-phosphate → Fructose-1, 6-bisphosphate b) 3-phosphate-glyceraldehyde → 1, 3-bisphosphoglyceric acid
 c) PEP → Pyruvic acid d) 2- phosphoglycerate → PEP
130. The reactions of Pentose Phosphate Pathway (PPP) take place in
 a) Mitochondrion b) Cytoplasm
 c) Chloroplast, peroxisome and mitochondrion d) Chloroplast, glyoxysome and mitochondrion
131. In citric acid cycle first step is
 a) Acetyl Co-A combines with oxalo acetic acid b) Acetyl Co-A combines with citric acid
 c) Citric acid combines with oxaloacetic acid d) Citric acid combines with malic acid
132. Pyruvate → C₂H₃OH + CO₂
 The above reaction needs two enzymes named as
 a) Pyruvate decarboxylase and alcohol dehydrogenase

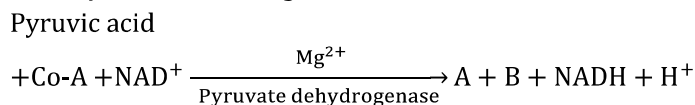
- b) Pyruvate decarboxylase and enolase
 c) Pyruvate decarboxylase and pyruvate kinase
 d) Pyruvate carboxylase and aldolase
133. FAD is electron acceptor during oxidation of which of the following?
 a) α -ketoglutarate \rightarrow Succinyl Co-A b) Succinic acid \rightarrow Fumaric acid
 c) Succinyl Co-A \rightarrow Succinic acid d) Fumaric acid \rightarrow Malic acid
134. Which of the following substrate can enter into the respiration?
 a) Glucose b) Amino acid c) Fatty acid d) All of these
135. RQ value of 4 may be expected for the complete oxidation of which one of the following?
 a) Glucose b) Malic acid c) Oxalic d) Tartaric acid
136. When act as a respiratory substrate, which of the following would be broken down to acetyl Co-A?
 a) Fatty acid b) Protein c) Carbohydrate d) All of these
137. Anaerobic respiration generally occurs in
 a) Lower organism, *e.g.*, bacteria and fungi b) Higher organism, *e.g.*, animal
 c) Both (a) and (b) d) None of the above
138. In which of the following, reduction of NAD does not occur?
 a) Isocitric acid \rightarrow α -ketoglutaric acid
 b) Malic acid \rightarrow Oxaloacetic acid
 c) Pyruvic acid \rightarrow Acetyl coenzyme
 d) Succinic acid \rightarrow Fumaric acid
139. How many NADH + H⁺ molecule is released in Kreb's cycle?
 a) 3 b) 6 c) 12 d) 14
140. Cell respiration is carried out by
 a) Ribosome b) Mitochondria c) Chloroplast d) Golgi bodies
141. The released energy obtained by oxidation is stored as
 a) A concentration gradient across a membrane b) ADP
 c) ATP d) NAD⁺
142. Respiratory Quotient (RQ) is one in case of
 a) Fatty acids b) Nucleic acids c) Carbohydrates d) Organic acids
143. Which of the following substrates is used in the formation of alcohol?
 a) Sucrose b) Glucose c) Galactose d) Fructose
144. Which one is correct sequence in glycolysis?
 a) G-6-P \rightarrow PEP \rightarrow 3-PGAL \rightarrow 3-PGA b) G-6-P \rightarrow 3-PGAL \rightarrow 3-PGA \rightarrow PEP
 c) G-6-P \rightarrow PEP \rightarrow 3-PGA \rightarrow 3-PGAL d) G-6-P \rightarrow 3-PGA \rightarrow 3-PGAL \rightarrow PEP
145. Cyanide resistant pathway is
 a) Anaerobic respiration b) Aerobic respiration
 c) Both (a) and (b) d) None of these
146. Common enzyme in glycolysis and pentose phosphate pathway is
 a) Hexokinase b) aconitase c) Fumarase d) Dehydrogenase
147. In aerobic respiration complete oxidation of pyruvate by the stepwise removal of all the hydrogen atom makes molecule of CO₂
 a) 2 b) 3 c) 4 d) 5
148. Phase common in aerobic and anaerobic respiration is
 a) TCA cycle b) Glycolysis c) Glycogenolysis d) ETS
149. 2NADH(H⁺) produced during anaerobic glycolysis yield
 a) 6 ATP molecules b) 4 ATP molecules c) 8 ATP molecules d) None of these
150. In the production of ethanol, pyruvic acid is first converted to acetaldehyde by the enzyme.
 a) Alcohol Dehydrogenase b) Alcohol oxidase
 c) Pyruvate Dehydrogenase d) Pyruvate decarboxylase
151. The activity of succinate Dehydrogenase is inhibited by

