FACULTY OF SCIENCE

B.Sc. (I Year) II Semester Examination

STATISTICS

Paper II

(Probability Distributions)

Time: 3 *Hours*] [*Max. Marks*: 80

Section A - (Marks: 5 × 4 = 20)

Answer any five *questions.*
Each question carries 4 *marks.*

I. a) Define Bernoulli distribution. Find its Mean and Variance.

b) The mortality rate for a certain disease is 7 in 1000. What is the probability for just two deaths on account of this disease in a group of 400?

c) Derive PGF of Geometric distribution and hence find its Mean and Variance.

d) Define Beta distribution of Second kind.

e) Define Standard Cauchy distribution.

f) If $f(x) = e^{-x}$; $0 < x < \infty$, then find i) $P(1 \le x \le 2)$, ii) F(1)

g) State the relation of Gamma distribution with Normal distribution.

h) If an unbiased coin is tossed 12 times, find the probability of getting 5 or 6 or 7 heads using Central Limit Theorem.

Section B - (Marks: 4 x 15 = 60)

Answer any all *the questions.*
Each question carries 15 *marks.*

2. a) i) Define Binomial Distribution. Find its Mean and Variance.

ii) The Mean and Variance of Binomial Distribution are 4 and 4/3 respectively. Find $P(X \le 1)$.

Or

b) Define Hyper Geometric distribution. Obtain the Mean and Variance of the distribution. Show that Hyper Geometric distribution tends Binomial Distribution under certain conditions.

3. a) i) Define Poisson distribution and derive Poisson distribution as a limiting form of Binomial Distribution.

   ii) Show that in a Poisson distribution with Unit Mean; Mean Deviation about Mean is (2/e) times the Standard Deviation.

Or

   b) Define Negative Binomial Distribution and obtain its MGF. Hence or otherwise find its Mean and Variance and also write its 4 assumptions.

4. a) Define Normal distribution, write its 4 properties. Prove that all odd order moments of Normal Distribution are zero.

Or

   b) i) Define Uniform Distribution on [a, b], find its Mean and Variance.

   ii) Find the Mode of Normal distribution.

5. a) Define Exponential Distribution and obtain its Mean and Variance using Moment Generating Function and state and prove its Memory Less Property.

Or

   b) Define Cauchy Distribution. Obtain its Characteristic function and verify its additive property.