MUHAMMED

Department of Theoretical and Applied Biology
Kwame Nkrumah University of Science and Technology
BIOL 354 Plant Metabolism – Quiz

QUIZ 1: PLANT METABOLISM: PHOTOSYNTHESIS; DICOVERY AND PROCESS

INDEX NUMBER: 1484407

ANSWER ALL QUESTIONS

25th February 2010

Time allowed: 10 minutes

State whether the following statements are TRUE or FALSE

1. Autotrophs are able to use external sources of energy in the synthesis of their inorganic food materials. ....False....
2. $NADPH_2$ and ADP are produced by photophosphorylation. ....True....
3. The chemical energy from light converts CO_2 and H_2O into energy rich molecules. ....False....
4. Jan Ingenhousz experiment demonstrated that light and CO_2 are needed to make O_2. ....False.... – True
5. Each molecule of photosynthetic pigment absorbs wavelengths across the entire electromagnetic spectrum. ....False....
6. The role of ATP in photosynthesis was formulated in 1943 ....
7. Chlorophyll d is green because it reflects green light. ....True....
8. Johannes Baptista van Helmont experiment of water as extra mass of plants was put to test by Jan Ingenhousz. ....True....
9. The thylakoids are contained in the chlorophyll membrane which is the site of the light reactions. ....False....
10. The structure of chlorophyll was determined by Robin Hill. ....True....
11. Carotenoids absorb light in the blue-violet and green regions. ....True....
12. The greenish-blue chlorophyll a has more hydrogen than the yellow-green chlorophyll b. ....False....
13. Approximately 20% of the radiant energy that reaches the leaf is not absorbed. ....True....
14. Carotenoids are yellow to orange and red because they are usually masked by the chlorophylls. ....False....
15. In photosynthesis blue light is absorb much more than red light. ....True....

Serious

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BIOL: 354 Plant Metabolism – Quiz

QUIZ 1: PLANT METABOLISM: PHOTOSYNTHESIS; DICOVERY AND PROCESS

INDEX NUMBER: 2197405 2177405

21st February 2011

ANSWER ALL QUESTIONS

Time allowed: 10 minutes

State whether the following statements are TRUE or FALSE

1. Autotrophs obtain inorganic source of carbon by breaking down substances obtained from other organisms. ...False...
2. NADH(H_2) and ATP are produced by non-cyclic photophosphorylation. ...True... False
3. Carbon dioxide is approximately 0.39% of the earth's atmosphere. ...False... 0.039%
4. Jan Ingenhousz experiment demonstrated that light and H_2O are needed to make O_2 ... False
5. Each molecule of photosynthetic pigment absorbs photons across the entire electromagnetic spectrum. ...False... a narrow range
6. The role of ATP in photosynthesis was formulated in 1943. ...True... by Samuel Reuben.
7. Chloroplast was isolated by Robin Hill. ...True...
8. Approximately 80% of the radiant energy that reaches the leaf is absorbed. ...False...
9. High energy photons have shorter than long wavelengths. ...True...
10. Light is required for the light dependent reactions because it is the source for electrons. ...true...
11. Unlike chlorophyll *a* and *b* the carotenoids do not absorb wavelength between 600 and 700nm. ...True...
12. The light-dependent reactions can occur only in the light. ...False... True
13. Plants produce O_2 gas by reducing H_2O. ...False...
14. The phosphate radical that add to ADP comes from the protein complexes. ...False...
15. In non-cyclic photophosphorylation photosystem 1 (PS1) transfers electron to ferredoxin and then to plastoquinone. ...True... False
16. The electrons lost by the hydroxyl radicals replace the electron expelled by photosystem II. ...False...
17. Chlorophyll is green because it absorbs in the red and blue regions of the spectrum. ...True...