- a) Pyruvate b) Glycolate c) Melonate d) Phosphoglycerate
152. Citric acid is industrially best produced by
a) *Streptococcus lactis* b) *Aspergillus niger*
c) *Penicillium purpurogenum* d) *Lactobacillus delbreukii*
153. Respiratory substrate are the organic substance which are during respiration to liberate energy
a) Oxidised b) Reduced c) Both (a) and (b) d) Synthesised
154. The oxidation of pyruvic acid to CO₂ and H₂O is called
a) Fermentation b) Citric acid cycle
c) Glycolysis d) Oxidative phosphorylation
155. Preparatory phase before fermentation is
a) Upstream process b) Downstream process c) Inoculation d) Filtration
156. For retting of jute the fermenting microbe used is
a) *Helicobacter pylori* b) *Methophilic bacteria*
c) *Streptococcus lactis* d) *Butyric acid bacteria*
157. The respiratory quotient during cellular respiration would depend on the
a) Nature of enzymes involved b) Nature of the substrate
c) Amount of carbon dioxide released d) Amount of oxygen utilized
158. Which one of following is complex V of the ETS of inner mitochondrial membrane?
a) NADH Dehydrogenase b) Cytochrome oxidase
c) Ubiquinone d) ATP synthase
159. Protein directly cannot be used as a respiratory substrate, it breaks down into
a) Amino acid b) Fatty acid c) Glycolytic acid d) Fumaric acid
160. Ethyl alcohol is commercially manufactured from
a) Bajra b) Grapes c) Maize d) Sugarcane
161. Biological oxidation in Krebs' cycle involves
a) O₂ b) CO₂ c) O₃ d) NO₂
162. Last electron acceptor during ETS is
a) O₂ b) cyt-a c) cyt-a₂ d) cyt-a₃
163. Which enzyme converts glucose into alcohol?
a) Zymase b) Diastase c) Invertase d) Lipase
164. Glycolysis is a part of
a) Anaerobic respiration only b) Aerobic respiration only
c) Both (a) and (b) d) Krebs' cycle
165. When tripalmitin is used as a substrate in respiration, the RQ is
a) >1 b) 1.0 c) 0.9 d) 0.7
166. Read the following table and choose the correct pair.
- | | | |
|-----------------|-----------------|--|
| V. DCMU | Herbicide | Inhibitor of non-cyclic electron transport |
| VI. PMA | Fungicide | Reduce transpiration |
| VII. Colchicine | Alkaloid | Causes male sterility |
| VIII. Soilrite | Sodium alginate | Encapsulation of somatic embryos |
- a) I, II b) I, III c) II, III d) II, IV
167. In aerobic respiration removal 3 molecules of CO₂ occurs in
a) Matrix of the mitochondria b) Inner membrane of the mitochondria
c) Both (a) and (b) d) Anywhere in the mitochondria
168. In anaerobic respiration bacteria produce
a) Lactic acid b) Formic acid c) Acetic acid d) Glutamic acid
169. During its formation, bread becomes porous due to release of Carbon dioxide by the action of
a) Yeast b) Bacteria c) Virus d) Protozoans
170. Before entering respiratory pathway amino acids are
a) Decarboxylated b) Hydrolysed c) Deaminated d) Phosphorylated

