Shares and Dividends **3**

3.1 SHARE

To start any big business (company or industry), a large sum of money is needed and, in general, it is not possible for an individual to invest such a large amount. Then some persons, interested in the business, join together and form a company. They divide the estimated money required into small parts. Each such part is called a *share*. A share may have value ₹5, ₹10, ₹25, ₹50, ₹100 etc. Each person who purchases one or more shares is called a *shareholder*.

3.1.1 Some terms related with a share

1. The original value of a share is called its **nominal value** (abbreviated **N.V.**) or **face value** or **printed value**. The nominal value of a share always remains same.
2. The price of a share at any time is called its **market value** (abbreviated **M.V.**) or **cash value**. The market value of a share changes from time to time.
3. If the market value of a share is the same as its nominal value, the share is called **at par**.
4. If the market value of a share is more than its nominal value, the share is called **at premium** or **above par**. If a share of ₹100 is selling at ₹135, then it is said to be selling at a premium of ₹35 or at ₹35 above par.
5. If the market value of a share is less than its nominal value, the share is called **at discount** or **below par**. If a share of ₹100 is selling at ₹88, then it is said to be selling at a discount of ₹12 or at ₹12 below par.

3.2 DIVIDEND

*The profit, which a shareholder gets for his/her investment from the company, is called **dividend**.*

1. The dividend is always expressed as the percentage of the face value of the share.
2. The dividend is always given (by the company) on the face value of the share irrespective of the market value of the share.

3.2.1 Quotations

"15% ₹100 shares at ₹145" means that

(1) the face value of 1 share = ₹100.

(2) the market value of 1 share = ₹145.

(3) the dividend (profit) on 1 share = 15% of ₹100 = ₹15 p.a.

(4) the income on ₹145 is ₹15 for one year.

(5) the rate of return (or yield) p.a. $= \left(\dfrac{15}{145} \times 100\right)\% = \dfrac{300}{29}\% = 10\dfrac{10}{29}\%$.

Similarly, "12% ₹25 shares at a discount of ₹5" means that

(1) the face value of 1 share = ₹25.

(2) the market value of 1 share = ₹25 – ₹5 = ₹20.

(3) the dividend on 1 share = 12% of ₹25 = ₹$\left(\dfrac{12}{100} \times 25\right)$ p.a. = ₹3 p.a.

(4) the income on ₹20 is ₹3.

(5) the rate of return p.a. $= \left(\dfrac{3}{20} \times 100\right)\% = 15\%$.

3.3 FORMULAE

1. Investment

Money invested = number of shares × market value of one share.

2. Income and Return

(*i*) Annual income = number of shares × rate of dividend × face value of one share

(*ii*) Rate of return $= \left(\dfrac{\text{annual income}}{\text{investment}} \times 100\right)\%$

3. Number of shares

Number of shares purchased (or held) $= \dfrac{\text{investment}}{\text{market value of one share}}$ or $\dfrac{\text{annual income}}{\text{income on one share}}$

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Illustrative Examples

Example 1. *A man purchases 600 shares of face value ₹40 at par. If a dividend of ₹1680 was received at the end of the year, find the rate of dividend.*

Solution. Total value of all the shares (investment) = ₹(40 × 600) = ₹24000.

The dividend received at the end of year = ₹1680.

∴ The rate of dividend $= \left(\dfrac{1680}{24000} \times 100\right)\% = 7\%$.

Example 2. *Vijay wants to invest ₹27000 in buying shares. The shares of the following companies are available to him :*

₹100 shares of company A at par value; ₹100 shares of company B at a premium of ₹25; ₹100 shares of company C at a discount of ₹10; ₹50 shares of company D at a premium of 20%.

Find how many shares will he get if he buys shares of company

(i) A (ii) B (iii) C (iv) D?

Solution. (*i*) Market value of a share of company A = ₹100.

∴ Number of shares of company A $= \dfrac{\text{investment}}{\text{market value of one share}}$

$= \dfrac{₹27000}{₹100} = 270.$

(*ii*) Market value of a share of company B = ₹100 + ₹25 = ₹125.

∴ Number of shares of company B $= \dfrac{₹27000}{₹125} = 216.$

(*iii*) Market value of a share of company C = ₹100 – ₹10 = ₹90.

