

Time: 3 Hours

Marks: 100

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw neat labelled diagrams wherever necessary.
4. Use of a simple, non-programmable calculator is allowed.

Q1. Answer any TWO of the following:

(20)

- A) What are Carbohydrates? Explain the structure of different aldose sugars studied by you.
- B) Define Proteins and describe their general structure. How are they classified?
- C) Compare and contrast the mechanisms of competitive and non-competitive inhibition in enzyme kinetics.
- D) What are enzymes? Classify them according to IUB classification citing suitable examples.

Q2. Answer any TWO of the following:

(20)

- A) Describe the structure and activity of Nitrogenase enzyme complex.
- B) Explain in detail the steps involved in the formation of root nodules.
- C) Write a note on the commercial applications & physiological effects of Cytokinins as growth regulators.
- D) Explain the role of Abscisic acid as a growth regulator.

Q3. Answer any TWO of the following:

(20)

- A) What are point mutations? Explain missense and nonsense mutations with examples.
- B) What are mutagens? Explain the role 5BU as a mutagen.
- C) Explain the molecular basis of PKU?
- D) Draw the map of three genes (sc s and v) showing the distance between all pairs of genes by finding out the correct gene order.

sc	s	v	314
+	+	+	280
+	s	v	150
sc	+	+	156
sc	+	v	46
+	s	+	30
sc	s	+	10
+	+	v	14

Q4. Answer any TWO of the following:

(20)

- A) Three varieties of wheat were sown in 4 plots each and the following yields in quintal per acre were obtained. Analyze with ANOVA whether the three varieties differ in yields or not.

A	B	C
8	7	2
4	5	5
6	5	4
7	3	4

(Tabulated F at 5% = 4.26)

B) Number of seeds (x) and length of pod (y) are given below. Calculate the **regression coefficient b**.

x	1	1	2	5	4	6	3	2	3	4
y	2.0	1.5	2.0	4.5	5.0	7.0	4.0	3.0	3.0	4.5

C) Albino rats were given a drug for 7 days. Their body weight was measured before and after exposure to the drug. Analyse whether the drug has any effect on body weight with the help of **paired t – test**.

	1	2	3	4	5	6	7	8	9	10
Before	110	115	102	98	112	110	97	120	102	110
After	109	116	100	95	108	112	98	115	98	111

(Tabulated t at 5% = 2.26)

D) In order to find effect of *Azolla* growth on rice yield, *Azolla* was grown in ten plots before rice planting. Ten similar plots were taken as control without *Azolla* growth. The yield of rice is given in the table. Verify with **unpaired t –test** whether there is effect of *Azolla* growth on rice yield.

	1	2	3	4	5	6	7	8	9	10
With	15.3	15.8	16.1	17.0	15.5	16.5	16.2	15.5	17.1	16.3
Without	14.5	13.8	15.9	13.9	14.8	14.9	15.2	15.0	14.1	13.7

(Tabulated t at 5% = 2.10)

Q5. Write short notes on any FOUR of the following:

(20)

- Km
- Saturated fatty acids
- Denitrification
- Commercial applications of Auxins
- Incomplete linkage
- UV light as a mutagen
- Degree of freedom in ANOVA
- Applications of t – test