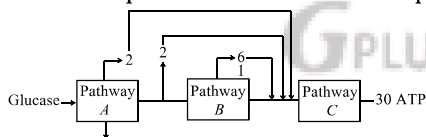
171. The intermediate compound common for aerobic and anaerobic respiration is
 a) Citric acid b) Pyruvic acid c) Acetyl Co-A d) Succinic acid
172. How many ATP molecules are obtained from fermentation of 1 molecule of glucose?
 a) 2 b) 4 c) 3 d) 5
173. During which stage in the complete oxidation of glucose are the greatest number of ATP molecules formed from ADP?
 a) Conversion of pyruvic acid to acetyl Co-A b) Electron transport chain
 c) Glycolysis d) Krebs' cycle
174. In plants the cells in the interior parts are
 a) Dead and for mechanical support b) Live and for various purpose
 c) Both (a) and (b) d) None of the above
175. Ultimate source of energy in biosphere, is
 a) Sunlight b) Protein c) Fats d) Enzymes
176. Dough kept overnight in warm weather becomes soft and spongy because of
 a) Absorption of carbon dioxide from atmosphere b) Fermentation
 c) Cohesion d) Osmosis
177. The respiratory quotient (RQ) or respiratory ratio is
 a) $RQ = \frac{\text{Volume of O}_2 \text{ evolved}}{\text{Volume of CO}_2 \text{ consumed}}$ b) $RQ = \frac{\text{Volume of O}_2 \text{ consumed}}{\text{Volume of CO}_2 \text{ evolved}}$
 c) $RQ = \frac{\text{Volume of CO}_2 \text{ consumed}}{\text{Volume of O}_2 \text{ evolved}}$ d) $RQ = \frac{\text{Volume of CO}_2 \text{ evolved}}{\text{Volume of O}_2 \text{ consumed}}$
178. Maximum amount of energy/ATP is liberated on oxidation of
 a) Fats b) Proteins c) Starch d) Vitamins
179. $\text{NADH}_2 \rightarrow \text{FAD} \rightarrow \text{FADH}_2$
 The given reaction occurs in
 a) Heart cells b) Kidney cells c) Liver cells d) Nerve cells
180. Net yield of ATP molecules in aerobic respiration during Krebs' cycle per glucose molecule is
 a) 2 ATP molecules b) 8 ATP molecules
 c) 36 ATP molecules d) 38 ATP molecules
181. Respiratory quotient can vary due to
 a) Temperature b) Respiratory substrate
 c) Light and oxygen d) Respiratory product
182. In anaerobic respiration the correct sequence of catabolism of glucose is
 a) Glycolysis, TCA cycle, oxidative phosphorylation
 b) Glycolysis, fermentation
 c) Glycolysis, oxidative phosphorylation, TCA cycle
 d) Oxidative phosphorylation, TCA cycle, glycolysis
183. In eukaryotes, photosynthesis occurs in
 a) Chloroplast b) Stomatal opening c) Bark d) Roots
184. In yeast during anaerobic respiration, how many glucose molecules are required for production of 38 ATP molecules?
 a) 1 b) 2 c) 19 d) 38
185. Which of the following is involved in the catalysis of link reaction during aerobic respiration?
 a) Vitamin- A b) Vitamin- B₁ c) Vitamin- B₆ d) Vitamin- K
186. Respiratory quotient in anaerobic respiration is
 a) 0.7 b) 0.9 c) Unity d) Infinity
187. Choose the correct combination of A and B in accordance with the NCERT text book.
 The NADH synthesised in ...A... is transferred into the mitochondria and undergoes oxidative ...B...
 a) A-EMP; B-carboxylation b) A-ETS; B-phosphorylation

- c) A-glycolysis; B-phosphorylation
 188. Total gain of ATP molecules during aerobic respiration of one molecule of glucose
 a) 36 b) 38 c) 40 d) 34
189. Which of the following enzyme is responsible for formation of glucose from glucose-6-phosphate?
 a) Kinase b) Aldolase c) Dehydrogenase d) Phosphatase
190. Alcoholic fermentation takes place in the presence of
 a) Maltase b) Zymase c) Amylase d) Invertase
191. Which of these steps in Krebs' cycle indicates substrate level phosphorylation?
 a) Conversion of succinyl acid to α -ketoglutaric acid
 b) Conversion of succinic acid to malic acid
 c) Conversion of succinyl Co-A to succinic acid
 d) Conversion of malic acid to oxalo acetic acid