F.A.D.B

ATP and $NADPH_2$ are produced in the non cyclic photophosphorylation

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QUIZ 1: PLANT METABOLISM: PHOTOSYNTHESIS; DICOVERY AND PROCESS

INDEX NUMBER: 3856009 Amonoo Samuel

ANSWER ALL QUESTIONS

20th February 2012

Time allowed: 15 minutes

State whether the following statements are TRUE or FALSE

1. Autotrophs obtain inorganic source of carbon by fixing CO_2 in the light-independent reactions. False
2. Anabolism is the synthesis of complex organic substances from simple inorganic substances releasing energy. False
3. Stacks of thylakoids are known as granum. False
4. The earth's atmosphere contains approximately 20.039% of CO_2 and O_2. True
5. Jan Ingenhousz experiment demonstrated that light and CO_2 are needed to make O_2. True
6. Each molecule of photosynthetic pigment absorbs wavelengths across the entire electromagnetic spectrum. False
7. Johannes Baptista van Helmont experiment of H_2O as extra mass of plant was put to test by Jan Ingenhousz. False
8. Radiant energy from light converts CO_2, H_2O and chlorophyll into energy rich molecules. False
9. The yellow-green chlorophyll *b* has more oxygen than the bluish-green chlorophyll *a*. False True
10. The light-dependent reactions can also occur in the dark. False
11. When H_2O molecules are split they are actually reduced. false
12. The electrons lost by the hydroxyl ions replace the electron expelled by photosystem 1. True
13. The process of photosynthesis occurs in the chlorophyll. false
14. Oxygen is an unwanted by-product of the process of photosynthesis. True
15. Green light that is reflected is within the visible light range of 390 and 780 nanometres. True
16. Photosynthesis is a reduction-oxidation process and not an oxidation-reduction process. False
17. In cyclic photophosphorylation chemical energy is stored in two molecules of ATP. True
18. Carotenoids absorb light in the 390 to 500 nanometres region of the electromagnetic spectrum. True
19. Unlike non-cyclic photophosphorylation plastoquinone accepts electrons from ferredoxin in cyclic photophosphorylation. True
20. In photosynthesis blue light is absorbed much more than red light. True

E.J.D.B

Decreasing λ
ROYGBIV
PS I → PQ → Cyt b → PC →

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BIOL 354 Plant Metabolism – Quiz

QUIZ 1: PLANT METABOLISM: PHOTOSYNTHESIS; DISCOVERY AND PROCESS

INDEX NUMBER: 4981610

25th February 2013

ANSWER ALL QUESTIONS

Time allowed: 15 minutes

State whether the following statements are TRUE or FALSE

1. Autotrophs are able to convert external sources of energy during anabolism of inorganic food materials. false
2. In his experiments Woodward measured the water consumed by plants over as many as 77 days. True
3. The experiment demonstrating that green plants can replenish stale or oxygen-poor air, capable of supporting combustion and respiration was conducted in 1771. True by Joseph priestly
4. Woodward experiments disapprove the hypothesis that water is the nutrient used by plants. True
5. Jan Ingenhousz was the first to distinguish systematically between the principles of assimilation and dissimilation. ~~True~~ False (Theodore Nicholas)
6. The light harvesting complex absorbs wavelengths across the entire electromagnetic spectrum. False
7. In 1915 Richard Willstätter determined the overall structure of chlorophyll recognizing that there are two major types of chlorophyll in land plants. True False it was in 1913
8. Chloroplasts were successfully isolated in 1937. True by Robin Hill
9. Photons are major light absorbing pigments of photosynthesis. False
10. Chlorophyll contains a coenzyme and an apoenzyme portion. false
11. Approximately 20% of the visible light that reaches a leaf is absorbed. False (80%)
12. The colour of light least effective in driving photosynthesis is green. True
13. The process of photosynthesis occurs in the lumen of the thylakoid. False (membrane)
14. The general reaction of photosynthetic photolysis can be given as: H_2A + 2 photons (light) → 2e- + $2H^+$ + OA True
15. Phycobilins are accessory photosynthetic pigments in plants. False — not found in plants
16. In PS1 the reaction-centre molecules P_{680} stands for the peaks in the absorption spectra of light waves at 680 nm. False
17. In cyclic photophosphorylation chemical energy is stored in two molecules of ADP. False (ATP)
18. About 99% of the water that is absorbed by plants is used in photosynthesis. False
19. Unlike non-cyclic photophosphorylation, cyclic photophosphorylation occurs during the dark reactions. False
20. Approximately 60% of the radiant energy the earth receives from the sun is invisible light. True

