SLR-DK-248

Seat No.	

Set P

B.Sc. (Semester - VI) (Old) (CGPA) Examination Oct/Nov-2019
Statistics (Special Paper – XI)
STATISTICAL INFERENCE – II

Day & Date: Monday, 07-10-2019 Max. Marks: 70
Time: 08:00 AM To 10:30 AM

Instructions: 1) All questions are compulsory and figures to the right indicate full marks.
2) Use of scientific calculators and statistical tables is allowed.

Q.1 Fill in the blanks by choosing correct alternatives given below. **14**

1) The most pragmatic approach for determining $(1-\alpha)\%$ confidence interval is to find out _____.
   a) Zero width confidence interval (C.I.)
   b) equal tail C.I.
   c) A C.I. such that area of both the tails is α
   d) none of these

2) For finding the C.I. for the ratio of variance of two normal populations which distribution is used?
   a) χ^2 b) F
   c) t d) normal

3) For a random sample of size n from $N(\mu, \sigma^2)$ with known μ, the degrees of freedom of $\chi^2 = \frac{\sum(X_i-\mu)^2}{\sigma^2}$ is _____.
   a) $(n-1)$ b) n
   c) $(n+1)$ d) 0

4) The hypothesis under test is _____ hypothesis.
   a) simple b) null
   c) composite d) alternative

5) Among all critical regions (C.R.) of size α the C.R. which minimizes β is called _____ C.R.
   a) best b) powerful
   c) minimum d) optimum

6) If there are 10 symbols of two types equal in numbers, the maximum possible number of runs is _____.
   a) 8 b) 10
   c) 9 d) 11

7) Ordinary sign test considers the difference of observed values from the hypothetical median value in terms of _____ only.
   a) signs b) magnitude
   c) both (a) and (b) d) neither (a) nor (b)

8) Most frequently used method of breaking the tie is _____.
   a) mid-rank method
   b) to omit tied values
   c) average statistic approach
   d) most favorable statistic approach

9) Neyman-Pearson Lemma provides _____ test.
   a) an unbiased b) an admissible
   c) most powerful d) minimax

10) The SPRT decision about the hypothesis is taken _____.
   a) after each successive observation
   b) after a fixed number of observations
   c) after at least five observations
   d) when the experiment is over

11) The test $H_0: \mu = 70$ against $H_1: \mu > 70$ leads to _____ tailed test.
   a) left b) right
   c) two d) none of these

12) Which of the following test is appropriate for paired data?
   a) the sign test b) signed rank test
   c) median test d) both (a) and (b)

13) In SPRT the decision criterion is a function of probability of _____ error.
   a) type one b) type two
   c) both (a) and (b) d) neither (a) nor (b)

14) The probability of rejecting Ho when it is false is _____.
   a) type I error b) type II error
   c) power of a test d) size of test

Q.2 A) Answer the following questions. (Any Four) **08**

1) Define simple and composite hypothesis.
2) Define power function of a test.
3) Define average sample number.
4) State the assumptions of non-parametric tests.
5) Define uniformly most powerful C.R. and uniformly most powerful test.

B) Answer the following questions. (Any Two) **06**

1) Define run used in run test with suitable illustration.
2) Define pivotal quantity and illustrate with suitable example.
3) State the advantages of non-parametric tests.

Q.3 A) Answer the following questions. (Any two) **08**

1) Obtain $100(1-\alpha)\%$ C.I. for the mean μ of $N(\mu, \sigma^2)$ distribution when σ^2 is unknown.
2) Explain Wilkoxan's signed rank test for two independent samples.
3) Let X be a $B(1, \theta)$ r.v. Construct SPRT of strength (α, β) for testing $H_0: \theta = \theta_0$ against $H_1: \theta = \theta_1 (\theta_1 > \theta_0)$.

B) Answer the following questions. (Any One) **06**

1) Obtain L.R. test for testing $Ho: \mu = \mu_0$ against $H_1: \mu \neq \mu_0$ based on a random sample from $N(\mu, \sigma^2)$ distribution when both μ and σ^2 are unknown.
2) Obtain $100(1-\alpha)\%$ confidence interval for difference between means $(\mu_1 - \mu_2)$ in case of two normal populations $N(\mu_1, \sigma_1^2)$ and $N(\mu_1, \sigma_2^2)$, where σ_1 *and* σ_2 both are known.

Q.4 A) Answer the following questions. (Any Two) **10**

1) Describe run test for two independent samples.
2) Obtain SPRT for testing $H_0: \lambda = \lambda_0$ against $H_1: \lambda = \lambda_1 (\lambda_1 > \lambda_0)$ where λ is the mean of Poisson distribution.
3) Obtain $100(1-\alpha)\%$ confidence interval for population proportion.

B) Answer the following questions. (Any One) **04**

1) Explain in brief median test.
2) An urn contains 6 marbles of which θ are white and remaining are black. Suppose two marbles are drawn at random without replacement, in order to test $H_0: \theta = 3$ against $H_1: \theta = 4$. H_0 is rejected if both marbles are white otherwise accepted. Compute size of a test.

Q.5 Answer the following questions. (Any two) **14**

a) Write a note in detail on Mann-Whitney U test.

b) State and prove Neyman-Pearson Lemma.

c) Construct SPRT for testing $H_0: \theta = \theta_0$ against $H_1: \theta = \theta_1 (\theta_1 > \theta_0)$ in $N(0, \sigma^2)$ distribution.