



Q.1. Solve the following:

(6x5=30)

- If an experiment can result in any one of N different equally likely outcomes and if n of these outcomes together constitute event A , then show that the probability of event A is

$$P(A) = \frac{n}{N}$$

- Check whether the function given by $f(x) = \frac{x+2}{25}$, for $x = 1, 2, 3, 4, 5$ can serve as the probability distribution of a discrete random variable.
- Find the probabilities of getting
 - Three heads in three random tosses of a balanced coin;
 - Four sixes and then another number in five random rolls of a balanced die.
- Solve the system of equation by factorization method

$$2x_1 - 3x_2 + 10x_3 = 3$$

$$-x_1 + 4x_2 + 2x_3 = 20$$

$$5x_1 + 2x_2 + x_3 = -12$$

- Find a root of the equation $x^3 - 2x - 5 = 0$ using bisection method.
- Use Trapezoidal Rule to evaluate the definite Integral $\int_0^1 (x + 5x^2) dx$ with $h = 0.2$.

Q.2. Solve the following:

(3x10=30)

- Find a root of the equation $x^3 + x^2 - 1 = 0$ by Newton's Raphson method. (6)
 - Calculate the following integral by Trapezoidal rule and Simpson's rule (by taking $n=2$) (4)

$$\int_0^2 (\sin x + e^x) dx$$

- Solve the following system of equations by Gauss's Jacobi method (10)

$$28x_1 + 4x_2 - x_3 = 32$$

$$2x_1 + 17x_2 + 4x_3 = 35$$

$$x_1 + 3x_2 + 10x_3 = 24$$

- If the joint probability density of X and Y is given by (10)

$$f(x, y) = \begin{cases} x + y & \text{for } 0 < x < 1, 0 < y < 1 \\ 0 & \text{elsewhere} \end{cases}$$

Find the joint distribution function of these two random variables.