

Assignment 1

AI1110: Probability and Random Variables

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Question 1(b) A man invests ₹ 4500 in shares of a company which is paying 7.5% dividend. If ₹ 100 shares are available at a discount of 10%, find:

- (i) the number of shares he purchases
- (ii) his annual income

Solution.

Total investment made by the man, $P = ₹ 4500$

Face value of a share, $F = ₹ 100$

Discount at which the shares are available, $d = 10\%$

Dividend, $D = 7.5\%$

(i) Market value of a share, $M = F \left(1 - \frac{d}{100} \right)$

The number of shares purchased is given by:

$$\begin{aligned}
 N &= \frac{P}{M} \\
 &= \frac{P}{F \left(1 - \frac{d}{100} \right)} \\
 &= \frac{P}{F \left(\frac{100 - d}{100} \right)} \\
 \therefore N &= \frac{100P}{F(100 - d)}
 \end{aligned}$$

On substituting the values, we get:

$$N = \frac{100 \times 4500}{100(100 - 10)} = \frac{4500}{90} = 50$$

\therefore The man purchased 50 shares.

(ii) His annual income is given by:

$$\begin{aligned}
 A &= F \times N \times \frac{D}{100} \\
 &= F \times \frac{100P}{F(100-d)} \times \frac{D}{100} \\
 \therefore A &= \frac{PD}{100-d}
 \end{aligned}$$

On substituting the values, we get:

$$A = \frac{4500 \times 7.5}{100 - 10} = \frac{4500 \times 7.5}{90} = 50 \times 7.5 = 375$$

\therefore The annual income of the man is ₹ 375