Respiration in Plants

I. Select the correct answer from the following questions:

Question 1.
Major fraction of CO_2 released during cellular respiration is transported in blood through the lungs in the form of
(a) Free CO_2
(b) HCO_3
(c) H_2 CO_3
(d) In combination with Hb CO_2

▼ Answer

Answer: (c) H_2 CO_3

Question 2.
Sudden deep inspiration is due to
(a) Increase in concentration of CO_2
(b) Increase in concentration of O_2
(c) Either increase in cone, of CO_2 or decrease in concentration of O_2
(d) Decrease in concertration of CO_2

▼ Answer

Answer: (a) Increase in concentration of CO_2

Question 3.
Fixing of CO_2 and liberation of oxygen in light is done with the help of
(a) chioroplast
(b) Mesophyll cells
(c) Mitocondria
(d) Chromatophores

▼ Answer

Answer: (a) Chioroplast

Question 4.
AH vegetation is only due to
(a) CO_2
(b) Water
(c) Oxygen
(d) Hydrogen

▼ Answer

Answer: (b) Water

Question 5.
Chioroplast DNA or ct DNA is
(a) Naked
(b) Circular
(c) Single stranded
(d) All of these

▼ Answer

Answer: (d) All of these

Question 6.
During synthesis of a glucose molecule, ATP and NADPH consumed are respectively
(a) 15 and 12
(b) 12 and 8
(c) 30 and 20
(d) 18 and 12

▼ Answer

Answer: (d) 18 and 12

Question 7.
Photorespiration takes place in
(a) Lvsosomes

(b) Peroxisomes
(c) Ribosomes
(d) Mitochondria

▼ Answer

Answer: (b) Peroxisomes

Question 8.
Chlorophyll 'a' is found in all
(a) Oxygen liberation photosvnthetic organisms
(b) Autotrophs
(c) Higher plants
(d) Algae

▼ Answer

Answer: (a) Oxygen liberation photosynthetic organisms

Question 9.
The atmosphere contains CO_2 by volume
(a) 0.1%
(b) 0.5%
(c) 0.03%
(d) 0.3%

▼ Answer

Answer: (c) 0.03 %

Question 10.
Green plants convert solar energy into chemical energy of organic matter was proved by
(a) Van Mayer
(b) Lavoisier
(c) Joseph Priestly
(d) Semebier

▼ Answer

Answer: (a) Van Mayer

Question 11.
Wastage of energy is associated with
(a) Glycolysis
(b) Photosynthesis
(c) Krebs cycle
(d) Photorespiration

▼ Answer

Answer: (d) Photorespiration

Question 12.
If a photosvnthesising plant releases oxygen containing more amount of lsO, it is concluded that the plant has been supplied with
(a) ^{18}O from $^{18}CO_2$
(b) ^{18}O from $^{18}CO_2$
(c) ^{18}O from $H_2\,^{18}O$
(d) .None of these

▼ Answer

Answer: (c) ^{18} O from $H_2\,^{18}O$

Question 13.
Carbon dioxide acceptor in C_3 plants is:
(a) RuBP
(b) RMP
(c) PGA
(d) PEP

▼ Answer

Answer: (a) RuBP

Question 14.
Photosynthetic process is completed in
(a) Chloroplasts
(b) Chlorophyll
(c) Chromatophores
(d) Mitochondria

▼ Answer

Answer: (a) Chloroplasts.

Question 15.
During synthesis of a glucose molecule, ATP and NADPH consumed are respectively
(a) 12 and 8
(b) 30 and 20
(c) 15 and 12
(d) 18 and 12

▼ Answer

Answer: (d) 18 and 12

Question 16.
First product of photorespiration is
(a) Glycolate
(b) Glycine
(c) Glvceine
(d) Phosphoglycolate

▼ Answer

Answer: (d) Phosphoglycolate

Question 17.
The breaking of the C-C bonds of complex compounds through oxidation within the cells, leading to release of considerable amount of energy is called
(a) respiration
(b) respiratory substrates
(c) Cellular respiration
(d) All of these

▼ Answer

Answer: (a) Respiration

Question 18.
The TCA cycle starts with the condensation of acetyl group with
(a) Oxaloacetic acid
(b) Water to yield citric acid
(c) (a) and (b) Both
(d) None of these

