Date: 02-05-2023   Dept. No.   Max. : 100 Marks
Time: 09:00 AM - 12:00 NOON

SECTION-A

Answer ALL the questions. **(10 x 2 = 20)**

1. Distinguish between Simple and Composite hypotheses.
2. Define most powerful test.
3. Define SPRT for testing Ho against H_1.
4. State the ASN function for the SPRT for testing H_o: $\theta = \theta_0$ against H_1: $\theta = \theta_1$.
5. State the assumptions for Student's t-test.
6. What do you mean by one-tailed and two-tailed tests?
7. What are the uses of Chi-square test?
8. State any two differences between parametric and non-parametric hypothesis testing.
9. Define run test.
10. Write any two disadvantages of non-parametric test.

SECTION-B

Answer any FIVE questions. **(5 x 8 = 40)**

11. Describe the steps involved in testing statistical hypothesis.
12. A single observation is taken from $f(x, \theta) = \theta e^{-\theta x}$; $\theta \geq 0$; $0 \leq x \leq \infty$ to test H_0: $\theta=2$ against H_1:$\theta=1$. Find the best critical region.
13. Show that the family $U(0, \theta)$, $\theta > 0$ has MLR property.
14. Obtain the most powerful test of size α for testing H_0: $\sigma = \sigma_0$ Vs H_1: $\sigma = \sigma_1$ in $N(0, \sigma^2)$.
15. Explain the various steps involved in Sequential probability ratio test.
16. Derive a likelihood ratio test for the variance of a normal population $N(\mu, \sigma^2)$ when μ is known.
17. The score of 10 candidate's performance after training are given below. Test whether the given training is effective

prior	84	48	36	37	54	69	83	96	90	65
after	90	58	56	49	62	81	84	86	84	75

18. Explain Sign test for one sample.

SECTION-C

Answer any TWO questions. **(2 x 20 =40)**

19. (a) Explain the concept of critical region.
    (b) State and prove Neyman Pearson lemma. (8+12)
20. (a) Explain the test procedure for testing equality of variances of two normal populations.
    (b) Let X have a binomial distribution resulting from n trials each with probability p of success. Given α, find the most powerful critical region of the null hypothesis $H_0 : p = p_0$ against $H_1 : p = p_1$ ($p_0 > p_1$). (10+10)
21. (a) Illustrate with an example that UMP does not exist always.
    (b) Explain the test of independence of attributes in contingency tables. (10+10)
22. (a) Explain the procedure of Mann-Whiteney U-test.
    (b) Derive the method of testing the significance of equality of two sample proportions. (10+10)

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