192. Identify A and B in the given reaction



- a) A-PEP; B-CO₂ b) A-Acetyl Co-A; B-CO₂
 c) A-CO₂; B-H₂O d) A-Acetyl Co-A; B-H₂O
193. In which one of the following reactions, oxidative Decarboxylation does not occur?
 a) Malic acid → Pyruvic acid b) Pyruvic acid → Acetyl Co-A
 c) Glyceraldehyde 3-phosphate → 1, 3-bisphosphoglycolysis acid d) α -ketoglutaric acid → Succinyl Co-A
194. Anaerobic respiration can occur
 a) Lower organism b) Higher plants and animals
 c) Both (a) and (b) d) None of the above
195. The three boxes in this diagram represent the three major biosynthetic pathways in aerobic respiration. Arrows represent net reactants or products



The numbered 2, 2, 6 can all be

- a) NADH b) ATP c) H₂O d) FAD² or FADH₂
196. The main purpose of electron transport chain is to
 a) Cycle NADH + H⁺ back to NAD⁺ b) Use the intermediate from TCA cycle
 c) Breakdown pyruvic acid d) All of the above
197. How many ATP are formed during the citric acid cycle?
 a) 12 b) 24 c) 32 d) 35
198. RQ is always less than one in
 a) Wheat b) Millets c) Bean d) Castor
199. In glycolysis from glucose to pyruvic acid involves more than seven reaction. Each individual reaction needs
 a) One molecule of ATP b) One molecule of ADP
 c) One molecule of NAD d) One molecule of specific enzyme
200. Which one is true for ATP?
 a) ATP is prosthetic part of an enzyme b) ATP is an enzyme
 c) ATP is organic ions of enzyme d) ATP is a coenzyme
201. Oxidative phosphorylation refers to
 a) Anaerobic production of ATP b) The citric acid cycle production of ATP
 c) Production of ATP by chemiosmosis d) Alcoholic fermentation
202. Which one is not correct about Krebs' cycle?

- a) It is also called citric acid cycle
- b) The intermediate compound which links glycolysis with Krebs' cycle is malic acid
- c) It occurs in mitochondria
- d) It starts with six carbon compound

203. Which specialised cell provides interconnectivity for air spaces?

- a) Parenchyma b) Chlorenchyma c) Sclerenchyma d) None of these

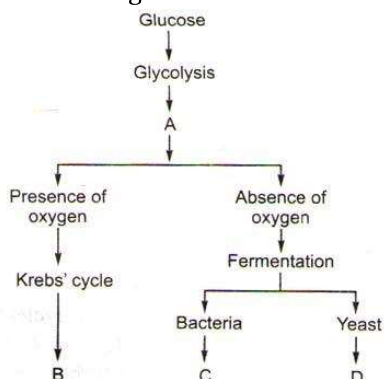
204. Steps of respiration are controlled by

- a) Substrates b) Enzymes c) Hormone d) Bile juice

205. The similarity between NAD^+ and NADP^+ is that

- a) Take up electron at a time b) Take up two protons at a time
- c) Take up two electrons at a time d) Give up one protons at a time

206. The following is a simplified scheme showing the fate of glucose during aerobic and anaerobic respiration. Identify the end products that are formed at stages indicated as A, B, C and D. identify the correct option from these given below.



- a) 1. Carbon dioxide and water, B- Pyruvic acid, C- Ethyl alcohol and carbon dioxide, D- lactic acid
- b) 1. Pyruvic acid, B- Carbon dioxide and water, C- Lactic acid , D- Ethyl alcohol and carbon dioxide
- c) 1. Pyruvic acid, B- Carbon dioxide and water, C- Ethyl alcohol and carbon dioxide, D- Lactic acid
- d) 1. Pyruvic acid, B- Ethyl alcohol and carbon dioxide, C- Lactic acid, D- Carbon dioxide and water

207. The process by which ATP is produced in the inner membrane of a mitochondrion, the electron transport system transfers protons from the inner compartment to the outer, as the protons flow back to the inner compartment, the energy of their movement is used to add phosphate to ADP, forming ATP is

