

Seat No. : \_\_\_\_\_

**AC-117**

**April -2018**

**B.Sc., Sem.-VI**

**CC-308 : Statistics**

**Time : 3 Hours]**

**[Max. Marks : 70**

- Instructions :** (1) Scientific calculator are allowed to use.  
(2) Statistical table will be provided on request.

1. (a) State and prove Neyman Pearson Lemma.

**OR**

Explain concept of Hypothesis and define (i) Null and Alternative Hypothesis (ii) Simple and composite Hypothesis (iii) Critical region Give illustrations.

- (b) If  $f(x) = \theta e^{-\theta x}; \leq x < \infty$   
 $= 0; \quad \text{Otherwise}$  . To test  $H_0 : \theta = 1$  against  $H_1 : \theta = 2$  as a single value of  $x$  is taken.

The critical region is  $x \leq 1.5$ . Find probability of type I and type II errors. Obtain power function, also obtain power for  $\theta = 1, 2, 3, 4$ .

**OR**

A coin is tossed 6 times and hypothesis  $H_0: p=1/2$  is rejected against  $H_1 : p = 3/4$  if the number of head is greater than 4. Calculate probabilities of two types of errors.

2. (a) Explain simple and composite hypothesis. Discuss likelihood ratio test for composite hypothesis.

**OR**

Explain LRT to determine critical region for testing the significance of population mean when population SD is known in case of normal distribution.

- (b) Explain LRT to determine critical region for testing significant difference between two population means if the variances are assumed to be same in case of two independent normal populations.

**OR**

To Test the significance differences two of population variances use LRT to determine critical region in case of two independent normal populations.

3. (a) Define parametric and non-parametric tests and discuss difference between parametric and non-parametric tests.

**OR**

Under what situations sign test is used ? Discuss sign test.

- (b) Write a short note on Mann Whitney U test.

**OR**

Write short note on Median test.

4. (a) Give layout and derive the missing value  $X_{lm}$ , missing in  $l^{\text{th}}$  row and  $m^{\text{th}}$  column of a Randomised block design, write ANOVA table and test its significance.

**OR**

Explain in detail layout and analysis of Latin Square Design.

- (b) Write a note on  $2^2$  factorial design.

**OR**

Write note on confounding.

5. Answer in short :

- (i) Define treatment contrast.
  - (ii) Define power of the test.
  - (iii) Display critical region for testing significant difference between two variances, in case of two normal populations.
  - (iv) Name the tests you used in median test.
  - (v) Give two advantages of Latin square design.
  - (vi) In factorial design define factor and level.
  - (vii) What do you mean by confounding ?
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