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22STP312N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2025
(Third Semester)

Branch - **STATISTICS**

HYPOTHESES TESTING

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	Size of critical region is known as (a) power of the test (b) size of type II error (c) critical value of the test statistics (d) size of the test	K1	CO1
	2	A test based on a test statistic is classified as (a) randomized test (b) non-randomized test (c) sequential test (d) Bayes test	K2	CO1
2	3	A uniformly most powerful test among the class of unbiased test is termed as (a) minimax test (b) minimax unbiased test (c) uniformly most powerful unbiased test (d) all the above	K1	CO2
	4	A test which maximizes the power of the test for fixed α is known as (a) optimum test (b) randomized test (c) Bayes test (d)likelihood ratio test	K2	CO2
3	5	The hypothesis that the population variance has a specific value can be tested by (a) F-test (b) Z-test (c) chi-square test (d) none of the above	K1	CO3
	6	The ratio of between sample variance and within sample variance follows (a) F-distribution (b) chi-square distribution (c) Z-distribution (d) t-distribution	K2	CO3
4	7	The decision criteria in SPRT depends on the functions of: (a) type I error (b) type II error (c) type I and II errors (d) none of the two types of errors	K1	CO4
	8	In SPRT, decision about the hypothesis H is taken (a) after each successive observation (b) after a fixed number of observations (c) at least after five observation (d) when the experiment is over	K2	CO4
5	9	In Friedman's two way analysis of variance, the observations are ranked in: (a) blocks (b) treatment (c) pooled observations (d) none of the above	K1	CO5
	10	Wilcoxon's signed rank test considers the differences (X_i-M_0) by way of: (a) signs only (b) magnitudes only (c) signs and magnitudes both (d) all the above	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 concept of Type I and Type II errors, with examples.	K4	CO1
		(OR)		
	11.b.	Explain the concept of most powerful test.		
2	12.a.	Verify whether the U(0,θ), θ > 0 distribution belongs to the one-parameter exponential family and also check if it has the MLR property.	K5	CO2
		(OR)		
	12.b.	Show that UMP test is unbiased.		
3	13.a.	Construct LR test for mean μ with known variance σ^2 in the case of $N(\mu, \sigma^2)$ distribution for testing 0 H : $\mu = \mu 0$ and K: $\mu > \mu_0$.	K4	CO3
		(OR)		
	13.b.	Explain the properties of Likelihood Ratio test.		
4	14.a.	Derive the power function and ASN function of SPRT procedure relating to Poisson distribution with parameter λ.	K5	CO4
		(OR)		
	14.b.	Derive their approximate expressions for the sequential probability ratio test.		
5	15.a.	Describe Wilcoxon signed rank test.	K4	CO5
		(OR)		
	15.b.	Explain the difference between parametric and non-parametric tests.		

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 Neyman – Pearson fundamental Lemma.	K4	CO1
2	17	Show that Every most powerful or uniformly most powerful critical region is necessarily unbiased.	K5	CO2
3	18	Explain the test for the Equality of Means of Two Normal population.	K5	CO3
4	19	Describe Wald's SPRT Procedure.	K4	CO4
5	20	Explain the various steps involved in the procedure of Mann-Whitney U - test.	K5	CO5

Z-Z-Z END