LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

SIXTH SEMESTER – **APRIL 2024**

UST 6501 – DESIGN AND ANALYSIS OF EXPERIMENTS

Date: 05-04-2024   Dept. No.   Max. : 100 Marks
Time: 01:00 PM - 04:00 PM

SECTION A – K1 (CO1)

	Answer ALL the questions	**(10 x 1 = 10)**
1	**Fill in the blanks**	
a)	_____ is a linear combination of treatment means such that the sum of the coefficients is zero.	
b)	_____ procedure is a combination of the Analysis of variance and the Regression Analysis.	
c)	In a CRD with 't' treatments and n experimental units, the error degrees of freedom is _____.	
d)	In _____ the effects of several factors of variation are studied and investigated simultaneously.	
e)	Fisher's inequality in BIBD is _____.	
2	**Match the following**	
a)	Fixed Effect model - BIBD	
b)	ANOCOVA - Yates' method	
c)	LSD - $y_{ij} = \mu_i + \varepsilon_{ij}$	
d)	Factorial design - Concomitant variable	
e)	Incidence Matrix - Incomplete 3-way layout.	

SECTION A – K2 (CO1)

	Answer ALL the questions	**(10 x 1 = 10)**
3	**True or False**	
a)	The sum of two covariance functions is not a covariance function.	
b)	The basic purpose of analysis of variance is to test the homogeneity of several means.	
c)	RBD may give misleading results if the blocks are not heterogeneous.	
d)	In 2^3 factorial, the number of treatment combinations is 16.	
e)	A BIBD is said to be symmetric if b = v and r = k.	
4	**Answer the following**	
a)	Define fixed effect model.	
b)	State the assumptions of ANOVA.	
c)	Give any two disadvantages of CRD.	
d)	State the treatment combinations of 2^3 factorial experiments.	
e)	Define BIBD.	

SECTION B – K3 (CO2)

Answer any TWO of the following	**(2 x 10 = 20)**

5	Describe Random Effect model and mixed effect model.
6	Discuss Tukey's test for testing pair of means
7	Develop the ANOVA table for one-way classified data with one observation per cell.
8	Explain the analysis of 2^2 factorial experiments

SECTION C – K4 (CO3)

Answer any TWO of the following	**(2 x 10 = 20)**

9	Explain in detail the fundamental principles of experimental design.
10	Develop the complete statistical analysis of LSD.
11	Discuss the efficiency of R.B.D relative to C.R.D.
12	Explain the parametric relation of BIBD.

SECTION D – K5 (CO4)

Answer any ONE of the following	**(1 x 20 = 20)**

13	Derive the statistical analysis of two-way classification
14	Analyze the m x m LSD for one observation per unit.

SECTION E– K6 (CO5)

Answer any ONE of the following	**(1 x 20 = 20)**

15	Describe the analysis of partially confounded 2^3 experiment design.
16	Construct the analysis of BIBD.

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