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J-3033[S-33]

[2037]

B.Sc. (Bio - Informatics) (Semester - 2nd)

BIO - STATISTICS (B.Sc. BI - 201)

Time : 03 Hours

Maximum Marks : 75

Instruction to Candidates:

- 1) Section - A is **compulsory**.
- 2) Attempt any **Nine** questions from Section - B.

Section - A

Q1)

(15 × 2 = 30)

- a) Write short note on importance of statistics in Bio-informatics.
- b) It is intended to compare the variability of height of individuals with the weight of individuals. Which measure you will use and why.
- c) Describe the procedure to determine 'Mean Deviation'.
- d) Define logarithm and hence find log of 32 to the base $\sqrt{2}$.
- e) State different properties of logarithm.
- f) Define probability and state its properties.
- g) Define mutually exclusive events and Independent events and classify the concept with suitable examples.
- h) State the laws of probability and elaborate it with suitable examples.
- i) State the assumptions of analysis of variance.
- j) State the conditions for the use of Chi-square test.
- k) Give the advantages and disadvantages of factorial experiments.
- l) Define 'main effect' and 'interaction effect'.
- m) Give the relationships between correlation coefficient and regression coefficients.
- n) Write short note on the method of least squares.
- o) Define the terms
stimulus, subject, Dose and Response as used in Bio-assay.

P.T.O.

Section - B

(9 × 5 = 45)

Q2) Find the value of $2 \log \frac{5}{3} - \log \frac{7}{4} + 2 \log 3 + \frac{1}{2} \log 49$
(Base = 10)

Q3) Describe the procedure of analysis of variance of one-way classification.

Q4) A box contains 6 red, 4 white and 5 black balls. Four balls are drawn at random. Find the probability that amongst the balls drawn, there is at least one ball of each colour.

Q5) The percentage of marks obtained in a course and the percentage of attendance of ten randomly selected students were

Student	1	2	3	4	5	6	7	8	9	10
% marks obtained	70	82	84	75	67	61	74	65	78	64
% attendance	85	93	96	90	75	72	88	70	91	65

Find the simple regression equation of % marks obtained on % attendance.

Q6) Describe any one method of bio-assay.

Q7) Given below are the observations on 5 strains of wheat at 4 locations.

Strain	Location			
	I	II	III	IV
A	24	15	20	21
B	20	12	18	18
C	30	20	25	27
D	22	14	20	19
E	27	21	24	26

Test, if all the strains are equivalent.

Q8) In a right angled triangle, the lengths of the sides containing the right angle are 'a' and 'b'. With mid-points of each side as the centre, three semi-circular areas are drawn outside the triangle. Find the total area, enclosed.

Q9) A rectangular reservoir is 54m x 10m x 10m. An empty pipe, of circular cross-section, is of radius 3cms; and the water runs through the pipe at 20m per second. Find the time, the empty pipe will take to empty the reservoir full of water.

Q10) The frequency distribution of expenditure, on the previous day, on a particular food item by the families in a locality was as follows :

Expenditure (Rs.)	3	4	5	6	7	8	9	10	11	12	13
No. of families	2	9	11	14	20	25	24	23	20	16	6

Find its coefficient of variation.

Q11) Use Fisher's exact test to test the effectiveness of inoculation Vs. Not-inoculation, on the basis of following summarised results of independent samples.

	Inoculated	Not-inoculated
Died	1	6
Survived	7	2

Q12) A random sample of 150 farmers was categorised with respect to farm size and the extent of mechanisation as follows :

		Extent of Mechanisation		
		High	Medium	Low
Farm size	Small	2	5	10
	Medium	21	36	28
	Large	24	16	8

Test, if the extent of mechanisation is related to farm size.

Q13) The observations on treatment combinations of 2^3 factorial experiment with factors A, B and C were as follows :

Block	treatment combinations with observations							
Block I	a 16	bc 21	(1) 10	ab 20	b 15	ac 23	c 14	abc 30
Block II	ac 28	b 16	c 15	a 19	abc 34	(1) 12	bc 22	ab 24
Block III	c 16	ab 28	bc 22	(1) 14	b 18	ac 30	a 20	abc 40

Analyse the data and interpret your results.