E.J.D.B

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Kwame Nkrumah University of Science and Technology
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PLANT METABOLISM: PHOTOSYNTHESIS; DISCOVERY AND PROCESS

INDEX NUMBER: 6084111

17th February 2014

ANSWER ALL QUESTIONS

Time allowed: 15 minutes

State whether the following statements are TRUE or FALSE

1. Autotrophs obtain organic source of carbon by synthesizing inorganic food materials during catabolism. ..False..
2. Jan Ingenhousz experiment demonstrated that light and H_2O are needed to make O_2. ..False..
3. John Woodward hypothesis that water was the source of extra mass in plants was put to test by Van Helmont. ..False..
4. The experiment demonstrating that green plants can replenish oxygen-poor air, capable of supporting combustion was conducted by John Priestly. ..False..
5. The role of ATP in photosynthesis was formulated in 1943. ..True..
6. Chlorophyll was successfully isolated in 1937. ..False..
7. The overall equation of of photosynthesis was worked out by Julius von Sachs. ..True..
8. Approximately 60% of the light that reaches the leaves is nonvisible. ..True..
9. Photon is an electromagnetic radiation having both wavelength and particle. ..False..
10. Coenzyme is the inactive protein component of an enzyme. ..True..
11. All of the photosynthetic pigments have the same absorption spectrum. ..False..
12. If all visible wavelengths are reflected an object will appear white. ..True..
13. Radiant energy from light converts CO_2, H_2O and Chlorophyll into energy rich molecules. ..False..
14. Carotenoids are usually red, orange or yellow because they are masked by the chlorophylls. ..True..
15. Phycobilins reflect blue light. ..True..
16. In PS1 the reaction-centre molecule P_{700} stands for the wavelength of maximum light absorption by the pigment molecule. ..False..
17. In non-cyclic photophosphorylation the primary electron acceptor of electron from PS1 is ferredoxin. ..True..
18. Electron deficiency in PS11 is filled by electron from hydroxyl ions during photolysis. ..True..
19. The phosphate radical that adds to ADP comes from the cytochrome complex ..False..
20. NADP+ reductase provide the proton that stabilizes NADP+ in forming NADPH ..True..

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Undergraduate

QUIZ 1: PLANT METABOLISM: CONCEPTS, PHOTOSYNTHESIS: DISCOVERY AND PROCESS

INDEX NUMBER: 209144 05

30th March 2022

ANSWER ALL QUESTIONS

Time allowed: 10 minutes

State whether the following statements are TRUE or FALSE

1. Autotrophs are able to manufacture their own food. True ✓
2. ATP and NADPH are generated by photophosphorylation. True
3. The electron from photolysis go through the antenna pigments and enters the reaction centre. False
4. The chemical energy from light convert CO_2 and H_2O into energy rich molecules. True (ATP & NADPH2)
5. Johannes Baptista van Helmont experiment of water as extra mass of plant was put to test by Jan Ingenhousz. False
6. Each molecule of photosynthetic pigment absorbs wavelengths across the entire electromagnetic spectrum. False
7. The structure of chlorophyll was determined by Robin Hill. Richard Willstatter 1913
8. Carotenoids are green because they reflects green light. False
9. Oxygen is a by product of cyclic photophosphorylation. non-cyclic
10. The thylakoids are contained in the chlorophyll membrane which is the site of the light reactions. chloroplast
11. The earth's atmosphere contains approximately 0.39% carbon dioxide. 0.039%
12. Non-cyclic photophosphorylation can also be referred to as non-linear process False linear

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QUIZ 1: PLANT METABOLISM: PHOTOSYNTHESIS: DISCOVERY AND PROCESS

INDEX NUMBER:.....2439014.....