∴ Number of shares of company C $= \dfrac{₹27000}{₹90} = 300.$

(iv) Market value of a share of company D $= ₹50 + 20\%$ of $₹50$

$$= ₹50 + ₹\left(\frac{20}{100} \times 50\right)$$

$$= ₹50 + ₹10 = ₹60.$$

∴ Number of shares of company D $= \dfrac{₹27000}{₹60} = 450.$

Example 3. *Raman has 450 shares of ₹ 200 of a company paying a dividend of 16%. Find his net income after paying an income tax of 20%.*

Solution. Total dividend = number of shares × rate of dividend × face value of one share

$$= 450 \times \frac{16}{100} \times ₹\,200 = ₹\,14400.$$

Income tax $= 20\%$ of $₹\,14400 = ₹\left(\frac{20}{100} \times 14400\right)$

$$= ₹\,2880.$$

∴ Net income = total dividend − income tax

$$= ₹\,14400 − ₹\,2880$$

$$= ₹\,11520.$$

Example 4. *A man bought 500 shares, each of face value ₹10, of a certain business concern and during the first year after purchase received ₹400 as dividend on his shares. Find the rate of dividend on shares.*

Solution. Let the rate of dividend be r % per annum.

Annual dividend = number of shares × rate of dividend × face value of one share

$$= 500 \times \frac{r}{100} \times ₹\,10 = ₹\,50\,r$$

Given, dividend received after one year of purchase of shares is ₹ 400.

∴ $₹\,50\,r = ₹\,400$ $\Rightarrow$ $50\,r = 400$ $\Rightarrow r = 8.$

Hence, the rate of dividend $= 8\%$.

Example 5. *A man invests ₹9600 on ₹100 shares at ₹80. If the company pays him 18% dividend, find :*

(i) the number of shares he buys.

(ii) his total dividend.

(iii) his percentage return on the shares. *(2012)*

Solution. *(i)* Investment = ₹9600, market value of one share = ₹80.

∴ The number of shares bought $= \dfrac{\text{investment}}{\text{market value of one share}} = \dfrac{₹9600}{₹80} = 120.$

(ii) Total dividend = number of shares × rate of dividend × face value of one share

$$= 120 \times \frac{18}{100} \times ₹100 = ₹2160.$$

(iii) ₹2160 is the income on ₹9600,

∴ rate of return on shares $= \left(\dfrac{2160}{9600} \times 100\right)\% = \dfrac{45}{2}\% = 22{\cdot}5\%.$

Example 6. *A man invests ₹3960 in shares of a company which pays 15% dividend at a time when a ₹25 share costs ₹33. Find :*

(i) the number of shares he bought.

(ii) the annual income from his shares.

(iii) the rate of interest which he gets on his investment.

Solution. (*i*) Since the market value of one share is ₹33 and the money invested is ₹3960,

$$\therefore \qquad \text{the number of shares bought} = \frac{₹3960}{₹33} = 120.$$

(*ii*) Annual income = number of shares × rate of dividend

× face value of one share

$$= 120 \times \frac{15}{100} \times ₹25 = ₹450.$$

(*iii*) ₹450 can be considered as the interest on ₹3960 for one year,

$$\therefore \text{ the rate of interest} = \left(\frac{450}{3960} \times 100\right)\% = \frac{125}{11}\% = 11\frac{4}{11}\%.$$

Example 7. *A man wants to buy 62 shares available at ₹132 (par value of ₹100).*

(i) How much should he invest?

(ii) If the dividend is 7·5%, what will be his annual income?

(iii) If he wants to increase his annual income by ₹150, how many extra shares should he buy?

(2002)

Solution. (*i*) Since the market value of one share (par value ₹100) is ₹132,

∴ market value of 62 shares = ₹(132 × 62) = ₹8184.

∴ The man should invest ₹8184.

(*ii*) Annual income = number of shares × rate of dividend

× face value of one share

$$= 62 \times \frac{7·5}{100} \times ₹100$$

$$= ₹(62 \times 7·5) = ₹465.$$

(*iii*) Since income on one share is ₹7·5,

$$\therefore \text{ for income of ₹150, the number of shares} = \frac{₹150}{₹7·5} = 20.$$

Thus, to increase the income by ₹150, the number of extra shares to be purchased = 20.

