RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

SECOND YEAR

B.A./B.SC. THIRD SEMESTER (July – December), 2012

Mid-Semester Examination, September 2012

Date : 12/09/2012 **STATISTICS (General)**

Time : 11 am – 12 noon Paper : III Full Marks : 25

[Answer <u>any five</u> questions taking atleast <u>two</u> from each group]

Group – A

1. Explain the following terms— i) Sampling Distribution of a Statistic
   ii) Standard Error of a Statistic [2½+2½]

2. Find out the sampling distribution of sample mean of the sample of size n from a $N(\mu, \sigma^2)$ universe. [5]

3. Find out the moment generating function of the Chi-Square distribution. From it determine its standard deviation. [5]

4. Write a short note on F distribution. [5]

Group – B

5. Explain the terms with example— i) Level of Significance
   ii) p-value
   iii) Critical region [2+1½+1½]

6. Derive the likelihood ratio test for testing for mean from a Normal population when the variance is unknown. [5]

7. State Neyman-Pearson Lemma for testing a simple null hypothesis against a simple alternative. Use this to derive the best critical region for testing of mean of a Normal distribution when the variance is known. [5]

8. Write down the appropriate test statistics for the following situations :
   a) Testing for equality of means of two normal populations when the population variances are known.
   b) Testing for equality of variances of two normal population when the population means are not known.
   c) Testing for a specific value of variance of a normal distribution when mean is not known.

   In each case, state the sampling distribution. [2+2+1]

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