PARUL UNIVERSITY
FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF APPLIED SCIENCE AND HUMANITIES
4th SEMESTER B. TECH PROGRAMME
PROBABILITY, STATISTICS AND NUMERICAL METHODS (203191254)
ACADEMIC YEAR 2022-2023

Assignment 2

1.	A discrete random variable X has the probability mass function given as follows: X: -2 | -1 | 0 | 1 | 2 $P(X=x)$: 0.2 | 0.1 | k | 0.3 | 0.1 Find (i) k (ii)$E(X)$ (iii)$V(X)$ (iv) $E(2X-3)$ (v)$V(2X-3)$.
2.	There are two defective pencils in a pack of dozen pencils. If three pencils are taken at random, find the probabilities that (i) at the most one pencil is defective (ii) two pencils are defective.
3.	A sample of 3 items is selected at random from a box containing 10 items of which 4 are defective. Find the expected number of defective items.
4.	The incidence of occupational disease in an industry is such that the workers have a 20% chance of suffering from it. What is the probability that out of 6 workers chosen at random, four or more will suffer from the disease?
5.	The probability that a patient will get the reaction of a particular injection is 0.001. If 2000 patients are given that injection. Find the probabilities that (i) 3 patients will get a reaction and (ii) more than 2 patients will get a reaction.
6.	The distribution of the number of road accidents per day in a city is Poisson with a mean of 4. Find the number of days out of 100 days when there will be (i) no accidents, (ii) at least 2 accidents, and (iii) at most 3 accidents.
7.	If X is normally distributed with a mean of 12 and standard deviation of 4 then, find the probability of: (i) $X \geq 20$ (ii) $X \leq 20$ (iii) $0 \leq X \leq 12$.
8.	The expenditures on breakfast of customers of a restaurant follow a normal distribution with a mean Rs.200 and a standard deviation of Rs.50. On a particular day 40 customers spent more than Rs.275, find the expected number of customers visiting the restaurant on that day.
9.	A coin is tossed 900 times. Find the probability that the number of heads is between 435 and 465.

10.	If X is normally distributed with P(X < 79) = 10% and P(X < 143) = 90% .Find the mean and standard deviation.
11.	The daily profit of a businessman is Rs.120 and the s.d. of the profit is Rs.15. Find the number of days out of 365 days on which his profit will be less than Rs.100.
12.	Solve the following system of linear equations by Gauss Jacobi method: $4x + y + 3z = 17$ $x + 5y + z = 14$ $2x - y + 8z = 12$
13.	Solve the following system of linear equations by Gauss seidel method, correct up to decimal places. $2x - 15y + 6z = 72$ $-x + 6y - 27z = 85$ $54x + y + z = 110$
14.	Find the root of the equation $x^3 - 5x + 3 = 0$, using the bisection method correct to three decimal places.
15.	Find the root of the equation $xe^x = 1$, using the bisection method correct to three decimal places.
16.	Find the root of the equation $cosx - xe^x = 0$, using the Regula- Falsi method correct to three decimal places, lying between 0.5 and 0.7.
17.	Find the root of the equation $x^3 + x - 1 = 0$, using the Newton - Raphson method correct to three decimal places.
18.	Find the root of the equation $x - 2\sin x = 0$, using the Newton-Raphson method correct to three decimal places.
19.	Using the iterative formula of the N-R method evaluate the following: (i) $\frac{1}{12}$ (ii) $\sqrt{28}$ (iii) $\frac{1}{\sqrt{35}}$ (iv) $\sqrt[3]{11}$