Example 8. *A man invests ₹20020 in buying shares of nominal value ₹26 at 10% premium. The dividend on shares is 15% per annum. Calculate :*

(i) the number of shares he buys.

(ii) the dividend he receives annually.

(iii) the rate of interest he gets on his money.

(2003)

Solution. (*i*) Since the man buys shares of nominal value ₹26 at 10% premium, the

$$\text{market value of one share} = \left(1+\frac{10}{100}\right) \text{ of } ₹26 = ₹\left(26 \times \frac{11}{10}\right) = ₹\frac{143}{5}.$$

As the investment is ₹20020,

$$\therefore \text{ the number of shares purchased} = \frac{₹20020}{₹\frac{143}{5}} = \frac{20020 \times 5}{143} = 700.$$

(*ii*) Annual income = number of shares × rate of dividend

× face value of one share

$$= 700 \times \frac{15}{100} \times ₹26$$

$$= ₹(7 \times 15 \times 26) = ₹2730.$$

(*iii*) ₹2730 can be considered as the income on ₹20020,

$$\therefore \text{ rate of interest} = \left(\frac{2730}{20020} \times 100 \right)\% = \frac{150}{11}\% = 13\frac{7}{11}\%.$$

Hence, rate of interest on his money $= 13\frac{7}{11}\%$ per annum.

Example 9. *Mr. Parekh invested ₹52000 on ₹100 shares at a discount of ₹20 paying 8% dividend. At the end of one year he sells the shares at a premium of ₹20. Find*

(*i*) *the annual dividend*

(*ii*) *the profit earned including his dividend.* (2011)

Solution. Market value of one share = ₹100 − ₹20 = ₹80, investment = ₹52000.

$$\therefore \text{ The number of shares bought} = \frac{₹52000}{₹80} = 650.$$

(*i*) The annual dividend = number of shares × rate of dividend

× face value of one share

$$= 650 \times \frac{8}{100} \times ₹100 = ₹5200.$$

(*ii*) As Mr. Parekh sells his shares at a premium of ₹20,

the market value of one share = ₹100 + ₹20 = ₹120.

∴ The selling value of his 650 shares = ₹(120 × 650)

$$= ₹78000.$$

∴ Profit earned including his dividend

= selling value + dividend − investment

= ₹78000 + ₹5200 − ₹52000

= ₹31200.

Example 10. *Mukul invests ₹9000 in a company paying a dividend of 6% per annum when a share of face value ₹100 stands at ₹150. What is his annual income? He sells 50% of his shares when the price rises to ₹200. What is his gain on this transaction?*

Solution. Investment = ₹ 9000, market value of one share = ₹ 150.

$$\therefore \text{ The number of shares purchased by Mukul} = \frac{₹ 9000}{₹ 150} = 60.$$

Annual income = number of shares × rate of dividend × face value of one share

$$= 60 \times \frac{6}{100} \times ₹ 100 = ₹ 360.$$

Hence, Mukul's annual income = ₹ 360.

$$50\% \text{ of his shares} = \frac{50}{100} \times 60 = 30.$$

Selling price of 30 shares = ₹ (200 × 30) = ₹ 6000 and

cost price of these shares = ₹ (150 × 30) = ₹ 4500.

∴ Mukul's gain in this transaction = S.P. − C.P.

$$= ₹ 6000 − ₹ 4500 = ₹ 1500.$$

Example 11. *How much should a man invest in ₹25 shares selling at ₹30 to obtain an income of ₹450, if the dividend declared is 15%?*

Solution. Dividend on 1 share of ₹25 = 15% of ₹25

$$= ₹\left(\frac{15}{100} \times 25\right) = ₹\frac{15}{4}.$$

Since the total income is ₹450,

∴ the number of shares bought $= \dfrac{\text{annual income}}{\text{dividend on one share}}$

$$= \frac{₹450}{₹\dfrac{15}{4}} = 450 \times \frac{4}{15} = 120.$$

Since the market value of one share = ₹30,

∴ the sum of money invested by the man = ₹(30 × 120) = ₹3600.