- a) Chemiosmosis b) Phosphorylation c) Glycolysis d) Fermentation

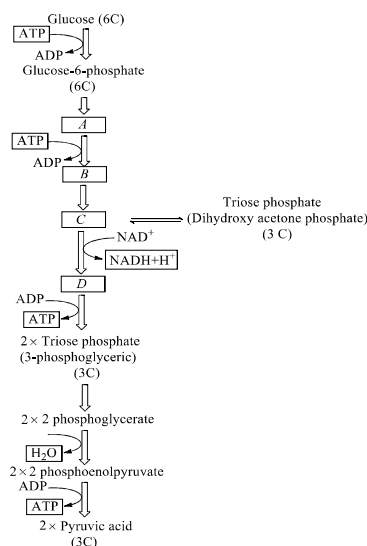
208. The haem protein complexes, which act as oxidizing agents are known as

- a) Haemoglobin b) Myoglobin c) Chlorophyll d) Cytochrome

209. If RQ is 0.6 in a respiratory metabolism, it would mean that

- a) Carbohydrates are used as respiratory substrate b) Organic acids are used as respiratory substrate
- The oxidation of the respiratory substrate
- c) consumed more oxygen than the amount of CO_2 released d) The oxidation of respiratory substrate consumed less oxygen than the amount of CO_2 released

210. The flowchart given below shows the steps in glycolysis. Select the option that correctly fills in the missing steps A, B, C and D



- a) A-Fructose-6-phosphate, B-Fructose-1, 6-biphosphate, C-3-PGAL, D-1, 3-biphosphoglyceric acid
 b) A-Fructose-1, 6-biphosphate, B-3-PGAL, C-1, 3-biphosphoglyceric acid, D-3-PGA
 c) A-3-PGA, B-1, 3-biphosphoglyceric acid, C-3-PGAL, D-Fructose-1, 6-biphosphate
 d) A-Fructose-1, 6-biphosphate, B-Fructose-6-biphosphate, C-3-PGAL, D-1, 3-biphosphoglyceric acid
211. A scientist added a chemical (cyanide) to an animal cell to stop aerobic respiration. Which of the following is most likely to have been affected by this treatment?
 a) Active transport of substances across the plasma membrane
 b) Passive transport of substances across the plasma membrane
 c) Diffusion of substances across the plasma membrane
 d) The thickness of the plasma membrane
212. Wine and beer are produced directly by fermentation. Brandy and whisky require both fermentation and distillation because
 a) Fermentation is inhibited at an alcohol level of 10-18%
 b) Distillation prolongs storage
 c) Distillation improves quality
 d) Distillation purifies the beverage
213. For gaseous exchange plants have
 a) Stomata b) Lenticels c) Pores d) Both (a) and (b)
214. Citric acid cycle was discovered by
 a) Hans Krebs; 1937 b) Jon Mathai; 1937 c) Parna; 1936 d) Embeden; 1936
215. Vitamin-C was the first vitamin to be produced by a fermentation process using
 a) Penicillium b) E. coli c) Yersinia pestis d) Acetobacter
216. Net gain of ATP from one molecule of glucose in glycolysis, is
 a) 3 b) 6 c) 8 d) 2
217. In Krebs' cycle, GTP is formed in
 a) Oxidative phosphorylation b) Substrate level phosphorylation
 c) Photophosphorylation d) Decarboxylation
218. A competitive inhibitor of Succinic Dehydrogenase is
 a) Malonate b) Oxaloacetate c) α -ketoglutarate d) Malate
219. The net gain of ATP from complete oxidation of one molecule of glucose in eukaryote is
 a) 2 b) 4 c) 24 d) 36
220. Animals are
 a) Heterotrophic b) Autotrophic c) Both (a) and (b) d) None of these
221. During Kreb's cycle of ...A... NADH, ...B... ATP is produced through ETS in mitochondria. Choose, the correct pair from the option given below

