BBA : Semester-I

NEW SYLLABUS

BUSINESS MATHEMATICS

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A Book Of

BUSINESS MATHEMATICS

B.B.A. Semester - I
As Per Pune University's Revised Syllabus
Effective from June 2013

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Preface …

We have great pleasure in presenting this text book on **'Business Mathematics'** to the students of B.B.A. (Semester – I). This book is written according to the new revised syllabus of University of Pune to be implemented from June 2013.

We have taken utmost care to present the matter systematically. The book contains several selected solved examples and an ample number of graded problems in the exercises.

We are thankful to **Shri Dineshbhai Furia, Shri Jignesh Furia, Shri M. P. Munde**, Mrs. Anagha Kaware, Mr. Santosh Bare, Mrs. Anjali Muley (Fig. Drawing) and the staff of Nirali Prakashan, for the great efforts that they have taken to publish the book in time.

We welcome the valuable suggestions from our colleagues' and readers for the improvement of the book.

PUNE **AUTHORS**

JULY 2013

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Shares and Dividends

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Learning Objectives:

Equaity Share, Preference Share, Debentures, Stock Market.

Chapter Objectives ...

To understand dealings in stock market.

1.1 Introduction

We know that a person or a small group of persons can start a business upto medium size. However, when a big industry is to be launched, several persons come together to raise required capital. These are called *promoters* of the company. The capital is divided into small parts called *shares*. The people who purchase shares are called *shareholders* of the company and in a way they are owners of the company. The company is managed by a body of persons known as *Board of Directors* of the company.

1.2 Share Capital

The total capital of the company is divided into a number of small unit of equal value called *'shares'*. Thus a capital of ₹ 100000 may be divided into 1000 shares of ₹ 100 each, or 2000 shares of ₹ 50 each. The rights of the holders of each class of shares are governed by the companies act and also by the Articles and Association of the company.

1.3 Kinds of Shares (Types of Share) **(April 2015)**

(i) Preference shares : The holders of these shares enjoy a preferential rights as regards the payment of dividend, and the repayment of capital in the event of winding-up. The rate of profit or dividend is fixed but it is paid before the profit is distributed on equity shares.

The preference shares are of the following kinds :

(a) Cumulative preference shares : The holders of these shares are entitled to a fixed dividend each year. But the amount of the dividend not paid in any year stands as arrears and is payable out of the profits of subsequent years.

(b) Non-cumulative preference shares : The holders of these shares have a preferential right for a fixed dividend out of the profits before the same are distributed to other classes of shares, but such dividend is payable only out of the profits of each particular year. Thus each year it lapses and cannot be claimed out of the future profits.

(ii) Equity shares : These shares ware formerly called 'ordinary' shares. They have no special rights attached to them. The holders of these shares are paid dividend after the claims of the preference shares holders are satisfied. The rate of the dividend is not fixed; it varies from year to year depending on the profits of the company. In some years they may have to go without dividend while in others they may get a very high rate of dividend. An equaity share is also called a "scrip".

1.4 Dividend

(April 2007, 2009)

The net profit made by the company every year is ascertained from its Profit and Loss Account prepared at the end of the year. Out of the net profits, dividend at a specified rate is paid on preference shares. Arrears of dividend, if any, on cumulative preference shares are also paid, if the amount of profit permits. The balance is then utilised for payment of dividend on equity shares. Dividend may be declared as fixed amount per share or as a percentage of the capital of the company.

1.5 Debenture

A company may require additional long-term capital for extension and development schemes. One of the methods of raising such finance is by means of debentures. Debentures are long-term loans taken by the company from the public. The total amount to be borrowed is divided like share capital into small units of equal amounts; and the members of the public are invited to lend such amounts to the company at a specified rate of interest.

1.6 Bonus Shares

(April 2007)

Sometimes a company rewards its share holders by issuing free shares to them in proportion of the shares held by them. These (free) shares are called **bonus shares**. They are entitled for all rights, that an ordinary share has. In this way, the holding of a person increases and the amount corresponding to bonus shares is capitalised. The company can use this amount for capital expenditure. Bonus shares are issued in some ratio. The ratio **a** : b means **a** free shares for **b** shares held.

1.7 Stock Exchange, Face Value, Market Value of Shares

(April 2011)

Shares and debentures are transferable assets. They are bought and sold in **"Stock Exchanges"**. A stock exchange is a form of exchange, which provides services for stock brokers and traders to trade stocks, bonds and other securities. Stock exchanges also provide facilities for issue and redemption of securities and other financial instruments and capital events including payment of income and dividends.

