

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2026
(Sixth Semester)

Branch – STATISTICS

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	Which of the following is NOT a fundamental principle of experimentation? (i) Randomization (ii) Replication (iii) Blocking (iv) Standard deviation	K1	CO1
	2	The model for two-way ANOVA with many observations per cell includes: (i) Only main effects (ii) Only interaction effects (iii) Main effects and interaction effect (iv) No error term	K2	CO1
2	3	In a Completely Randomized Design (CRD), treatments are allocated by: (i) Blocking (ii) Randomization only (iii) Systematic arrangement (iv) Matching	K1	CO2
	4	The analysis of LSD removes variation due to: (i) Treatments only (ii) Rows only (iii) Column only (iv) Rows and Columns	K2	CO2
3	5	In a 2^3 factorial experiment, the number of main effects is: (i) 2 (ii) 4 (iii) 3 (iv) 8	K1	CO3
	6	In Yates method, the first column consists of: (i) Factorial effects (ii) Observed treatment totals arranged in standard order (iii) Mean squares (iv) F-values	K2	CO3
4	7	Partial confounding means: (i) All effects are confounded (ii) Same effect confounded in all replications (iii) No confounding (iv) Different effects confounded in different replications	K1	CO4
	8	In a 3^2 factorial experiment, ANOVA separates variation into: (i) Factor A, Factor B, Interaction, Error (ii) Mean and Error only (iii) Blocks only (iv) Treatments only	K2	CO4
5	9	In ANCOVA with one concomitant variable, the concomitant variable is: (i) Dependent variable (ii) Independent treatment factor (iii) Auxiliary variable related to response (iv) Error term	K1	CO5
	10	BIBD is preferred when: (i) Number of treatments is small (ii) Block size equals number of treatments (iii) Block size is smaller than number of treatments (iv) No blocking is required	K2	CO5

Cont...

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.	Explain the following terms: (i) Experimental error and (ii) Uniformity trials.	K2	CO2
		(OR)		
	11.b.	Describe the mathematical model for Two-way classification.		
2	12.a.	Discuss the advantages and disadvantages of C.R.D.	K2	CO2
		(OR)		
	12.b.	Write a short note on Latin Square Design.		
3	13.a.	Apply the concept of design of experiments to distinguish between main effect and interaction effect with a suitable example.	K3	CO3
		(OR)		
	13.b.	Apply Yates' method to compute factorial effect totals for a given 2 ⁿ factorial experiment and interpret the results.		
4	14.a.	Apply the concept of confounding in a factorial experiment to identify confounded effects and explain their impact on the analysis with a suitable example.	K3	CO3
		(OR)		
	14.b.	Discuss the advantages and disadvantages of confounding.		
5	15.a.	Explain the concept of Analysis of covariance with one concomitant variable in RBD.	K3	CO4
		(OR)		
	15.b.	Explain the concept of BIBD and its parameters.		

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	Apply the terminology of experimental designs in describing a given experiment and explain the role of terms such as treatment, replication, block, experimental unit, and factor.	K3	CO1																																										
2	17	A set of data involving four “tropical feed stuffs A, B, C, D” tried on 20 chicks is given below. All the 20 chicks are treated alike in all respects except the feeding treatments and each feeding treatment is given to 5 chicks. Analyze the data. <table><tr><th>Feed</th><th colspan="5">Gain in Weight</th><th>Total T_i</th></tr><tr><td>A</td><td>55</td><td>49</td><td>42</td><td>21</td><td>52</td><td>219</td></tr><tr><td>B</td><td>61</td><td>112</td><td>30</td><td>89</td><td>63</td><td>355</td></tr><tr><td>C</td><td>42</td><td>97</td><td>81</td><td>95</td><td>92</td><td>407</td></tr><tr><td>D</td><td>169</td><td>137</td><td>169</td><td>85</td><td>154</td><td>714</td></tr><tr><td colspan="6">Grand Total</td><td>G = 1695</td></tr></table>	Feed	Gain in Weight					Total T _i	A	55	49	42	21	52	219	B	61	112	30	89	63	355	C	42	97	81	95	92	407	D	169	137	169	85	154	714	Grand Total						G = 1695	K3	CO4
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3	18	Give a complete statistical analysis of 2 ³ factorial experiment.	K2	CO2																																										
4	19	Explain the concept of 3 ² factorial experiment and give complete statistical analysis.	K4	CO4																																										
5	20	Explain the concept of split plot design and give complete statistical.	K2	CO2																																										

Z-Z-Z

END