

Indian Statistical Institute, Chennai
MSTAT: Semester-I, 2016-18

Final Examination: Introductory Computer Programing

Answer all the questions, maximum marks **20**. Duration: 150 minutes

1. Write an R program to generate Poisson distribution using inverse transform method. [4]
2. Write an R program to generate the mixture of two Gamma variates X_1 and X_2 where $X_1 \sim \text{Gamma}(2, 5)$ and $X_2 \sim \text{Gamma}(3, 5)$ considering the mixing coefficients as $p_1 = 0.4$ and $p_2 = 0.6$. [3]
3. Write an R program to find the value of π using monte carlo method [3]
4. Let X_1 and X_2 be independent and identical copies of X which has distribution function F . We want to estimate the quantity

$$g = \frac{E|X_1 - X_2|}{2E(X_1)}$$

using

$$\hat{g} = \frac{\sum_{i=1}^n (2i - n + 1) X_{(i)}}{(n - 1) \sum_{i=1}^n X_i},$$

where $X_{(i)}$ denotes the order statistics. Write an R program to find the Bias and MSE using monte carlo simulation when F has standard exponential. (Hint: The value of $g = 0.5$) [4]

5. Analyse the data set given at the time of examination. Instructions will be given at the time of examination. [5×2=10]