UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program : Fifth Semester – Fall 2021

Roll No. .....

Paper: Design and Analysis of Experiments (Theory) **Time: 3 Hrs.** **Marks: 60**

Course Code: STAT-303

Q.1. Give short answers of the following: **(6x5=30)**

I. Systematic and Randomized Design
II. Disadvantages of CR design
III. ANCOVA
IV. Fixed and Random effect models.
V. Principles of Experimental Design
VI. Advantages and Disadvantages of Latin square design

Solve the following questions. **(3x10=30)**

Q2. In a Latin Square design with "p" treatments, "p" rows and "p" columns, the observation is assumed to be represented by the model,

$$Y_{ij(k)} = \mu + \alpha_i + \delta_j + \gamma_k + \beta\left(X_{ij(k)} - \bar{X}\right) + \epsilon_{ij(k)};\ \ i, j, k = 1,2, \ldots, p$$

Obtain the least square estimates of the parameters of the above model. **(10)**

Q3. Perform the Analysis of covariance on the given data. Compute tests of significance and adjusted treatment means. **(10)**

		A		B		C	
		x	y	x	y	x	y
Blocks	1	5	17	6	23	4	29
	2	15	16	8	16	10	25
	3	12	12	15	18	15	24

Q4. Each of five varieties of corn is planted in three plots in a large field. The respective yield in bushels per acre are indicated below

Var1	Var2	Var3	Var4	Var5
46.2	49.2	60.3	48.9	52.5
51.9	58.6	58.7	51.4	54.0
48.7	57.4	60.4	44.6	49.3

Test whether the differences among the average yields are statistically significant at α=0.05. Also use the Duncan's multiple range test to make comparisons between pairs of means. **(10)**