PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Fifth Semester)

Branch – STATISTICS

STATISTICAL INFERENCE – II

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	A hypothesis which is tested for possible rejection under the assumption that it is true is called (a) Alternative hypothesis (b) Null hypothesis (c) Simple hypothesis (d) Composite hypothesis	K1	CO1
	2	The Neyman–Pearson lemma provides a method for finding (a) Unbiased tests (b) Most powerful tests (c) Non-parametric tests (d) Asymptotic tests	K2	CO1
2	3	A test that maximizes the power among all tests of the same size is called a _____ test. (a) Likelihood Ratio (b) Uniformly Most Powerful (c) Chi-square (d) Asymptotic	K1	CO2
	4	The Likelihood Ratio (LR) test is based on the ratio of (a) Sample mean to sample variance (b) Maximum likelihood under null and alternative hypotheses (c) Variance to mean (d) Confidence limits	K2	CO2
3	5	The Student's t-test is applicable when _____ is unknown. (a) Mean. (b) Population variance (c) Population mean (d) Sample variance	K1	CO3
	6	6. The level of significance is denoted by (a) β (b) α (c) μ (d) σ	K2	CO3
4	7	The F-test is used for testing (a) Equality of two means (b) Equality of two proportions (c) Equality of variances (d) Independence of attributes	K1	CO4
	8	The chi-square test is mainly used for (a) Estimation of parameters (b) Testing independence or goodness of fit (c) Comparing means (d) Finding regression lines	K2	CO4
5	9	A contingency table is used to study (a) Regression (b) Correlation (c) Association between attributes (d) Distribution fitting	K1	CO5
	10	Yule's coefficient of association ranges between (a) 0 and 1 (b) -1 and 1 (c) 0 and ∞ (d) $-\infty$ and ∞	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.	Explain the fundamental concepts of hypothesis testing and the Neyman–Pearson approach.	K2	CO1
		(OR)	K3	
	11.b.	Describe the properties of unbiased tests with simple examples.		
2	12.a.	Explain the Likelihood Ratio Test for testing the mean of a normal population.	K2	CO2
		(OR)	K3	
	12.b.	Describe the procedure for obtaining the Uniformly Most Powerful (UMP) test with an example.		
3	13.a.	Explain the concept of tests of significance for proportions and means.	K2	CO3
		(OR)		
	13.b.	Derive the test statistic for correlation coefficient based on Student's t-distribution.	K3	
4	14.a.	Describe the procedure for testing the equality of several variances using the F-test.	K3	CO4
		(OR)		
	14.b.	Explain the chi-square test for testing the independence of two attributes with an example.	K2	
5	15.a.	Explain the construction and interpretation of a 2×2 contingency table.	K2	CO5
		(OR)		
	15.b.	Describe the computation of Yule's coefficient of association and coefficient of colligation.	K3	

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	State and prove the Neyman–Pearson Fundamental Lemma. Discuss its role in developing most powerful tests.	K5	CO1
2	17	Derive the Likelihood Ratio Test (LRT) for testing the mean and variance of a normal population for both one-sample and two-sample cases.	K3	CO2
3	18	Explain in detail the large-sample tests for proportions, means, standard deviations, and correlation coefficients with examples.	K2	CO3
4	19	Describe the exact sampling distributions – F and Chi-square. Explain their applications in testing homogeneity of variances and correlation coefficients.	K4	CO4
5	20	Discuss the concept of association of attributes. Derive and explain Yule's coefficient of association and coefficient of colligation with examples.	K6	CO5

Z-Z-Z   END