In India there are two prominent stock exchanges, the Bombay Stock Exchange (BSE) and National Stock Exchange (NSE).

Bombay Stock Exchange, known as BSE limited is the oldest stock exchange in entire Asea. It is located at Jeejee bhoy towers, Dalal street in fort, Mumbai. It has largest number of companies of the world listed on it. As per March 2012 there are more than 5000 Indian companies listed on BSE. The BSE sensex which is also known as BSE-30 (weighed average of 30 leading companies) is most commonly used term while referring to trading volume in India and Asea. The total capital of all shares listed on BSE in 2012 was approximately ₹ 50000 crores. In term of share volume NSE is almost twice that of BSE.

Now-a-days shares in physical form have given way to shares in demat (dematerialize) form. In short, an investor has a list of shares he possesses and not physical share certificates. This has simplified several procedures and reduced lot of paper work.

The price stated on the body of share or debenture is called its **face value** (F.V.) or **nominal value.** **(April 2015)**

The price at which a debenture or share is actually bought or sold is called **market value** or **cash value** of the share.

If the face value and market value of a share are equal, the share is said to be "**at par**".

Illustrative Examples

Example 1.1 : *A sum of money got by selling shares of ₹ 1,500 in 10% at 135 was deposited in a bank at 8% p.a. which investment gives a better return ?*

Solution : As there is no mention of brokerage, we need not think of it.

By 10% at 135 we mean a share with face - value ₹ 100 is having a market price ₹ 135 and fetches dividend ₹ 10. Let us find the amount realised by selling shares of face-value ₹ 1,500.

When face-value is ₹ 100, market price is 135.

∴ When face-value is ₹ 1,500, market price

$$= \frac{135 \times 1500}{100} = ₹\ 2{,}025$$

However, the income by way of dividend on these shares is ₹ 15 × 10 = 150 (since there are 15 shares of face-value ₹ 100 each).

The annual interest received from the bank at 8% p.a.

$$= \frac{Pnr}{100}$$

$$= \frac{2025 \times 1 \times 8}{100}$$

$$= ₹\ 162$$

∴ Investment in bank is better as it gives ₹ 12 more annually.

Example 1.2 : *A sum of ₹ 1,350 was invested in 6% stock at 87. When it rose to 91 all the shares were sold. In the meanwhile dividend was received. For purchasing the brokerage was 3%, while selling it was 2%. What is the total gain or loss in the total transaction ?*

Solution : Since rate of commission is 3% for purchase, each share costs ₹ (87 + 3) = ₹ 90.

$\therefore$ In ₹ 1,350, a person will get $\frac{1350}{90}$ = 15 shares.

The dividend received on it will be ₹ (15 × 6) = ₹ 90.

While selling the shares, amount received per share will be ₹ (91 – 2) = ₹ 89.

$\therefore$ Amount received by selling all 15 shares = ₹ (15 × 89) = ₹ 1,335.

$\therefore$ Total gain = ₹ (1,335 + 90 – 1,350) = ₹ 75.

Example 1.3 : *Two companies have shares of 12% at 124 and 16% at 145. In which of the shares would the investment be more profitable ?*

Solution : Clearly, the face-value of the share must be ₹ 100 in each case.

Let us find percentage return in each case.

For ₹ 124, the return is ₹ 12

For ₹ 100, the return is ₹ 9.677 $\left(\frac{100}{124} \times 12 = 9.677\right)$

For the second company.

For ₹ 145, the return is ₹ 16

$\therefore$ For ₹ 100, the return is ₹ 11.03 $\left(\frac{100}{145} \times 16 = 11.03\right)$

As the percentage return in second case is more, the investment in the second company is more profitable.

Example 1.4 : *The capital of a company consists of ₹ 6,00,000, 10% preference shares and ₹ 24,00,000 equity shares. What percentage dividend can be declared out of a total profit of ₹ 3,75,000 after making a tax provision of 20% on the profit ?*

Solution : Tax @ 20% on 3,75,000 = 75,000, Net profit = ₹ 3,00,000

less 10% dividend on ₹ 6 lacs. (preference shares) = ₹ 60,000.

$\therefore$ Profit available for equity dividend = ₹ 2,40,000.

Equity share capital is ₹ 24 lacks.

$\therefore$ Rate of dividend on equity shares = 10%.

Example 1.5 : *The capital of a company consists of 1 lac, 8% cumulative preference shares of ₹100 each and 5 lack equity shares of ₹10 each. In a year there was no profit, in the next year company decided to pay 15% on equity shares. What was the total dividend distribution ?*

Solution : Cumulative preference share capital

$= ₹\ 1{,}00{,}000 \times 100$

$= ₹\ 1$ crore

The company has to pay dividend for 2 years at 8% (each year).

i.e. 16% in all.

