UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Fourth Semester – 2019

Paper: Statistics-IV

Course Code: STAT-203 / STT-22314 Part–I (Compulsory) Time: 30 Min. Marks: 10

Roll No. in Fig. .....

Roll No. in Words. .....

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ATTEMPT THIS PAPER ON THIS QUESTION SHEET ONLY.
Division of marks is given in front of each question.
This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer cutting and overwriting is not allowed. (10x1=10)

(i)	Suppose in a population of size N, the class frequencies of two attributes A and B are given by (A) and (B), Then we have the expectation of (A) and (B) combined is (a) $\frac{(A)(B)}{N^4}$		(b) $\frac{(A)}{N}\cdot\frac{(B)}{N}$ (d) $\frac{(A)(B)}{N}$	
	(c) $\frac{(A)}{N^2}\cdot\frac{(B)}{N^2}$			
(ii)	In Duncan's multiple range test the "least significant range" is defined as (a) $R_p = q_\alpha(p,\nu)\sqrt{s/r}$	(b) $R_p = q_\alpha(p,\nu)\sqrt{s^2/r^2}$	(c) $R_p = q_\alpha(p,\nu)\sqrt{s^2/r}$	(d) $R_p = q_\alpha(p,\nu)\sqrt{s/r^2}$
(iii)	If the multiple correlation coefficient $R_{3.12} = 1$, then it implies a (a)Weak linear relationship	(b)Perfect relationship	(c)Perfect linear relationship	(d)High relationship
(iv)	The second principle of an experimental design is (a)Randomization	(b)Local control	(c)Replication	(d)None of these
(v)	The hypothesis is rejected at the α level of significance, when (a) $F \le F_\alpha;(\nu_1,\nu_2)$	(b) $F > F_\alpha;(\nu_1,\nu_2)$	(c) $F < F_\alpha;(\nu_1,\nu_2)$	(d) $F \ge F_\alpha;(\nu_1,\nu_2)$
(vi)	Which of the following relationship holds (a) $r_{12.3} = \sqrt{b_{12.3}\times b_{12.3}}$	(b) $r_{12.3} = \sqrt{b_{23.1}\times b_{32.1}}$	(c) $r_{13.2} = \sqrt{b_{13.2}\times b_{13.2}}$	(d)none of these
(vii)	The range of multiple correlation coefficient is (a) 0 to 1	(b) 0 to +∞	(c) -1 to +1	(d) none of these
(viii)	If a chi-square test is performed on a contingency table with 5 rows and 4 columns. How many degrees of freedom should be used? (a)10	(b)14	(c)12	(d) 9
(ix)	If $s^2 = 1.57$, $r = 4$ and $t_{0.025,(15)} = 2.13$, then the "Least significant difference" is (a)1.98	(b)1.97	(c)1.79	(d)1.89
(x)	The standard error of estimate in multiple regression has degrees of freedom (a) k - n	(b) k - 1	(c) n - k	(d) n - 1

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Roll No. .....

Paper: Statistics-IV

Course Code: STAT-203 / STT-22314 Part – II **Time: 2 Hrs. 30 Min. Marks: 50**

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

SECTION – II

Q. 2	SHORT QUESTIONS	
(i)	What is meant by a Two-way analysis of Variance and an interaction?	(4)
(ii)	Three variable have in pairs simple correlation coefficients given by $r_{12} = 0.8$, $r_{13} = -0.7$ and $r_{23} = -0.9$. Find the multiple correlation coefficient $R_{1.23}$ of X_1 on X_2 and X_3.	(4)
(iii)	(a) Define a Contingency Table. How do you determine the number of degrees of freedom in an r×c contingency table. (b) Discuss the important properties of chi-square distribution.	(4)
(iv)	What is a multiple regression? Explain the basic difference between simple regression and multiple regression .	(4)
(v)	Define and discuss the use of randomization and replication in designing an experiment.	(4)

SECTION – III

LONG QUESTIONS

Q.3 Five pennies were tossed 1000 times and the number of heads were observed as given below (6)

Number of heads	0	1	2	3	4	5
Frequencies	38	144	342	287	164	25

Test whether a binomial distribution gives a satisfactory fit to test data by applying the chi-square goodness-of-fit-test.

Q.4 Perform the analysis of variance on the following data and analyse the treatment means using the "least significant difference" test with a 0.05 level of significance. (6)

		Treatments					
		1	2	3	4	5	6
Blocks	1	1	3	6	4	3	2
	2	1	4	4	8	5	1
	3	3	6	7	8	4	3
	4	2	3	2	3	2	1

P.T.O.

Q.5 (6)

The following table shows the corresponding values of three variables X_1, X_2 and X_3.

X_1	3	5	6	8	12	14
X_2	16	10	7	4	3	2
X_3	90	72	54	42	30	12

a) Find the regression equation X_3 on X_1 and X_2.
b) Estimate X_3 when X_1 =10 and X_2=6.
c) Compute $R_{3.12}$ and $S_{3.12}$

Q.6 (6)

Given the following data

Y	2	5	7	8	5
X_1	8	8	6	5	3
X_2	0	1	1	3	4

(a) Calculate the estimated regression equation, (i.e $Y=a+b_1X_1+b_2X_2$) for the above data.

(b) State the meaning of the partial regression coefficients b_1 and b_2.

Q.7 (6)

The following data obtained from a randomized complete block design with 3 treatments A, B and C and 3 blocks contain one missing observation represented by *x*.

Blocks	Treatments		
	A	B	C
I	5	12	15
II	7	10	14
III	8	16	x

Estimate the missing observation and prepare a table for analysis of variance.