

**MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE**  
**SEMESTER END THEORY EXAMINATION**

**B.Sc.(Hons.) Agriculture**

Semester	: III (New)	Term	: First	Academic Year	: 2022-23
Course No.	: BIOCHEM 231	Title	: Fundamentals of Plant Biochemistry and Biotechnology		
Credits	: 3(2+1)				
Day & Date	: Wednesday, 01.02.2023	Time	: 09:00 to 12:00 hrs.	Total Marks	: 80

- Note :**
1. Solve ANY EIGHT questions from SECTION 'A'.
  2. All questions from SECTION 'B' are compulsory.
  3. All questions carry equal marks.
  4. Draw neat diagram wherever necessary.

**SECTION 'A'**

- Q.1 a) Write the importance of biochemistry in the field of agriculture.  
b) What is nitrate assimilation? Explain the steps involved in nitrate assimilation.
- Q.2 a) Define enzymes. Explain Fischer's lock and key theory for mechanism of enzyme action.  
b) Define amino acids. Enlist the properties of amino acids.
- Q.3 a) What is  $\beta$ -oxidation of fatty acids? Explain the steps involved in biosynthesis of fatty acids.  
b) Enlist the general properties of enzymes and explain any two of them.
- Q.4 a) Write the structural components of RNA and DNA.  
b) Draw the cyclic structures of fructose and sucrose.
- Q.5 a) Define carbohydrates and classify oligosaccharides with suitable examples.  
b) What do you mean by Marker-assisted Breeding? Enlist its requirements.
- Q.6 a) Define proteins. Classify proteins on the basis of composition.  
b) Explain the steps involved in the preparatory phase of glycolysis.
- Q.7 a) Define biomolecules. Enlist the different biomolecules present in living organisms along with their properties.  
b) What is meant by micropropagation? Explain different stages of micropropagation.
- Q.8 a) What is somoclonal variation? What are the advantages and disadvantages of somoclonal variation?  
b) Define lipids. Classify lipids on the basis of chemical composition with suitable examples.
- Q.9 a) What do you mean by anther culture? Describe in detail its applications.  
b) Define photosynthesis. Describe Calvin cycle of photosynthesis.

**(P.T.O.)**

- Q.10 a) Define molecular marker. Classify different types of DNA markers.  
b) Draw the structure of water. Write chemical properties of water.

**SECTION 'B'**

Q.11 Define the following terms:

- |                         |                       |
|-------------------------|-----------------------|
| 1) Vector               | 2) Buffer solution    |
| 3) Plant tissue culture | 4) Free energy        |
| 5) Mutarotation         | 6) Allosteric enzymes |
| 7) Nucleotides          | 8) Rancidity          |

Q.12 Fill in the blanks:

- 1) Capacity of a cell to grow into an entire plant is known as \_\_\_\_\_.
- 2) PCR technique was invented by \_\_\_\_\_.
- 3) \_\_\_\_\_ is the powerhouse of energy in plant cell.
- 4) The calorific value of lipids is \_\_\_\_\_.
- 5) Two amino acids are joined together by \_\_\_\_\_ bond.
- 6) Deficiency of Vitamin \_\_\_\_\_ causes Scurvy.
- 7) \_\_\_\_\_ number of ATP are produced, when one molecule of acetyl CoA is oxidized through citric acid cycle.
- 8) When four different atoms or functional groups are bonded to single carbon atom in an organic molecule, the carbon atom is said to be \_\_\_\_\_.

