2 /51

# 0304N46

Candidate's Seat No :_____

**B.Sc Semester-6 Examination**

**CC 307**

**Statistics**

**April-2024**

**Time : 2-30 Hours]** **[Max. Marks : 70**

---

Q1 A) State and prove Neyman-Pearson Lemma. Discuss its uses. [7 marks]

B) A random sample of size 5 is drawn from Binomial population with probability of success = P. suppose we want to test $H_0: P = \frac{1}{2}$ $Vs$ $H_1: P = \frac{3}{4}$. Obtain most powerful test (critical region) for $\alpha = \frac{6}{32}$. [7 marks]

OR

Q 1 A) Write short note on two types of errors in testing of hypothesis and explain role of level of significance. Also explain power function. [7 marks]

B) Let $x_1, x_2 \ldots \ldots \ldots x_n$ be a random sample of size 'n' from N($\mu$, $\sigma^2$). Test for $\mu$ when $\sigma$ is known. Obtain the Best Critical Regions for testing $H_0: \mu = \mu_0$ $Vs$ $H_1: \mu = \mu_1$ $(\mu_1 < \mu_0)$ [7 marks]

Q 2 A) Give detail procedure for test of significance for single sample proportion. [7 marks]

B) Explain the test for the significance of observed value of correlation coefficient when hypothetical value of correlation coefficient = $\rho_0$? [7 marks]

OR

Q 2 A) Bloomington Computer Company sells computers and computer parts by mail. The company claims that at least 90% of all orders are mailed within 72 hours after they are received. The quality control department at the company often takes samples to check if this claim is valid. A recently taken sample of 150 orders showed that 129 of them were mailed within 72 hours. Can you conclude that the company's claim is false? Use a 2.5% significance level. [7 marks]

B) Give detail procedure for the test of significance of the difference between two sample proportions. [7 marks]

Q 3 A) Write the test to test the homogeneity and independence in a contingency table of order r rows and s columns. [7 marks]

B) test the hypothesis $H_0: \mu_1 - \mu_2 = 0$ $vs$ $H_1: \mu_1 - \mu_2 < 0$ by using the following data at 10% level of significance. Sample 1: $\overline{x_1} = 51.3, \sigma_1^2 = 52, n_1 = 31$ Sample 2: $\overline{x_2} = 53.2, \sigma_2^2 = 60, n_2 = 32$. Use critical value method to find the critical difference in the mean value required to reject the null hypothesis. [7 marks]

OR

Q 3 A) Explain the procedure to test the significance difference between two sample means having sample sizes $n_1$ and $n_2$ respectively drawn from the Normal populations having same variances. [7 marks]

B) Discuss how to test homogeneity of two population variances in two independent samples of sizes $n_1$ and $n_2$ from normal population. [7 marks]

Q 4 A) Describe Run test in detail. [7 marks]

B) Describe Median Test in detail. [7 marks]

OR

P.T.O

NMG- 2

A) Write the advantages and disadvantages of non-parametric test. [7 marks]

B) Explain Mann-Whitney U test. [7 marks]

Q 5 Attempt Any Seven. [14 marks]

1. The mean price of mid-sized cars in a region is Rs. 32,000. A test is conducted to see if the claim is true. State the Type I and Type II errors in complete sentences..
2. The two tailed test is more powerful than one tailed test (True/False)
3. Write the test statistic used to test the significance for single sample mean.
4. When is null hypothesis rejected in the case of $Z$ test at 5% level of significance?
5. Which type of error is also known as level of significance?
6. Write the null hypothesis to test equality of two population variances.
7. What is the test statistics used to test the significance of an observed correlation coefficient (whether sample has come from an uncorrelated population)?
8. Give test statistics to test the significance of variance by Chi Square test.
9. What is the test statistics used in Wilcoxon signed rank test?
10. What is the null hypothesis used in Run test?
11. In determining the critical value for two tailed test what is the one tail probability?
12. Write one advantage of non-parametric test.

— X —