3(a) Suppose that 10 men out of 100 and 20 women out of 1000 are color blind. A color blind person is chosen at random. What is the probability of his being male? (10)

(b) Define ‘Random probability distribution’. If a bag contains 3 white and 4 red balls. Three balls are drawn one by one with replacement. Find the probability distribution of the no. of red balls. (10)

4(a) The wages of a group of workers were found to be normally distributed with mean of rupees 400 and standard deviation of rupees 100. estimate the total number of workers in this group in each of the following cases (10)

(i) If there were 3174 workers getting wages below Rs. 300

(ii) If there were 6170 workers getting wages above Rs. 450

(iii) If there were 2996 workers getting wages Rs. 300 and Rs. 350

(iv) If there were 9298 workers getting wages Rs. 325 and Rs. 450.

(b) Binomial distribution is fitted to a set of observed data with total number of observations 200, if the mean and variance are 1.6 and 0.96 respectively then calculate the expected frequencies. (10)

5. Maximize \( z = 8x_1 + 10x_2 - x_1^2 - x_2^2 \) subject to the constraints: (20)

\[ 3x_1 + 2x_2 \leq 6, x_1, x_2 \geq 0. \]

6(a) Using Newton’s forward formula, find the value of \( f (1.6) \) (10)

\[
\begin{array}{cccc}
X & 1 & 1.4 & 1.8 & 2.2 \\
Y & 3.49 & 4.82 & 5.96 & 6.5 \\
\end{array}
\]

(b) Fit the exponential curve \( y = ae^{bx} \) to the following data: (10)

\[
\begin{array}{cccc}
X & 1 & 2 & 3 & 4 \\
Y & 4 & 11 & 35 & 100 \\
\end{array}
\]

7(a) Find the values of \( x, y \) and \( z \) using Gauss -Seidal method. (10)

\[ 8x-3y-2z = 20, 6x+3y+12z = 35, 4x+11y-z = 33. \]

(b) Using Runge –Kutta method, solve \( y = x + y^2 \) for \( x=0.1 \) correct upto 4 decimal places .initial conditions are \( x=0, y =1. \) (10)