Example 12. *Salman invests a sum of money in ₹50 shares, paying 15% dividend quoted at 20% premium. If his annual dividend is ₹600, calculate:*

(i) the number of shares he bought.

(ii) his total investment.

(iii) the rate of return on his investment. (2014)

Solution. (*i*) Dividend on one share = 15% of ₹ 50

$$= ₹\left(\frac{15}{100} \times 50\right) = ₹\frac{15}{2}.$$

Since Salman's annual dividend is ₹ 600,

∴ the number of shares bought by Salman $= \dfrac{\text{annual income}}{\text{dividend on one share}}$

$$= \frac{₹\,600}{₹\dfrac{15}{2}} = 600 \times \frac{2}{15} = 80.$$

(*ii*) As Salman bought shares of ₹ 50 at 20% premium, market value of one share

$$= ₹\left(1 + \frac{20}{100}\right) \times 50 = ₹\left(\frac{6}{5} \times 50\right) = ₹\,60.$$

∴ His total investment = number of shares × market value of one share

$$= ₹\,(80 \times 60) = ₹\,4800.$$

(*iii*) Rate of return $= \left(\dfrac{\text{annual income}}{\text{investment}} \times 100\right)\%$

$$= \left(\frac{₹\,600}{₹\,4800} \times 100\right)\% = \frac{25}{2}\% = 12·5\%$$

Example 13. *A man sold 400 (₹20) shares paying 5% at ₹18 and invested the proceeds in (₹10) shares, paying 7% at ₹12. How many (₹10) shares did he buy and what was the change in income?*

Solution. Selling price of 400 (₹20) shares at ₹18 = ₹(18 × 400)

$$= ₹7200.$$

Market price of ₹10 share = ₹12,

∴ the number of ₹10 shares purchased $= \dfrac{₹7200}{₹12} = 600.$

Annual income from original (₹ 20) shares

= number of shares × rate of dividend × face value of one share

$$= 400 \times \frac{5}{100} \times ₹\,20 = ₹\,400.$$

Annual income from new (₹ 10) shares

$$= \text{number of shares} \times \text{rate of dividend} \times \text{face value of one share}$$

$$= 600 \times \frac{7}{100} \times ₹\ 10 = ₹\ 420.$$

∴   Change in annual income = ₹420 – ₹400

$$= ₹20 \text{ (increase).}$$

Example 14. *Vivek invests ₹4500 in 8%, ₹10 shares at ₹15. He sells the shares when the price rises to ₹30, and invests the proceeds in 12% ₹100 shares at ₹125. Calculate*

(i) the sale proceeds.

(ii) the number of ₹125 shares he buys.

(iii) the change in his annual income from dividend.   *(2010)*

Solution. Market value of ₹ 10 share is ₹ 15, investment = ₹ 4500.

∴   The number of shares purchased by Vivek $= \dfrac{\text{investment}}{\text{market value of one share}}$

$$= \frac{₹\ 4500}{₹\ 15} = 300.$$

(*i*) Selling price of one share = ₹ 30.

∴   Selling price of 300 shares = ₹ (30 × 300) = ₹ 9000.

Hence, Vivek's sale proceeds = ₹ 9000.

(*ii*) He invests his proceeds in 12% ₹ 100 shares at ₹ 125.

Investment = ₹ 9000, market value of one share = ₹ 125.

∴   The number of new shares bought $= \dfrac{₹\ 9000}{₹\ 125} = 72.$

(*iii*) Annual income (dividend) from previous shares

$$= \text{number of shares} \times \text{rate of dividend} \times \text{face value of one shares}$$

$$= 300 \times \frac{8}{100} \times ₹\ 10 = ₹\ 240.$$

Annual income (dividend) from new shares

$$= \text{number of shares} \times \text{rate of dividend} \times \text{face value of one share}$$

$$= 72 \times \frac{12}{100} \times ₹\ 100 = ₹\ 864.$$

∴ Change in income = ₹ 864 – ₹ 240 = ₹ 624 (increase).