- a) A-2; B-4 b) A-4; B-2 c) A-6, B-18 d) A-2; B-8
222. Product of glycolysis is
a) Citric acid
b) Dihydroxy acetone
c) Pyruvic acid
d) Phosphoenol pyruvate
223. Electron Transport System (ETS) occurs in
a) Inner mitochondrial membrane b) Outer mitochondrial membrane
c) Both (a) and (b) d) Not specific place
224. In aerobic respiration, citric acid cycle takes place in
a) Cytosol b) Mitochondria
c) Peroxisome d) Endoplasmic reticulum
225. If RQ is less than 1.0 in a respiratory metabolism, it would mean that
a) Carbohydrates are used as respiratory substrate
b) Organic acids are used as respiratory substrate
c) The oxidation of the respiratory substrate consumed more oxygen than the amount of CO₂ released
d) The oxidation of the respiratory substrate consumed less oxygen than the amount of CO₂ released
226. Calorie is the unit of
a) Sound b) Temperature c) Light d) Heat
227. Which of the following organism is useful in the preparation of Roquefort cheese?
a) Mucor b) Rhizopus c) Aspergillus d) Penicillium
228. What is the correct order of the stages of cellular respiration?
a) Krebs' – Electron – Glycolysis cycle transport chain
b) Electron – Krebs' cycle – Glycolysis transport chain
c) Glycolysis – Krebs' cycle – Electron transport chain
d) Glycolysis – Electron transport chain – Krebs' cycle
229. The term glycolysis has originated from the Greek word and
a) Glycos, lysis b) Glycol, analysis c) Glycerol, lysis d) Glycol, lysis
230. The organelle associated with aerobic respiration is
a) Chloroplast b) Centriole c) Nucleus d) Mitochondria
231. Incomplete breakdown of sugar in anaerobic respiration forms
a) Glucose and carbon dioxide b) Alcohol and carbon dioxide
c) Water and carbon dioxide d) Fructose and water
232. The total energy trapped per gm mole of glucose is 1292 kJ with an efficiency of
a) 35% b) 55% c) 45% d) 25%
233. Phase common in aerobic and anaerobic respiration is
a) Krebs' cycle b) Glycolysis c) Glycogenolysis d) ETS
234. Synthesis process in organism is also called
a) Catabolism b) Anabolism c) Both (a) and (b) d) None of these
235. Oxalosuccinic acid, an intermediary compound of Krebs' cycle is a
a) 5-carbon compound b) 6-carbon compound c) 4-carbon compound d) 3-carbon compound
236. Which of the following process takes place in mitochondria?
a) Photolysis b) Photophosphorylation
c) Carboxylation d) Oxidative phosphorylation
237. How much percentage of energy is released during lactic acid and alcoholic of fermentation?
a) 2 b) 9 c) 8 d) Less than 7
238. Calculation of ATP gain for every glucose is made on certain assumptions. Choose the correct option in accordance with the statement given above
a) The pathway functioning is sequential and orderly
b) One substrate forms the reactant for the others

- c) TCA cycle and ETS pathway follow one after another
d) All of the above
239. Sucrose is converted into
a) Glucose and fructose
b) Triose phosphate and pyruvic acid
c) Oxalic acid and citric acid
d) Citric acid and pyruvic acid
240. Which of the following respiratory substrates requires the highest number of oxygen molecules for its complete oxidation?
a) Tripalmitin
b) Triolein
c) Tartaric acid
d) Oleic acid
241. The metabolic pathway through which the electron passes from one carrier to another is called
a) Electron transport system
b) Electron procedure system
c) Electron moving procedure
d) None of the above
242. In which one of the following options, the two names refer to one and the same thing?
a) Citric acid cycle and Calvin cycle
b) Tricarboxylic acid cycle and urea cycle
c) Krebs' cycle and Calvin cycle
d) Tricarboxylic acid cycle and citric acid cycle
243. The complete combustion of glucose in respiration is represented by
a) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy}$
b) $C_6H_{12}O_6 + 6CO_2 \rightarrow +6O_2 + 6H_2O + \text{Energy}$
c) $C_6H_{12}O_6 + 6O_2 + 6CO_2 \rightarrow +6CO_2 + 6H_2O + \text{Energy}$
d) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + ATP \rightarrow 6CO_2 + 6H_2O + 6O_2 + \text{Energy}$
244. The overall goal of glycolysis, Krebs' cycle and the electron transport system is the formation of
a) ATP in small stepwise units
b) ATP in one large oxidation reaction
c) Sugars
d) Nucleic acids
245. In glycolysis, $NADH + H^+$ is formed from NAD, when
a) 3-phosphoglyceraldehyde (PGAL) is converted to 1, 3-bisphosphoglycerate (BPGA)
b) Triose phosphate is converted to 2-phosphoglycerate
c) 2-phosphoglycerate is converted to 2-phosphopyruvate
d) 2-phosphopyruvate is converted to 2-pyruvic acid