15P355 (Pages: 2) Name.........................

Reg. No..................

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2016

(CUCSS - PG)

(Statistics)

CC15P ST3 C12 - TESTING OF STATISTICAL HYPOTHESES

(2015 Admission)

Time : Three Hours Maximum : 36 Weightage

Part A

(Answer ***all*** questions. Weightage 1 for each question)

1. Distinguish between non-randomised test and randomised test.
2. Define power of the test.
3. What is the difference between MP tests and UMP tests?
4. Define α-similar test??
5. Show that N-P most powerful tests are unbiased.
6. Show that Poisson family of distribution possess MLR property .
7. What are Bayesian tests?
8. Define Locally Uniformly Most Powerful Test .
9. Explain sign test.
10. Define O.C function.
11. Define (i) stopping region (ii) stopping r. v in sequential statistical inference
12. Justify the boundary points A and B of SPRT in terms of the strength of the test.

(12 x 1 = 12 Weightage)

Part B

(Answer ***any eight*** questions. Weightage 2 for each question)

13. (a)What are two types of errors occur in testing of hypothesis?

(b)A sample of size 1 is taken from an exponential p.d.f with parameter θ, ie, $X \sim G(1,\theta)$. To test $H_0: \theta = 1$ against $H_1: \theta > 1$, the test to be used is the nonrandomized test

$$\Phi(x) = \begin{cases} 1, & if\ x > 2 \\ 0, & if\ x \leq 2 \end{cases}$$. Find the size of the test.

14. For the p.d.f $f_\theta(x) = e^{-(x-\theta)}$, x ≥ θ , find the MP size α test of $H_0 : \theta = \theta_0$ against $H_1 : \theta = \theta_1$ ($>\theta_0$) , based on the sample of size n.
15. Give an example for a distribution with MLR property and one without it. Justify .
16. Find the Most Powerful size α test of testing $H_0: X \sim f_0(x)$ against $H_1: X \sim f_1(x)$, where $f_0(x) = (2\pi)^{-\frac{1}{2}} e^{-\frac{x^2}{2}}$ and $f_1(x) = (2)^{-\frac{1}{2}} e^{-|x|}$;$-\infty < x < \infty$ based on a sample of size 1.
17. State and prove Karlin Rubin theorem for testing one sided hypothesis.
18. Explain Chi-square test for goodness of fit.
19. Write a short note on robustness.

20. Examine by using sign test whether the following observations coming from a population with median 32. Observations are 37.0, 31.4, 34.4, 33.3, 34.9, 31.6, 31.3, 34.6, 32.6, 31.6, 36.2, 31.0, 33.5 ,33.7,33.4
21. Explain median test.
22. Explain Mann Whitney –Wilcoxon test.
23. State and prove Wald's equation in sequential statistical inference.
24. Show that SPRT terminates with probability 1.

(8 x 2 = 16 Weightage)

Part C

(Answer ***any two*** questions. Weightage 4 for each question)

25. (a)State and prove Neymann-Pearson lemma.

    (b) Let $X_1, X_2, \ldots, X_n$ be n random observations from N(0,σ^2) . Derive UMP test for testing $H_0 : \sigma \leq \sigma_0$ against $H_1 : \sigma > \sigma_0$ of size α.
26. (a) Define LRT. (b)Let $X_1, X_2, \ldots, X_n$ be a random sample taken from $N(\mu, \sigma^2)$, both μ *and* σ^2 unknown. Find LRT of $H_0 : \sigma = \sigma_0$ against $H_1 : \sigma \neq \sigma_0$.
27. Explain (a) Kendall's tau

    (b) Kolmogorov Smirnov two sample test.

    (c) Test for homogeneity.
28. For the density function $f(x;\theta) = \theta e^{\theta x}; x > 0, \theta > 0$. Develop SPRT for testing $H_0 : \theta = 3.6$ against $H_1 : \theta = 4.8$ ($>\theta_0$) of strength α =0.06 and β = 0.10. Also obtain O.C and A.S.N curves.

(2 x 4 = 8 Weightage)

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