Example 15. *Rohit invested ₹9600 on ₹100 shares at ₹20 premium paying 8% dividend. Rohit sold the shares when the price rose to ₹160. He invested the proceeds (excluding dividend) in 10% ₹50 shares at ₹40. Find the :*

(i) original number of shares.   *(ii) sale proceeds.*

(iii) new number of shares.   *(iv) change in the two dividends.*   *(2015)*

Solution. (*i*) Rohit invested ₹ 9600 on ₹ 100 shares at 20% premium paying 8% dividend.

Market value of one share $= ₹\left(1 + \dfrac{20}{100}\right) \times 100 = ₹\ 120.$

∴   The original number of shares purchased $= \dfrac{\text{investment}}{\text{market value of one share}}$

$$= \frac{₹\ 9600}{₹\ 120} = 80.$$

(*ii*) Selling price of one share = ₹ 160,

∴   selling price of 80 shares = ₹ (160 × 80) = ₹ 12800.

Hence, Rohit's sale proceeds = ₹ 12800.

(*iii*) Market value of new share = ₹ 40, investment = ₹ 12800.

$\therefore$ The number of new shares purchased = $\dfrac{\text{investment}}{\text{market value of one share}}$

$$= \dfrac{₹ \ 12800}{₹ \ 40} = 320.$$

(*iv*) Annual income (dividend) from original shares

= number of shares × rate of dividend × face value of one share

$$= 80 \times \dfrac{8}{100} \times ₹ \ 100 = ₹ \ 640.$$

Annual income (dividend) from new shares

= number of shares × rate of dividend × face value of one share

$$= 320 \times \dfrac{10}{100} \times ₹ \ 50 = ₹ \ 1600$$

$\therefore$ Change in two dividends = ₹ 1600 − ₹ 640 = ₹ 960 (increase)

Example 16. *Which is better investment :*

7% ₹100 shares at ₹120 or 8% ₹10 shares at ₹13·50?

Solution. *In the first case*:

Income on ₹120 = 7% of ₹100 = ₹7,

$\therefore$ income on ₹1 = ₹ $\dfrac{7}{120}$.

In the second case :

Income on ₹13·50 = 8% of ₹10 = ₹ $\dfrac{8}{10}$,

$\therefore$ income on ₹1 = ₹ $\dfrac{\frac{8}{10}}{13\cdot50}$ = ₹ $\left(\dfrac{8}{10} \times \dfrac{2}{27} \right)$ = ₹ $\dfrac{8}{135}$.

Now $\dfrac{7}{120} = \dfrac{7 \times 9}{120 \times 9} = \dfrac{63}{1080}$ and $\dfrac{8}{135} = \dfrac{8 \times 8}{135 \times 8} = \dfrac{64}{1080}$.

Since 63 < 64, therefore, the investment in the second case is better than the investment in the first case.

Example 17. *By purchasing ₹25 gas shares for ₹10 each, a man gets 4 percent profit on his investment. What rate percent is the company paying? What is his dividend if he buys 60 shares?*

Solution. Since the man gets 4% profit on his investment,

$\therefore$ income on 1 share of market value ₹10 = 4% of ₹10

$$= ₹ \left(\dfrac{4}{100} \times 10 \right) = ₹ \dfrac{4}{10}.$$

Since the nominal value of 1 share is ₹25,

$\therefore$ on ₹25, company pays = ₹ $\dfrac{4}{10}$

$\therefore$ on ₹100, company pays = ₹ $\left(\dfrac{4}{10} \times \dfrac{100}{25} \right)$ = ₹1·6

$\therefore$ Rate percent which the company pays = 1·6%

Income on one share = ₹ $\dfrac{4}{10}$.

$\therefore$ Income on 60 shares = ₹ $\left(\dfrac{4}{10} \times 60 \right)$ = ₹24.

