Assignment 1

AI1110: Probability and Random Variables

Indian Institute of Technology Hyderabad

Ankit Saha
AI21BTECH11004

29 March 2022

ICSE 2019 Grade 10

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.

The various parameters involved in this question are listed in Table (I):

Parameter	Symbol/Formula	Value
Total investment	P	4500
Face value of a share	F	100
Discount on shares	d	10
Dividend	D	7.5
Number of shares	$N = \frac{100P}{F(100-d)}$	???
Annual income	$A = \frac{PD}{100-d}$	???

TABLE I

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

The number of shares purchased is given by:

$$N = \frac{P}{M} \tag{1}$$

$$= \frac{P}{F\left(1 - \frac{d}{100}\right)} \tag{2}$$

$$= \frac{P}{F\left(\frac{100-d}{100}\right)} \tag{3}$$

$$\therefore\ N = \frac{100P}{F(100-d)} \tag{4}$$

On substituting the values, we get:

$$N = \frac{100 \times 4500}{100(100-10)} = \frac{4500}{90} = 50 \tag{5}$$

$\therefore$ The man purchased 50 shares.

(ii) His annual income is given by:

$$A = F \times N \times \frac{D}{100} \tag{6}$$

$$= F \times \frac{100P}{F(100-d)} \times \frac{D}{100} \tag{7}$$

$$\therefore\ A = \frac{PD}{100-d} \tag{8}$$

On substituting the values, we get:

$$A = \frac{4500 \times 7.5}{100-10} = \frac{4500 \times 7.5}{90} = 375 \tag{9}$$

$\therefore$ The annual income of the man is ₹ 375