Department Of Mathematics
Indian Institute Of Technology, Delhi
MTL 108 - Introduction to Statistics
Minor I Test – 17-02-2015

Time: One Hour **Total Marks: 20**

If you use any results proven/mentioned in the class, please write the result clearly before using it in your answer.

Q1. **(a)** If X ~ Bin (100, 0.4) What is the distribution of Y = 100 - X? Justify your answer.

[2]

(b) If X ~ Uniform [-10, 10], what is the distribution of $Y = \frac{|X|}{10}$?

Obtain the Mean and Variance of Y.

[2 + 0.5 + 1.5 = 4]

(c) If X1, X2 , ..., Xn are independent and identically distributed random variables each following Uniform(0,1)

- Find the distribution of - 2 log (X1).
- Hence or otherwise find out the distribution of - 2 log (X1 X2. ... Xn)

[2 + 2 = 4]

Q2. **(a)** Suppose we choose a sample of size 10 from the set {0, 1, 2, ... 1000} without replacement. What are the mean and variance of the sample mean? Justify your answer.

[1 + 2 = 3]

(b) In the above problem suppose the numbers are chosen as follows:

First a number *x1* is chosen randomly from [0, 1, 2.. 100]. Next 9 numbers are generated as: *x2* = *x1* +100, *x3* = *x2* +100, ... *x10* = *x9* + 100.

What will be the mean and variance of the sample mean? Justify your answer.

[1 + 2 = 3]

(c) What do you mean by a Beta2 distribution with parameters m, n.

Find the mean and variance of the above distribution.