Answer All Questions   Time Allowed: 02 Hours

1.

a) List the assumptions considered in Analysis of Variance.

b) In a study to determine the effect of diet on blood sugar, 36 persons were selected for their uniformity and randomly assigned to four diet groups A, B, C and D. The records of six subjects were lost due to a mishap. The data (blood sugar content) for the remaining cases are given below.

Perform an Analysis of Variance and find out whether the diet has any effect on blood sugar. (ml/100ml blood)

DIET			
A	B	C	D
18	19	31	29
20	18	32	31
21	21	28	30
24	23	30	33
23	22	32	35
25	24	33	34
25	20		32
23			34
			36

2. a) Explain the terms (a) Mean, (b) Standard deviation, and (c) standard error.

b) To estimate the number of daisy plants growing at two different locations, (sunny and shade) a circular frame was thrown down at random 50 times, and the number of plants in each locations so ringed were counted. These two distributions were obtained.

No. of plants ringed	0	1	2	3	4	5	6	7	Throws
Frequency (shade)	11	13	8	5	8	1	1	3	50
No. of throws (sunny)	36	7	4	2	1	0	0	0	50

1. Propose a null hypothesis to this experiment
2. Find the mean, variance, standard deviation, standard error for each population.
3. Is there any difference in the population density of daisy plant between these two locations? If so, explain the results in your own words.

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3. Explain the following terms:

(A)   (i) Law of product probability

(i) Degrees of freedom

(B)

(i)   Black hair in the guinea pig is dominant to white hair. In families of six offspring where both parents are heterozygous black, with what frequency would we expect to find (a) 3 whites and 2 blacks, (b) 2 whites and 4 blacks, (c) 1 white and 5 blacks, (d) all whites.

(ii)   The results of phenotypic analysis of 96 F_2 progeny is shown below:

Experiment	Phenotype-1	Phenotype-2
1	70	26

Calculate chi-square for the experiment assuming a (a) 3:1 ratio, (b) 13:3 ratio, (c) Which hypothesis is most consistent with the data?

4. a) Explain the term "Correlation Coefficient".

b) In an experiment to examine the effect of glucose concentration in the medium on linear growth of *Fusarium oxysporum* (a mould) the following results were obtained for a medium containing mineral nutrients plus glucose at 50mg l^{-1}.

Days from inoculation	3	5	7	9	11	13
Radius of colony (mm)	7.7	13.0	17.5	23.0	26.7	29.7

$$\sum y^2 = 2658.52 \qquad \sum x^2 = 454 \qquad \sum xy = 1097.4$$

1. Name the dependent/ independent variable.
2. Plot a scatter diagram.
3. Calculate the correlation coefficient and test its significant?
4. Predict the number of days that would take to reach a colony size of 20 mm, using the regression equation.
5. Predict the approximate colony size on day 6.
6. Explain the results.