Time: 3 Hours **Marks: 100**

N.B. 1. All questions are compulsory.
2. Draw neat labelled diagrams wherever necessary.
3. All questions carry equal marks.
4. Use of simple calculator is allowed.

Q.1 Attempt any two **20**

a. Classify amino acids based on their R groups and explain chemical structures of any two amino acids from each group.
b. Describe the classification of carbohydrates in detail.
c. What is enzyme inhibition? Describe any two types of inhibition in detail.
d. Explain the mode & mechanism of enzyme action.

Q.2 Attempt any two **20**

a. What is role of Nitrate Reductase (NR) and Nitrogenase in Nitrogen fixation?
b. Explain the mechanism of assimilation of ammonia in higher plants.
c. Give the physiological effect and commercial applications of Gibberellins.
d. What are the physiological effects of Abscisic acid?

Q.3 Attempt any two **20**

a. What is the molecular basis of spontaneous mutation?
b. What are induced mutations? Describe the role of UV light and X rays in inducing mutation.
c. Explain Bateson and Punett's experiment on coupling and repulsion leading to linkage.
d. Construct a chromosome map from the given data:-

+ + + -	1370	+ + g -	185
v ct g -	1015	v ct + -	159
+ ct + -	249	+ ct g -	8
v + g -	254	v + + -	9

Q.4 Attempt any two **20**

a. Explain BLAST and its applications.
b. How does Phylogenetic analysis help in commenting on the evolution between organisms?
c. Explain how comparison of protein structure helps in function prediction.
d. What are homologs? How does their study help to distinguish between proteins?

Q.5 Write short notes on any four of the following **20**

a. Active sites and allosteric sites
b. Denitrification
c. Garrod's Hypothesis
d. Incomplete linkage
e. EMBL
f. SWISS PROT