$\therefore$ dividend outgo $= ₹\ 16{,}00{,}000$

equity capital $= ₹\ 5{,}00{,}000 \times 10$

$= ₹\ 50{,}00{,}000$

dividend at the rate of 15% $= ₹\ 7{,}50{,}000$

$\therefore$ Total dividend outgo $= ₹\ 16{,}00{,}000 + 7{,}50{,}000$

$= ₹\ 23{,}50{,}000$

Example 1.6 : *A person holds 400, 8% preference shares of ₹100 each, ₹50 paid-up and 300 equity shares of ₹10 each, 5 paid-up. If the company declares a dividend of 20% on equity shares, find the total dividend received by him.*

Solution : Since the company declares dividend on equity shares, it has to pay dividend on preference shares.

Preference capital of the person $= 400 \times 100$

$= 40{,}000$

But it is 50% paid up.

$\therefore$ Paid-up preference capital $= 20{,}000$

Dividend on preference shares $= 20{,}000 \times \frac{8}{100} = ₹\ 1600$

Equity capital $= 300 \times 30 = 3000$

It is also 50% paid up.

$\therefore$ Paid-up equity capital $= 1500$

Dividend @ 20% $= 300$

$\therefore$ Total dividend received by him = 3300.

Example 1.7 : *A persons finds that if he invests his money in 15% stock at 225, his income will be ₹270 greater than if he invest it in 22% stock at 375. Find the sum invested.*

Solution : Suppose that the person invests ₹ x. On ₹ 225, earn ₹ 15.

$\therefore$ On ₹ x, he earn $\frac{15x}{225}$

In the other case, on ₹ 375, he earns ₹ 22.

$\therefore$ On ₹ x, he earns $\frac{22x}{375} = 270$

$$\frac{15x}{225} - \frac{22x}{375} = 270$$

$\therefore \quad x = 33750$

$\therefore$ His investment is ₹ 33750.

Example 1.8 : *Ashok purchased 10 share of Infosys at ₹ 2000 per share cum-bonus. Bonus was declared at 1 : 1. Ashok sold 15 share ex-bonus at ₹ 1250. He had to pay 1% brokerage each time on the market value. What is the cost price of remaining 5 shares held by him ?*

Solution : Cost price of 10 shares @ ₹ 2000 = ₹ 20,000.

Selling price of 15 shares @ ₹ 1250 = ₹ 18,750.

Total brokerage paid on ₹ 38750 @ 1% = ₹ 387.50.

$\therefore$ His net outgo = ₹ 20,000 + 387.50 = ₹ 20387.50

His earning by selling shares = ₹ 18750.

$\therefore$ His net cost of 5 shares = ₹ 1637.50.

$\therefore$ Cost price per share ₹ 327.50.

Example 1.9 : Mr. *A invested ₹ 3,100 in 6% shares at ₹ 124. How much divided will be get ? (Face value = ₹ 100)* **(April 2010)**

Solution :

Market value of the share = ₹ 124

Amount invested = ₹ 3100

$$\text{Number of shares purchased} = \frac{₹\ 3100}{124} = 25$$

Face value of each share = ₹ 100

Face value of 25 shares = 25×100 = ₹ 2500

$\because$ Mr. A received dividend at 6%

$$\therefore \quad \text{Dividend received by him} = ₹\ 2500 \times \frac{6}{100} = ₹\ 150$$

Example 1.10 : *A man invested ₹ 2000 in 10% shares at 125 of company 'A' and ₹ 2400 in 15% shares at 120 of company 'B'. Which investment is more profitable ? Why ?* **(April 2007)**

Solution : The man invested ₹ 2000 in 10% shares at 125 in company 'A'.

$$\text{Number of shares} = \frac{2000}{125} = 16$$

So, Dividend on 16 shares of company A = 16×10 = ₹ 160 $\therefore$ % return is $\frac{160}{20} = 8$

The man also invested ₹ 2400 in 15% shares at 120 in company 'B'.

$$\therefore \quad \text{Number of shares} = \frac{2400}{120} = 20$$

So, Dividend on 20 shares of company B = 20×15 = ₹ 300 $\therefore$ % return is $\frac{300}{24} = 12.5$

Therefore, the investment in company B is more profitable than company A.