15th February 2017

ANSWER ALL QUESTIONS

Time allowed: 15 minutes

State whether the following statements are TRUE or FALSE

1. Autotrophs are able to convert external sources of energy during anabolism of inorganic food materials. TRUE
2. In his experiments Woodward measured the water consumed by plants over as many as 77 days. TRUE
3. The experiment demonstrating that green plants can replenish stale or oxygen-poor air, capable of supporting combustion and respiration was conducted in 1771. TRUE
4. Woodward experiments disapprove the hypothesis that water is the nutrient used by plants. TRUE
5. Jan Ingenhousz was the first to distinguish systematically between the principles of assimilation and dissimilation. FALSE
6. The light harvesting complex absorbs wavelengths across the entire electromagnetic spectrum. FALSE
7. In 1915 Richard Willstätter determined the overall structure of chlorophyll recognizing that there are two major types of chlorophyll in land plants. FALSE
8. Chloroplasts were successfully isolated in 1937. TRUE
9. Photons are major light absorbing pigments of photosynthesis. FALSE
10. Chlorophyll contains a coenzyme and an apoenzyme portion. TRUE
11. Approximately 20% of the visible light that reaches a leaf is absorbed. FALSE
12. The colour of light least effective in driving photosynthesis is green. TRUE
13. The process of photosynthesis occurs in the lumen of the thylakoid. FALSE
14. The general reaction of photosynthetic photolysis can be given as: $H_2A + 2$ photons (light) $\rightarrow 2e^- + 2H^+ + O$. FALSE
15. Phycobilins are accessory photosynthetic pigments in plants. FALSE
16. In PS1 the reaction-centre molecules P_{680} stands for the peaks in the absorption spectra of light waves at 680 nm. FALSE
17. In cyclic photophosphorylation chemical energy is stored in two molecules of ADP. FALSE
18. About 99% of the water that is absorbed by plants is used in photosynthesis. FALSE
19. Unlike non-cyclic photophosphorylation, cyclic photophosphorylation occurs during the dark reactions. FALSE
20. Approximately 60% of the radiant energy the earth receives from the sun is invisible light. TRUE

E.J.D.B

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BIOL: 354 Plant Metabolism – Quiz

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QUIZ 1: PLANT METABOLISM: PHOTOSYNTHESIS; DICOVERY AND PROCESS

INDEX NUMBER: 4526915

ANSWER ALL QUESTIONS

15th February 2018

Time allowed: 15 minutes

State whether the following statements are TRUE or FALSE

1. During catabolism, autotrophs are able to convert light energy to chemical energy. False
2. The chemical energy from light converts CO_2 and H_2O into energy rich molecules. False
3. The earth's atmosphere contains approximately 20.039% of CO_2 and O_2. True
4. Jan Ingenhousz experiment demonstrated that light and CO_2 are needed to make O_2. True
5. Each molecule of photosynthetic pigment absorbs light across the entire electromagnetic spectrum. False
6. The role of ATP in photosynthesis was formulated in 1943. True
7. The structure of chlorophyll was determined by Robin Hill. False
8. Approximately 80% of the radiant energy that reaches the leaf is absorbed. False
9. High energy photons have shorter than long wavelengths. True
10. Thylakoids are contained in the chlorophyll membrane which is the site of the light reactions. False
11. Unlike chlorophyll *a* and *b* the carotenoids do not absorb light between 600 and 700nm. True
12. The light-dependent reactions can occur only in the light. True
13. Plants produce O_2 gas by the oxidation of H_2O. True
14. The phosphate radical that add to ADP comes from the protein complexes. false
15. In non-cyclic photophosphorylation, (PS1) transfers electron to Ferredoxin via Iron sulphide. True
16. The electrons lost by the hydroxyl radicals replace the electron expelled by photosystem II. False
17. Chlorophyll is green because it absorbs in the red and blue regions of the spectrum. False ×
18. Carotenoids absorb light in the blue-violet and green regions. False ×
19. In photosynthesis blue light is absorb much more than red light. True
20. The electron from photolysis go through the antenna pigments and enters the reaction centre. True ×