Example 18. *Mr. Lohia invests ₹26680 in buying ₹50 shares at a discount of 8%. He sells shares worth ₹15000 at a premium of 6% and the rest at a discount of 10%. Find his total gain or loss from the transaction.*

Solution. As Mr. Lohia buys shares at a discount of 8%,

$$\text{market value of one share} = \left(1 - \frac{8}{100}\right) \text{ of } ₹50 = ₹46.$$

∴ The number of shares purchased $= \dfrac{₹26680}{₹46} = 580.$

Number of shares worth (face value) ₹15000 $= \dfrac{₹15000}{₹50} = 300.$

He sold 300 shares at a premium of 6%,

$$\text{market value of one share} = \left(1 + \frac{6}{100}\right) \text{ of } ₹50 = ₹53.$$

∴ The selling value of 300 shares at ₹53 each
$$= ₹(300 \times 53) = ₹15900.$$
The number of remaining shares = 580 − 300 = 280.
Lohia sold 280 shares at discount of 10%,

$$\text{market value of one share} = \left(1 - \frac{10}{100}\right) \text{ of } ₹50 = ₹45.$$

∴ The selling value of 280 shares at ₹45 each
$$= ₹(280 \times 45) = ₹12600.$$

∴ Total selling value = ₹15900 + ₹12600
$$= ₹28500.$$

∴ Lohia's total gain = ₹28500 − ₹26680
$$= ₹1820.$$

Example 19. *Mr. Ram Gopal invested ₹8000 in 7% ₹100 shares at ₹80. After a year he sold these shares at ₹75 each and invested the proceeds (including his dividend) in 18% ₹25 shares at ₹41. Find:*

(i) his dividend for the first year.

(ii) his annual income in the second year.

(iii) the percentage increase in his return on his original investment. *(2006)*

Solution. (*i*) Since Mr. Ram Gopal invested ₹8000 at ₹80 per share,

the number of shares bought by him $= \dfrac{₹8000}{₹80} = 100.$

Dividend received on one share = 7% of ₹100 = ₹7.

∴ The total dividend received after a year = ₹(7 × 100) = ₹700.

∴ His dividend for the first year = ₹700.

(*ii*) As Mr. Ram Gopal sold his shares at ₹75 each,

the sale value of his shares = ₹(75 × 100) = ₹7500.

His investment in new shares *i.e.* his proceeds
$$= \text{dividend received} + \text{sale value of shares}$$
$$= ₹700 + ₹7500 = ₹8200.$$

As Mr. Ram Gopal invested his proceeds *i.e.* ₹8200 in ₹25 shares at ₹41 each,

the number of new shares purchased $= \dfrac{₹8200}{₹41} = 200.$

Dividend received on one share = 18% of ₹25

$$= ₹\left(\frac{18}{100} \times 25\right) = ₹\frac{9}{2}.$$

∴ Total dividend received on his second investment = $₹\left(\frac{9}{2} \times 200\right)$ = ₹900.

∴ His annual income in the second year = ₹900.

(*iii*) The increase in return = dividend on second investment

– dividend on first investment

= ₹900 – ₹700 = ₹200.

∴ The percentage of increase in return on his original investment

$$= \left(\frac{200}{8000} \times 100\right)\% = \frac{5}{2}\% = 2.5\%.$$

Example 20. *Amit and Richa invest ₹12000 each in buying shares of two companies. Amit buys 15% ₹100 shares at a discount of ₹20, while Richa buys ₹25 shares at a premium of 20%. If both receive equal dividends at the end of the year, find the rate percent of the dividend declared by Richa's company.*

Solution. Market value of one share purchased by Amit

= ₹100 – ₹20 = ₹80.

Investment by Amit = ₹12000.

∴ Number of shares purchase by Amit = $\dfrac{₹12000}{₹80}$ = 150.

Annual dividend received by Amit = number of shares held by Amit

× rate of dividend × face value of one share held by Amit

$$= 150 \times \frac{15}{100} \times ₹100 = ₹2250.$$

∴ Annual dividend received by Richa = ₹2250.

(∵ Both Amit and Richa get equal dividends)

Richa purchased ₹25 shares at premium of 20%.

∴ Market value of one share purchased by Richa = $\left(1 + \dfrac{20}{100}\right)$ of ₹25

$$= ₹\left(25 \times \frac{6}{5}\right) = ₹30.$$

Investment by Richa = ₹12000.

∴ Number of shares purchased by Richa = $\dfrac{₹12000}{₹30}$ = 400.

