QP Code : 77077

(2½ Hours) [Total Marks : 75]

Note: 1) All questions are compulsory
2) Figures to the right indicate full marks.
3) Draw neat labelled diagrams wherever necessary.
4) Use of simple calculator is allowed.

1. Answer **any two** of the following 15
   a) Describe the structure and functions of nucleolus.
   b) Give an account of the structure of vacuole in plant cells. Add a note on its contents.
   c) What are giant chromosomes? Describe in detail the morphology of giant chromosomes.
   d) Describe in detail, the process of formation of "initiation complex" of translation in Prokarotes.

2. Answer **any two** of the following 15
   a) Define Osmosis. Explain its role in absorption of water in plants.
   b) What are macronutrients? Describe the source, functions and deficiency symptoms of **any two** macronutrients studied by you.
   c) Describe the anatomy of sieve tube elements and companion cells.
   d) Describe various internal factors affecting plant growth.

3. Answer **any two** of the following 15
   a) Define bioremediation. Discuss the principle involved in bioremediation
   b) What is bioaccumulation? Describe the process of bioaccumulation in an ecosystem.
   c) Explain biomagnification. Discuss the role of aquatic ecosystem in biomagnification.
   d) Define phytoremediation. Explain various processes involved in phytoremediation of metals.

4. Answer **any two** of the following 15

a) Experimental study of the effect of exposure of fish to sublethal concentrations of dichlorvos for 12 hours showed the following results pertaining to 0_2 consumption (mg/g/h). Analyse with paired t-test, the significance of exposure.

Fish No.

1	2	3	4	5	6	7	8	9	10

Before exposure

3.0	2.8	2.9	2.8	3.2	3.1	3.0	3.2	2.7	2.9

After exposure

2.6	2.5	2.6	2.4	2.8	2.5	2.5	2.7	2.5	2.6

(Tabulated t at $p<0.001 = 4.78$)

b) Two varieties of potato plants (variety A& B) yielded tubers as shown in the following table. Does the mean number of tubers of variety A significantly differ from that of variety B?
Analyse by unpaired t- test.

Tyber yielde, kg/plant

Variety A	Variety B
2.2	**2.8**
2.5	**2.5**
1.9	**2.7**
2.6	**3.0**
2.3	**3.1**
1.8	**2.3**
2.0	**2.4**
2.1	**3.2**
2.4	**2.5**
2.3	**2.9**

(Tabulated t at $p<0.001 = 3.92$)

c) Three different concentrations of IBA were given to check number of roots emerged from detached leaves. Test with ANOVA whether the three concentrations have identical effect on root emergence.

Number of roots

Conc. of IBA (ppm)

Replicates	10	20	30
1	5	7	4
2	4	9	3
3	6	8	5
4	5	10	3
5	6	9	4

(Tabulated t at $p \leq 0.001 = 13.0$)

d) Deduce the regression equation for the given data and calculate the value of y if x = 0.6

Hormone Solution (x)

0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

No. of roots emerged after 7 days (y)

1	3	4	6	8	5	6	5	6	6

5. Write short notes **any three** of the following : 15

(a) Degeneracy of Genetic code
(b) Imbibiton
(c) Donnan equilibrium
(d) Microbial population in bioremedication
(e) Biotransformation
(f) Applications of t - test