▼ Answer

Answer: (c) (a) and (b) Both

Question 19.
The metabolic pathway through which the electron passes from one carrier to another, is called the
(a) Electron transport system
(b) Complex I
(c) Complex II
(d) Complex IV

▼ Answer

Answer: (a) Electron transport system

Question 20.
NADH produced in the mitochondrial matrix during citric acid cycle are oxidised by an NADH dehydrogenase
(a) Complex I
(b) Complex II
(c) Complex III
(d) Complex IV

▼ Answer

Answer: (a) Complex I

Question 21.
The energy released during the electron transport system is utilised in synthesising ATP with the help of ATP synthase
(a) Complex III
(b) Complex IV
(c) Complex V
(d) None of these

▼ Answer

Answer: (c) Complex V

Question 22.
The ratio of the volume of CO_2 evolved to the volume of O_2 consumed in respiration is called the
(a) respiratory quotient
(b) amphibolic pathway
(c) catabolism
(d) anabolism

▼ Answer

Answer: (a) Respiratory quotient.

II. Fill in the blanks:

Question 1.
All the energy required for 'life' processes is obtained by oxidation of some macromolecules that we call ……

▼ Answer

Answer: Food

Question 2.
Green plants trap light energy and convert it into chemical energy that is stored in the bonds of carbohydrates like ……., …… and …….

▼ Answer

Answer: glucose, sucrose, starch

Question 3.
Animals are …… i.e. they obtain food form plants directly (herbivores) or indirectly (carnivores).

▼ Answer

Answer: heterotrophic

Question 4.
The compounds that are oxidised during this process are known as …….

▼ Answer

Answer: respiratory substrates

Question 5.
……., …… and ……. respire at rates far lower than are characteristic for animals.

▼ Answer

Answer: Root, stems, leaves

Question 6.
In stems, the '…….' cells are organised in thin layers in and beneath the bark.

▼ Answer

Answer: living

Question 7.
The complete ……. of glucose, which produces CO_2 and H_2O as end products, yields energy most of which is given out as heat.

▼ Answer

Answer: combustion

Question 8.
The scheme of glycolysis was given by …….. and J.Pamas, and is often referred to as the …….. pathway.

▼ Answer

Answer: Gustav Embden, Otto Meyerhof, EMP

Question 9.
……. are phosphorylated to give rise to glucose- 6-phosphate by the activity of the enzyme hexokinase.

▼ Answer

Answer: Glucose and fructose

Question 10.
ATP is utilised at two steps: first in the conversion of …… into glucose 6-phosphate and second in the conversion of …….. 6- phosphate to fructose 1, 6-diphosphate.

▼ Answer

Answer: glucose, fructose

Question 11.
These are …….. major ways in which different cells handle Pyruvic acid produced by glycolysis.

▼ Answer

Answer: three,

Question 12.
In fermentation, say by yeast, the incomplete oxidation of glucose is achieved under anaerobic conditions by sets of reactions where …… is converted to CO_2 and ethanol.

▼ Answer

Answer: Irrational

Question 13.
In a coupled reaction GTP is converted to GDP with the stimultaneous synthesis of …….. from ……

▼ Answer

Answer: ATP, ADP

Question 14.
When the electrons pass from one carrier to another via complex I to IV in the electron transport chain, they are coupled to ATP synthase (complex V) for the production of ……. from …… and ……..

▼ Answer

Answer: ATP, ADP, inorganic phosphate

Question 15.
…… is favoured substrate for respiration.

▼ Answer

Answer: Glucose

III. Mark the statement True (T) or False (F)

Question 1.
Saprophytes like fungi are dependent on green plant.

▼ Answer

Answer: False

Question 2.
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.

▼ Answer

Answer: True

Question 3.
Only during photosynthesis are large volumes of gases exchanged and each leaf is well adapted to take care of its own needs during these periods.

▼ Answer

Answer: True

Question 4.
In stems, the 'living' cells are organised in thin layers in and beneath the bark. They also have openings called lenticels.

▼ Answer

Answer: True

Question 5.
The combustion reaction requires carbon.

▼ Answer

Answer: False

Question 6.
Sucrose is converted into glucose and fructose by the enzyme invertase, and these two monosaccharides can readily enter the glycolytic pathway.

▼ Answer

Answer: True

Question 7.
For the complete oxidation of glucose to O_2 and CO_2, however, organisms adopt Kreb's cycle which is also called as aerobic respiration. This requires CO_2 supply.