Let *r*% be the rate of dividend declared by Richa's company, then

annual dividend of Richa = number of shares held by Richa × rate of dividend of Richa's company × face value of one share held by Richa

⇒ $₹2250 = 400 \times \dfrac{r}{100} \times ₹25$

⇒ 2250 = 100*r* ⇒ *r* = 22·5

Hence, the rate percent of the dividend declared by Richa's company = 22·5%

Example 21. *A dividend of 9% was declared on ₹100 shares selling at a certain price. If the rate of return is $7\frac{1}{2}$%, calculate:*

(i) the market value of the share.

(ii) the amount to be invested to obtain an annual dividend of ₹630. (2000)

Solution. Dividend on one share of ₹100 = ₹9.

(*i*) Let the market value of one share be ₹x.

The profit on one share = $7\frac{1}{2}$% of ₹x = ₹$\left(\frac{15}{2} \times \frac{1}{100} \times x\right)$ = ₹$\frac{3x}{40}$.

Since the dividend paid on one share = ₹9,

∴ $\frac{3x}{40} = 9 \Rightarrow x = 120$.

∴ The market value of each share = ₹120.

(*ii*) As the total income is ₹630,

∴ the number of shares bought = $\frac{₹630}{₹9}$ = 70.

Since the market value of each share = ₹120,

∴ the amount to be invested = ₹(120×70) = ₹8400.

Example 22. *A man buys ₹50 shares of a company which pays 12% dividend. He buys the shares at such a price that his profit is 15% on his investment. At what price did he buy the shares?*

Solution. Dividend on 1 share of ₹50 = 12% of ₹50 = ₹6.

Let the man buy one share for ₹x.

His profit on one share = 15% of ₹x = ₹$\frac{15}{100}x$.

Since the dividend paid by the company on 1 share = ₹6,

∴ $\frac{15}{100}x = 6 \Rightarrow x = 40$.

∴ The man buys each share at ₹40.

Example 23. *Mr. Ghosh sold a certain number of ₹20 shares paying 8% dividend at ₹18 and invested the proceeds in ₹10 shares, paying 12% dividend at 50% premium. If the change in his annual income is ₹120, find the number of shares sold by Mr. Ghosh.*

Solution. Let the number of shares sold by Mr. Ghosh be x.

Income on one share = 8% of ₹20 = ₹$\left(\frac{8}{100} \times 20\right)$ = ₹$\frac{8}{5}$.

∴ Total income on x shares = ₹$\frac{8}{5}x$.

Since Mr. Ghosh sold x shares at ₹18 each, sale value of his shares = ₹$18x$.

As Mr. Ghosh invested the proceeds *i.e.* ₹$18x$ in ₹10 shares at 50% premium *i.e.* at $\left(1 + \frac{50}{100}\right)$ of ₹10 *i.e.* at ₹15, the number of new shares bought = $\frac{₹18x}{₹15} = \frac{6x}{5}$.

Dividend received on one share = 12% of ₹10

$$= ₹\left(\frac{12}{100} \times 10\right) = ₹\frac{6}{5}.$$

∴ Total income on new shares = ₹$\left(\frac{6}{5} \times \frac{6x}{5}\right)$ = ₹$\frac{36x}{25}$.

$$\therefore \quad \text{Loss in income} = ₹\frac{8}{5}x - ₹\frac{36}{25}x = ₹\left(\frac{8}{5} - \frac{36}{25}\right)x = ₹\frac{4}{25}x.$$

According to given, $₹\frac{4}{25}x = ₹120 \Rightarrow \frac{4}{25}x = 120 \Rightarrow x = 750.$

∴   The number of shares sold by Mr. Ghosh = 750.

Example 24. *Suresh has a choice to invest in shares of two companies A and B. ₹100 shares of company A are available at 10% premium and it pays 8% dividend whereas ₹50 shares of company B are available at 12% discount and it pays 7% dividend. If he invests equally in both the companies and the sum of his annual incomes from them is ₹1340, find how much, in all, does he invest?*

Solution. Let Suresh invest $₹x$ in each company.

