(b) Show that the order of convergence of Newton-Raphson methods in Quadratic.

7

6. (a) Find the root of the equation :

$$xe^x = \cos x$$

by secant method, correct to 4 decimal palace. **8**

(b) Find cube root of 24, correct to three places of decimal by Newton-Raphson method. **7**

Unit IV

7. (a) Solve the equations by Gauss-Jordan method : **7**

$$x + 2y + z = 8$$
$$2x + 3y + 4z = 20$$
$$4x + 3y + 2z = 16$$

(b) Solve the equation by using Crout's triangular method : **8**

$$2x + y + 3z = 13$$
$$x + 5y + z = 14$$
$$3x + y + 4z = 17$$

DD-343

M. Sc. EXAMINATION, May 2017

(5 Years Integrated)

(Fourth Semester)

(Main & Re-appear)

MATHEMATICS

MAT-316-H

Probability Distributions and Numerical Methods

Time : 3 *Hours*]   [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Define moment generating functions and prove a random variable X may have no moments although its m.g.f. (moment generating function) exists. **8**

   (b) If X follows binomial distribution with mean 3 and variance 3/2, find P(X ≤ 5). **7**

2. (a) Define cumulant and if $\mu'r$ is the rth moment about origin prove that : **7**

$$\mu'r = \sum_{j=1}^{r}\binom{r-1}{j-1}\mu'_{r-j} - k_j$$

   where k_i is jth comulants.

   (b) In sampling a large number of parts manufactured by a machine, the mean number of defective in a sample of 20 is 2. Out of 1000 such samples, how many would be expected to contain at least 3 objective parts. **8**

Unit II

3. (a) Define Poisson distribution. Find out formula for the mean and variance of Poisson distribution. **7**

   (b) State central unit theorem and give its applications. **8**

4. (a) 1000 light bulbs with a mean life of 120 days are installed in a new factory, their length of life being normally distributed with standard deviation of 20 days. How many bulbs will be expire in less than 90 days ? **8**

   (b) If the variance of Poisson distribution is 2, find the probabilities for X = 1, 2, 3, 4 and 5 from the recurrence relation of the distribution.

Unit III

5. (a) Find a real root of the equation $x^3 - x - 4 = 0$, by using the bisection method correct to 3 decimal places. **8**

8. (a) Solve the equations by Cholesky's method : **7**

$$4x + 2y + 14z = 14$$
$$2x + 17y - 5z = -101$$
$$14x - 5y + 83z = 155$$

(b) Solve the equations by Gauss-Seidel method : **8**

$$20x + y - 2z = 17$$
$$2x - 3y + 20z = 25$$
$$3x + 20y - z = -18$$