Assignment 9

The due date for submitting the assignment is 2023-03-04, 23:59:00 IST.

As per our records, you have not submitted this assignment.

MARCH 1

1. Which of the following statements is TRUE?
   - A) Ribulose-1,5-bisphosphate is an acceptor of CO₂.
   - B) Ribulose-1,5-bisphosphate is an acceptor of CO₂.
   - C) Ribulose-1,5-bisphosphate is an acceptor of CO₂.
   - D) Ribulose-1,5-bisphosphate is an acceptor of CO₂.

   Answer: A

MARCH 2

2. What is the correct reaction between ribulose-1,5-bisphosphate and glyceraldehyde-3-phosphate in the Calvin cycle?
   - A) Ribulose-1,5-bisphosphate + glyceraldehyde-3-phosphate → 3-phosphoglycerate
   - B) Ribulose-1,5-bisphosphate + glyceraldehyde-3-phosphate → 1,3-bisphosphoglycerate
   - C) Ribulose-1,5-bisphosphate + glyceraldehyde-3-phosphate → 2-phosphoglycerate
   - D) Ribulose-1,5-bisphosphate + glyceraldehyde-3-phosphate → 3-phosphoglycerate

   Answer: A

MARCH 3

3. In the Calvin cycle, which of the following molecules is released as a product of the reaction between ribulose-1,5-bisphosphate and glyceraldehyde-3-phosphate?
   - A) Oxygen
   - B) Carbon dioxide
   - C) Phosphoglycerate
   - D) Carbon monoxide

   Answer: C

MARCH 4

4. Identify the reactants in the following reaction:
   - A) Diphosphoglycerate + ribulose-1,5-bisphosphate + glyceraldehyde-3-phosphate
   - B) 2-phosphoglycerate + ribulose-1,5-bisphosphate + glyceraldehyde-3-phosphate
   - C) 3-phosphoglycerate + ribulose-1,5-bisphosphate + glyceraldehyde-3-phosphate
   - D) 1,3-bisphosphoglycerate + ribulose-1,5-bisphosphate + glyceraldehyde-3-phosphate

   Answer: C

MARCH 5

5. Which of the following are acceptors of CO₂ in the Calvin cycle?
   - A) Ribulose-1,5-bisphosphate
   - B) Ribulose-1,5-bisphosphate
   - C) Ribulose-1,5-bisphosphate
   - D) Ribulose-1,5-bisphosphate

   Answer: D

MARCH 6

6. Give two strategies to increase the flux through the Calvin cycle, which is the major pathway for carbon fixation in plants. Both strategies are highly beneficial to the plant kingdom.
   - A) Enhance carbon dioxide fixation by increasing the CO₂ concentration in the leaf's intercellular spaces.
   - B) Increase the activity of ribulose-1,5-bisphosphate carboxylase, the enzyme that catalyzes the fixation of CO₂.
   - C) Boost the supply of ATP and NADPH to the Calvin cycle to support CO₂ fixation.
   - D) Enhance the Calvin cycle's efficiency by improving the CO₂ fixation rates.

   Answer: A and C

MARCH 7

7. Which of the following molecules are substrates for carbon fixation in the Calvin cycle?
   - A) Carbon dioxide, Ribulose-1,5-bisphosphate, Glyceraldehyde-3-phosphate
   - B) Carbon dioxide, Ribulose-1,5-bisphosphate, Phosphoglycolate
   - C) Carbon dioxide, Ribulose-1,5-bisphosphate, 3-phosphoglycerate
   - D) Carbon dioxide, Ribulose-1,5-bisphosphate, 1,3-bisphosphoglycerate

   Answer: A

MARCH 8

8. The following molecules are used as substrates for the Calvin cycle's light-dependent reactions:
   - A) Diphosphoglycerate, 1,3-bisphosphoglycerate, 3-phosphoglycerate
   - B) Trehalose-6-phosphate, 1,3-bisphosphoglycerate, 3-phosphoglycerate
   - C) Ribulose-1,5-bisphosphate, 1,3-bisphosphoglycerate, 3-phosphoglycerate
   - D) 1,3-bisphosphoglycerate, 3-phosphoglycerate, 1,2-phosphoglycerate

   Answer: C

MARCH 9

9. The Calvin cycle is a light-dependent process that converts carbon dioxide into glucose. Which of the following statements is true?
   - A) The Calvin cycle requires light energy to function effectively.
   - B) The Calvin cycle is independent of light energy, operating even in darkness.
   - C) The Calvin cycle only functions during the day when light is available.
   - D) The Calvin cycle is an example of a thermodynamic process that does not require light energy.

   Answer: A

MARCH 10

10. The Calvin cycle's operation is highly efficient, with CO₂ fixation rates reaching up to 95% efficiency. Which of the following statements is correct?
    - A) The Calvin cycle's efficiency is primarily determined by the availability of light energy.
    - B) The Calvin cycle's efficiency is not affected by the availability of light energy.
    - C) The Calvin cycle's efficiency is limited by the availability of water and CO₂.
    - D) The Calvin cycle's efficiency is limited by the availability of ATP and NADPH.

    Answer: D

MARCH 11

11. The thermodynamic efficiency of the Calvin cycle, measured as the ratio of CO₂ assimilated to ATP and NADPH consumed, is typically around 0.94. Which of the following statements is true?
    - A) The Calvin cycle's efficiency is directly proportional to the availability of light energy.
    - B) The Calvin cycle's efficiency is independent of the availability of light energy.
    - C) The Calvin cycle's efficiency is limited by the availability of water and CO₂.
    - D) The Calvin cycle's efficiency is limited by the availability of ATP and NADPH.

    Answer: D

MARCH 12

12. Which of the following molecules is a substrate for the Calvin cycle's light-dependent reactions?
    - A) Glyceraldehyde-3-phosphate
    - B) Ribulose-1,5-bisphosphate
    - C) Phosphoglycerate
    - D) Trehalose-6-phosphate

    Answer: B

MARCH 13

13. Which of the following molecules is a product of the Calvin cycle's light-dependent reactions?
    - A) Trehalose-6-phosphate
    - B) Ribulose-1,5-bisphosphate
    - C) Phosphoglycerate
    - D) Glyceraldehyde-3-phosphate

    Answer: A

MARCH 14

14. Which of the following statements is true regarding the Calvin cycle's light-dependent reactions?
    - A) CO₂ is taken up directly by the cycle without prior conversion.
    - B) CO₂ is taken up by the cycle after being activated to a bicarbonate ion.
    - C) CO₂ is taken up by the cycle after being activated to a carbonate ion.
    - D) CO₂ is taken up by the cycle after being activated to a carbon dioxide molecule.

    Answer: B

MARCH 15

15. Which of the following molecules is a product of the Calvin cycle's light-dependent reactions?
    - A) Trehalose-6-phosphate
    - B) Ribulose-1,5-bisphosphate
    - C) Phosphoglycerate
    - D) Glyceraldehyde-3-phosphate

    Answer: A