For company A

Face value of each share = ₹100,

$$\text{market value of each share} = \left(1 + \frac{10}{100}\right) \text{ of } ₹100 = ₹110.$$

∴   The number of shares bought $= \dfrac{₹x}{₹110} = \dfrac{x}{110}.$

Annual income = no. of shares × rate of dividend × F.V. of one share

$$= \frac{x}{110} \times \frac{8}{100} \times ₹100 = ₹\frac{4x}{55}.$$

For company B

Face value of each share = ₹50,

$$\text{market value of each share} = \left(1 - \frac{12}{100}\right) \text{ of } ₹50 = ₹44.$$

∴   The number of shares bought $= \dfrac{₹x}{₹44} = \dfrac{x}{44}.$

Annual income = no. of shares × rate of dividend × F.V. of one share

$$= \frac{x}{44} \times \frac{7}{100} \times ₹50 = ₹\frac{7x}{88}.$$

∴ Sum of annual income from both companies $= ₹\dfrac{4x}{55} + ₹\dfrac{7x}{88}$

$$= ₹\left(\frac{4x}{55} + \frac{7x}{88}\right) = ₹\left(\frac{4}{5} + \frac{7}{8}\right) \times \frac{x}{11}$$

$$= ₹\frac{32 + 35}{40} \times \frac{x}{11} = ₹\frac{67x}{440}.$$

According to given, $₹\dfrac{67x}{440} = ₹1340 \Rightarrow \dfrac{67x}{440} = 1340 \Rightarrow x = 8800$

⇒ Suresh invests ₹8800 in each company.

∴   Suresh invests in all = ₹8800 + ₹8800

                                = ₹17600.

Example 25. *A man invests ₹13500 partly in 6% ₹100 shares at ₹140 and partly in 5% ₹100 shares at ₹125. If his total income is ₹560, how much has he invested in each?*

Solution. Let the investment of the man in 6% ₹100 shares at ₹140 be $₹x$, then his investment in 5% ₹100 shares at ₹125 = $₹(13500 - x).$

Income on one share of ₹140 $= ₹6\%$ of ₹100 $= ₹6$.

$\therefore$ Income on ₹x $= ₹\dfrac{6}{140}x = ₹\dfrac{3}{70}x.$

Income on one share of ₹125 $= ₹5\%$ of ₹100 $= ₹5$.

$\therefore$ Income on ₹$(13500 - x)$ $= ₹\dfrac{5}{125}(13500 - x)$

$= ₹\dfrac{1}{25}(13500 - x).$

But the total income of the man is ₹560,

$\therefore$ $\dfrac{3}{70}x + \dfrac{1}{25}(13500 - x) = 560$

$\Rightarrow$ $15x + 14(13500 - x) = 350 \times 560$

$\Rightarrow$ $15x - 14x = 350 \times 560 - 14 \times 13500$

$\Rightarrow$ $x = 7000.$

$\therefore$ $13500 - x = 13500 - 7000 = 6500.$

$\therefore$ Investment in 6% shares at ₹140 $= ₹7000$

and investment in 5% shares at ₹125 $= ₹6500$.

Exercise 3

1. Find the dividend received on 60 shares of ₹20 each if 9% dividend is declared.
2. A company declares 8 percent dividend to the shareholders. If a man receives ₹2840 as his dividend, find the nominal value of his shares.

   Hint

   Let the nominal value of his shares be ₹x, then 8% of ₹x = ₹2840.
3. A man buys 200 ten-rupee shares at ₹12·50 each and receives a dividend of 8%. Find the amount invested by him and the dividend received by him in cash.
4. Find the market price of 5% ₹100 share when a person gets a dividend of ₹65 by investing ₹1430.
5. Salman buys 50 shares of face value ₹100 available at ₹132.

   (*i*) What is his investment?

   (*ii*) If the dividend is 7·5% p.a., what will be his annual income?

   (*iii*) If he wants to increase his annual income by ₹150, how many extra shares should he buy? (*2013*)
6. A lady holds 1800, ₹100 shares of a company that pays 15% dividend annually. Calculate her annual dividend. If she had bought these shares at 40% premium, what percentage return does she get on her investment?
7. What sum should a person invest in ₹25 shares, selling at ₹36, to obtain an income of ₹720, if the dividend declared is 12% ? Also find

   (*i*) the number of shares bought by him.

   (*ii*) the percentage return on his income.
8. Ashok invests ₹26400 on 12% ₹ 25 shares of a company. If he receives a dividend of ₹2475, find:

   (*i*) the number of shares he bought.

   (*ii*) the market value of each share. (*2016*)