Example 1.11 : *Pragat invested ₹13,568/- in 7% shares at ₹106/-. Find his profit at the end of the year. [F.V. 100].* **(April 2008)**

Solution : Pragat invested ₹ 13568/- in 7% shares at 106/-.

$$\text{Number of shares} = \frac{13568}{106} = 128$$

$$\text{Profit on 128 shares} = 128 \times ₹\ 7\ (7\% \text{ of } ₹\ 100) = 896$$

Example 1.12 : *Which of the following is the better investment ?*

(i) 8% at ₹80/-. **(April 2011)**

(ii) 15% at ₹120/- [F.V. = ₹100] **(April 2008)**

Solution : Two companies have shares 8% at 80 and 15% at 120. The face value in each case is 100. Let us find percentage return in each case.

For the first company : For ₹ 80 the return is 8 for ₹ 100 the return is

$$\frac{100}{80} \times 8 = 10$$

For the second company : For ₹ 120 the return is 15 for ₹ 100 the return is

$$\frac{100}{120} \times 15 = 12.5$$

As the percentage return in second case is more than first case, investment in the second company is more profitable.

Example 1.13 : *Mrs. 'A' buys 100 shares of ₹ 100 each at ₹ 125 of a company. If company pays dividend at 12% what is the percentage return on her investment ?***(April 2009)**

Solution : The dividend is declared on the face value ₹ 100 at the rate of 12%. Mrs. A will get $100 \times \frac{12}{100} =$ ₹ 12 divided on an investment of ₹ 125 on each share.

On ₹ 125, return is ₹ 12.

$\therefore$ On ₹ 100, return is ₹ 9.6

$$\left(\frac{1200}{125} = 9.6\right)$$

$\therefore$ % return is 9.6.

Example 1.14 : *Ramesh sold 2000 shares of a company 'X' of face value ₹ 100 each paying a dividend of 12% at ₹126. He invested the proceeds in another company (Y) shares of face value ₹25 at ₹30 each, giving a dividend of 20%.*

Find : (i) The number of shares of the company 'Y' purchased by Ramesh.

(ii) Change in the dividend income.

Solution : Dividend at ₹ 12 on 2000 shares = ₹ 24000.

S.P. of 2000 shares of company X = 200 × 126 = 252000.

(i) Number of shares of company Y = $\frac{252000}{30}$ = 8400.

(ii) Company Y pays dividend at 20%.

∴ On a share of face value ₹ 25, dividend is ₹ 4.

∴ On 8400 shares, total dividend = 8400 × 4 = ₹ 9600.

∴ Change in dividend = ₹ 33600 – 24000 = ₹ 9600.

Example 1.15 : *A man invested ₹ 6200 in 6% shares at ₹ 124. How much dividend will be get ? What percent of dividend does he get on his investment ?* **(Oct. 2011)**

Solution : For ₹ 124, he gets one share.

∴ For ₹ 6200, he gets $\frac{6200}{124}$ = 60 shares.

Dividend at 6% = 60 × 6 = ₹ 360.

He gets ₹ 360 on investment of ₹ 6200.

∴ % dividend = $\frac{360}{6200} \times 100 = 5.806$ (approximately)

Example 1.16 : *Arvind purchased a share of ₹ 100 for ₹ 2000. The company declared a dividend of 40%. After receiving the dividend, Arvind sells the share for ₹ 2200. Find the average returns on his investment.* **(April 2013)**

Solution : Arvind receives divided of ₹ 40 on his investment.

∴ His outgo from packet = 2000 – 40 = ₹ 1960.

By selling the share at ₹ 2200, his profit = 2200 – 1960 = 240.

Thus he gets ₹ 240 on investment of ₹ 2000.

∴ % return = $\frac{1000 \times 240}{2000}$ = 12

Exercise 1.1

Theory Questions :

1. Explain the term 'shares'. **(Nov. 2010)**
2. Explain the term dividend. State its types. **(April 2007, 2009, Nov. 2010)**
3. Explain the term "Bonus Shares". **(April 2007)**
4. Define the following terms :

   (i) Share, (ii) Dividend, (iii) Bonus shares.