▼ Answer

Answer: False

Question 8.
Yeasts poison themselves to death when the concentration of alcohol reaches about 25 percent.

▼ Answer

Answer: False

Question 9.
The complete oxidation of pyruvate by the stepwise removel of all the hydrogen atoms, leaving three molecules of CO_2.

▼ Answer

Answer: True

Question 10.
In the remaining steps of citric acid cycle, succinyl-CoA is oxidised to OAA allowing the cycle to continue.

▼ Answer

Answer: True

Question 11.
The reduced ubiquinone (Ubiquinol) is than oxidised with the transfer of electrons to cytochrome C via cytochrome be complex (complex III).

▼ Answer

Answer: True

Question 12.
The F_1 headpiece is a peripheral membrane protein complex and contains the site for synthesis of ATP from ADP and inorganic phosphate.

▼ Answer

Answer: True

Question 13.
NADH is oxidised to NAD^- rather slowly in fermentation, however the reaction is very vigorous in case of aerobic respiration.

▼ Answer

Answer: True

Question 14.
Glycerol would enter the pathway after being conveted to PGAL.

▼ Answer

Answer: True

Question 15.
Pure proteins or fats are never used as respiratory substrates.

▼ Answer

Answer: True

IV. Match the items of column I with the items of column II

Column I	Column II
(a) Plants require O_2 for respiration to occur	1. TCA
(b) Breakdown of glucose to Dyruvic acid is	2. Converted into DPGA.
(c) PGAL is oxidised and with inorganic phosphate to get	3. inadequate for cellular respiration pyruvic acid is reduced to lactic acid by locate dehydrogenase.
(d) Pyruvic acid is then the key product	4. and they also give out CO_2
(e) In animal cells also, like muscles during exercise, when oxygen is	5. NADH + H^+ and $FADH_2$
(f) Aerobic respiration	6. called glycolysis
(g) Pyruvate is transported from the cytoplasm into the mitochondria.	7. oxidative phosphorylation.
(h) Tricarboxylic acid cycle	8. of glycolysis.
(i) Citrate is then isomerised to isocitrate	9. through which protons cross the inner membrane
(j) In the respiratory process are to release and utilise the energy stored in	10. The NADH synthesised in glycolysis is transferred into the mitochondria and under-goes oxidative phosphorylation.
(k) In respiration it is the energy of oxidation-reduction utilised for the same process.	11. Aerobic respiration
(l) F0 is an integral membrane protein complex that form the channel	12. is the process that leads to a complete oxidation of organic sub-stances in the presence of oxygen, and releases CO_2
(m) The respiratory balance sheet	13. It is followed by two successive steps of decarboxylation, leading to the formation of α -ketoglutaric acid then succinvI-CoA
(n) Glycerol would enter the pathway after being converted to	14. PGAL
(o) RQ +	15. Volume of CO_2 evolved

▼ Answer

Answer:

Column I	Column II
(a) Plants require O₂ for respiration to occur	4. and they also give out CO₂
(b) Breakdown of glucose to Dyruvic acid is	6. called glycolysis
(c) PGAL is oxidised and with inorganic phosphate to get	2. Converted into DPGA.
(d) Pyruvic acid is then the key product	8. of glycolysis.
(e) In animal cells also, like muscles during exercise, when oxygen is	3. inadequate for cellular respiration pyruvic acid is reduced to lactic acid by locate dehydrogenase.
(f) Aerobic respiration	12. is the process that leads to a complete oxidation of organic sub-stances in the presence of oxygen, and releases CO_2
(g) Pyruvate is transported from the cytoplasm into the mitochondria.	11. Aerobic respiration
(h) Tricarboxylic acid cycle	1. TCA
(i) Citrate is then isomerised to isocitrate	13. It is followed by two successive steps of decarboxylation, leading to the formation of α -ketoglutaric acid then succinvI-CoA
(j) In the respiratory process are to release and utilise	5. NADH + H^+ and $FADH_2$

the energy stored in	
(k) In respiration it is the energy of oxidation-reduction utilised for the same process.	7. oxidative phosphorylation.
(l) F_0 is an integral membrane protein complex that form the channel	9. through which protons cross the inner membrane
(m) The respiratory balance sheet	10. The NADH synthesised in glycolysis is transferred into the mitochondria and under-goes oxidative phosphorylation.
(n) Glycerol would enter the pathway after being converted to	14. PGAL
(o) RQ +	15. Volume of CO_2 evolved