

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2024
(Second Semester)

Branch - STATISTICS

LINEAR MODELS AND DESIGN OF EXPERIMENTS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The Gauss-Markov theorem will not hold if _____. a. the error term has the same variance given any values of the explanatory variables b. the error term has an expected value of zero given any values of the independent variables c. the independent variables have exact linear relationships among them d. the regression model relies on the method of random sampling for collection of data	K1	CO1
	2	Analysis of variance is a statistical method of comparing the _____ of several populations. a. standard deviations b. variances c. means d. proportions	K2	CO1
2	3	What should be the criteria for applying RBD? (a). Fertility gradient in field is in two direction (b). Fertility gradient in field is in one direction only (c). Both a and b (d). None of the above	K1	CO2
	4	The word "Latin" is used due to Euler who used Latin letters for symbols of a. Factors b. Levels c. Observations. d. Treatments	K2	CO2
3	5	When a researcher plans a study to examine the effect of three fully-manipulated independent variables on a single dependent variable, the research is using a: a. a single-case experimental design b. a quasi-experimental design c. a factorial design d. a correlational design	K1	CO3
	6	A _____ effect(s) analysis examines mean differences at each level of the independent variable. a). main b) simple main c) interaction d) simple interaction	K2	CO3
4	7	In BIBD every pair of treatment should occur λ times together in the design, thus constraint on BIBD sometimes requires very large number of blocks or very large block size. To overcome this difficulty we consider a. PBIBD b. SSPD c. SSPD and ANOVA d. ANOCOVA	K1	CO4
	8	Some pairs of treatments appear together λ_1 times, some pairs of treatments appear together λ_2 times.....and the remaining pairs λ_m times. a) In BIBD b) In PBIBD c) In GLSD d) In RCBD	K2	CO4

Cont...

5	9	The uncontrollable factors are also called _____ a) Designed factors b) Noise factors c) Acceptance factors d) Sound factors	K1	CO5
	10	Which of these can be used to develop a new process? a) Design of experiments b) Acceptance sampling c) Control charts d) Histogram	K2	CO5

SECTION - B (35 Marks)Answer **ALL** questions**ALL** questions carry **EQUAL** Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Outline the applications of Analysis of variance.	K2	CO1
		(OR)		
	11.b.	Demonstrate the mixed plot technique.		
2	12.a.	Examine the principles of design of experiment.	K4	CO2
		(OR)		
	12.b.	Derive the missing plot technique for RBD.		
3	13.a.	Classify the types of confounding.	K4	CO3
		(OR)		
	13.b.	Explain Complete confounding and its advantages.		
4	14.a.	State the importance of incomplete block design.	K5	CO4
		(OR)		
	14.b.	Describe the relations of parameter in BIBD.		
5	15.a.	Evaluate the weighing design and response surface design.	K5	CO5
		(OR)		
	15.b.	Explain the feller theorem and its applications.		

SECTION - C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Illustrate the Gauss Markov's Theorem and its applications.	K2	CO1
2	17	Construct the model for ANOCOVA technique for RBD.	K3	CO2
3	18	Discover the 3 ⁿ factorial experiments.	K4	CO3
4	19	Explain the analysis of BIBD using Intra block information.	K4	CO4
5	20	Construct analysis of cross over design.	K3	CO5

Z-Z-Z END