E.J.D.B

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QUIZ 1: PLANT METABOLISM: PHOTOSYNTHESIS; DICOVERY AND PROCESS

INDEX NUMBER: 4465518

ANSWER ALL QUESTIONS

10th June 2021

Time allowed: 15 minutes

State whether the following statements are TRUE or FALSE

1. When H_2O molecules are split during photolysis, they are actually reduced. False
2. Approximately 80% of the radiant energy that reaches the leaf is absorbed. True
3. Light dependent reactions manufacture NADP. ~~True~~ False
4. Thylakoids are contained in the chlorophyll membrane which is the site of the light reactions. False
5. Protons are transported through the thylakoid membrane for chemiosmotic synthesis of ATP. True
6. The light-independent reactions do not require the presence of light. True
7. Carotenoids are orange because they reflect green light. False
8. During the process of cyclic photophosphorylation O_2 is released in the lumen of thylakoid. False
9. The electrons lost by the hydroxyl ions replace the electron expelled by photosystem II. True
10. In photosynthesis red light is absorb much more than blue light. False
11. Autotrophs are able to convert light energy to chemical energy during anabolism. False
12. The earth's atmosphere contains approximately 0.039% of CO_2. True
13. The overall structure of chlorophyll was determined by Richard Willstätter. True
14. Theodor Wilhelm Engelmann showed that the light reactions, occur within the chloroplasts. True
15. Jan Ingenhousz experiment demonstrated that light and CO_2 are needed to make O_2. True
16. Samuel Ruben formulated the role of ATP in photosynthesis in 1943. True
17. The bluish-green Chlorophyll a has more oxygen than the yellow-green Chlorophyll b. False
18. Unlike the chloroplast, the chlorophyll has a double membrane. False
19. Each molecule of photosynthetic pigment absorbs wavelengths across the entire electromagnetic spectrum. False
20. If all the light wavelengths are absorbed the object will appear black. True

E.J.D.B

ANSWER ALL QUESTIONS

15th July 2022

Time allowed: 11 minutes

State whether the following statements are TRUE or FALSE

1. Approximately 40% of the radiant energy that reaches the leaf is absorbed. ....False.....
2. As a pigment chlorophyll is quite analogous to haemoglobin in that it carries oxygen. ..False.....
3. Carotenoids are orange because they reflect green light. .....False.....
4. Chemical energy from light converts CO_2 and H_2O into energy rich molecules. ...False.....
5. During the process of cyclic photophosphorylation ATP and O_2 are released. ..False.....
6. Each pigment molecule can absorb light at only one wavelength of the visible spectrum. ...False.....
7. If all the light wavelengths are absorbed the object will appear black. ...True.....
8. In photosynthesis red light is absorb much more than blue light. ...False.....
9. In the chloroplast grana are connected by chlorophyll molecules. ...False.....
10. Jan Ingenhousz experiment demonstrated that light and CO_2 are needed to make O_2. .....True.....
11. Plants are the only autotrophs that carry out photosynthesis. ....False.....
12. Samuel Ruben formulated the role of ATP in photosynthesis in 1943. .....True.....
13. The bluish-green Chlorophyll a has more oxygen than the yellow-green Chlorophyll b. ..False.....
14. The earth's atmosphere contains approximately 0.39% of CO_2. .....False.....
15. The least favourite colour of plants is green. .....False.....
16. The light-dependent reactions do not require the presence of light. ...False.....
17. The reflective colour of sunlight is colourless. ..False.....
18. The role of ATP in photosynthesis was formulated in 1953. ...false.....
19. The structure of chlorophyll was determined by Robin Hill. .....False.....
20. Thylakoids are contained in the chlorophyll membrane which is the site of the light reactions. .....false.....
21. Unlike the chloroplast, the chlorophyll has a double membrane. ...false.....
22. Visible light is white and it's a mixture of colours. ...True.....