Exercise 1.2

1. A man purchased shares of face - value ₹ 3,200 by investing ₹ 4,000. What was the market price of a share ? If the shares fetched 6% dividend, what percentage of dividend did he get on his investment ?
2. Suresh invested ₹ 1,080 in shares of face value ₹ 50 at ₹ 54. After receiving dividend on them at 8% he sold them at 52. In each of the transactions he paid 2% brokerage. How much did he gain or lose in the overall transaction ? **(Oct. 2011)**
3. A man invested ₹ 6,200 in 6% shares at 124. How much dividend will he get ? How much per cent of dividend does he get on his investment ?
4. Shah spent ₹ 7,560 in purchasing 5% shares at 126. After getting the dividend on them, he sold them at the same price. In each transaction he had to pay 2% brokerage. Did he gain or lose in the total transaction ? By how much ?
5. A man invested ₹ 13,568 in 7% shares at 106 and ₹ 12,648 in 11% shares at 124. How much income would he get in all ?
6. Hussen and Altaf each invested ₹ 4,550 in $5\frac{1}{2}$ at 91 and $7\frac{1}{2}$ at 130 respectively. Whose investment is more profitable and by how much ?
7. A man purchased shares worth ₹ 18,900 when the market price was ₹ 94.50. Out of those shares he sold shares of face value ₹ 12,600 when the market rate was 104, and sold the remaining shares at 98. He had to pay 1.5% brokerage each time. What was his gain or loss on the whole ?
8. The amount realised by selling 8% shares at 144 of the face value of ₹ 2,400 was invested in 6% shares at 96. What would be the difference in annual income ?
9. Two companies have shares of 13% at 122 and 17% at 150 respectively. In which of the shares would the investment be more profitable ? **(April 2013)**
10. The capital of a company consists of 10 lac., 8% cumulative preference shares and of ₹ 10 each and 50 lac equity shares of ₹ 10 each. The company could not declared dividend on preference shares. In the third year company decided to pay 12% dividend on equity shares. Find the total amount paid by the company, by way of dividend.
11. The ordinary share capital of a company is thrice preference capital. Preference shares carry 8% dividend. When the distributable profit amounted to ₹ 22 lacs, equity holders received dividend at 12%. Find amount of each kind of capital.
12. Mahesh purchased 400 shares of a company of ₹ 10 at ₹ 80 each through a broker. Mahesh paid 1.5% brokerage and 0.5% of the market price towards transfer charges. The company declared a dividend of 25% and declared bonus in the ratio 1 : 4. Mahesh sold all the shares at ₹ 60 each. Find his net gain/loss.
13. Explain the terms :

    (a) Equity shares, (b) Preference shares, (c) Bonus shares, (d) Stock exchange.

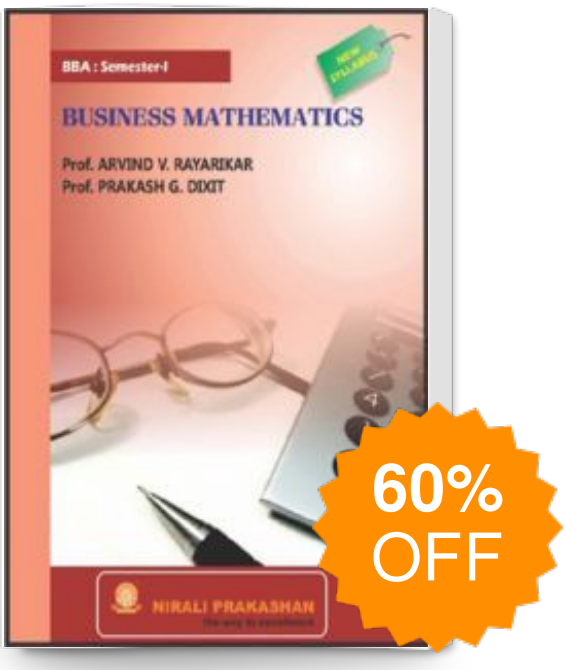
14. Salil has following investment in shares :
    (i) 300 shares of ₹ 90 each paying 20% dividend.
    (ii) 500 shares of ₹ 80 each paying 10% dividend.
    (iii) 600 shares of ₹ 100 each paying 15% dividend.
    What is average rate of return (%) on his investment.
15. Swati purchased 900 shares of a company at par (f.v. = 100 ₹) company issued right shares at a premium of ₹ 5 in the ratio 5 : 4. How many right shares did she get ? If the company declared 25% dividend next year, what was her dividend income ?

Answers 1.2

1. ₹ 125, 4.8%,
2. No gain, no loss,
3. ₹ 300, 4.84%,
4. Gain of ₹ 60,
5. ₹ 2,108,
6. Hussen's investment is profitable by ₹ 12.50,
7. Gain of ₹ 856,
8. Gain ₹ 24,
9. 17% at 150
10. ₹ 84 lacs.
11. Preference capital ₹ 50 lacs.
12. Loss : ₹ 1640.
13.
14. 14.4%
15. 720 shares, dividend ₹ 40000.

❐❐❐

Business Mathematics



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