AC-106

April-2016

B.Sc., Sem.-VI

CC-308 : Statistics

(Statistical Inference and Design of Experiment-II)

Time : 3 Hours]   **[Max. Marks : 70**

Instructions : (1) **All** questions carry equal marks.

                (2) Scientific calculator is allowed.

                (3) Statistical table will be provided on request.

1. (a) Explain :

    (i) Procedure of testing of hypothesis.

    (ii) Null and Alternative hypothesis.

    (iii) Critical Region.

OR

Explain two types of errors, level of significance power of a test & UMP test.

(b) State and prove Neyman-Pearson Lemma.

OR

Let P be the Prob. that a win will fall head in a single toss in order to test $H_0 : P = \frac{1}{2}$ against $H_1 : P = \frac{3}{4}$. The coin is tossed 5 times and H_0 is rejected if more than 3 heads are obtained. Find the prob. of type-I error and power of the test.

2. (a) Explain likchihood ratio test.

OR

Explain how will you test the significance of single mean μ for normal population. If.

$H_0 : \mu = \mu_0$ vs $H_1 : \mu \neq \mu_0$ and σ^2 is known.

(b) Let $X_1, X_2, \ldots\ldots X_{n1}$ be a r.s. from N (μ, σ^2), then explain the procedure to test $H_{0 :} \sigma^2 \leq \sigma_0{}^2$ vs $H_1 : \sigma^2 > \sigma_0{}^2$.

OR

Let $X_1, X_2, \ldots\ldots X_{n_1}$ be a r.s. of size n_1 from N (μ_1, σ^2) & $y_1 y_2 \ldots\ldots y_{n_2}$ be a r.s. from N (μ_2, σ^2), then explain the procedure to test $H_{0 :} \mu_1 = \mu_2$ vs $H_1 : \mu_{1 \neq} \mu_2$.

3. (a) What is non-parametric test ? Give difference between parametric and non-parametric test.

   OR

   Write a short note on sign test.

   (b) Explain Mann-Whitney U-test.

   OR

   Explain Median test.

4. (a) Give complete layout and ANOVA table for RBD.

   OR

   What is LSD ? Explain and give complete layout and analysis of variance for LSD.

   (b) Explain :

   (i) Factorial design.

   (ii) 2^2 factorial experiment.

   OR

   What is confounding ? Explain in detail Complete confounding and Partial confounding.

5. (1) What is the critical value (at 5% level of significance) for $H_0 : \mu = \mu_0$ vs $H_1 : \mu \neq \mu_0$.

   (2) If n = 36, $\overline{X} = 24.6$, S = 12, $H_0 : \mu \leq 20$, vs $H_1 : \mu > 20$. What is the value of test statistics ?

   (3) Define simple and composite hypothesis.

   (4) Define likelihood function.

   (5) Name the test statistics for post HOC analysis.

   (6) Complete the following ANOVA table :

Source	SS	d.f.	MSS	F
Between Treatment	2073.6	4	–	–
Between Blocks	6000	5	1200	–
Error		20	288	
Total		29	–	

   (7) Define BLUE.

———————