STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086
(For candidates admitted during the academic year 2011 – 12 & thereafter)

SUBJECT CODE: 11MT/PC/MS34

M. Sc. DEGREE EXAMINATION, NOVEMBER 2015
BRANCH I - MATHEMATICS
THIRD SEMESTER

COURSE : CORE
PAPER : MATHEMATICAL STATISTICS
TIME : 3 HOURS **MAX. MARKS : 100**

SECTION- A (5x2=10)
ANSWER ALL QUESTIONS

1. Find the characteristic function of a random variable with uniform distribution.
2. Obtain the moments of zero-one distribution.
3. State Bernoulli's law of large numbers.
4. Define a parametric hypothesis and a parametric test.
5. What is a confidence interval?

SECTION- B (5x6=30)
ANSWER ANY FIVE QUESTIONS

6. If X_1, X_2 are two independent random variables with Poison distributions, find the characteristic function of $X_1 - X_2$.
7. Define beta distribution and find its moments m_1 and m_2.
8. State and prove chebychev law of large numbers.
9. State and prove Lindeberg – Levy theorem.
10. Define sample mean and obtain its distribution.
11. The random variable X has the Poisson distribution $P(X = k) = \frac{\lambda^k}{K!} e^{-\lambda}$ $(K = 0,1, \dots)$. Using method of maximum likelihood, find the unknown parameter λ.
12. Explain the contingency table for the independence test.

SECTION- C (3x20=60)
ANSWER ANY THREE QUESTIONS

13. State and prove theorem of Levy to uniquely determine the distribution function by the characteristic function.

14. a) Define Cauchy distribution and find its characteristic function.
    b) State and prove addition theorem for Gamma random variables.

15. State and prove Levy-Cramer theorem.

16. Define chi-square statistic and obtain its distribution function.

17. State and prove Rao-Cramer inequality.