UNIT 8 PERCENT (II) COMMERCIAL MATHEMATICS

Structure

8.1 INTRODUCTION

Students have already learnt the concept of "percentage" and its applications in a previous unit. This chapter is based on the application of the percent concept in daily life problems. When we apply simple concepts of arithmetic to problems of money transaction trade, business and industry, we say that we are doing commercial mathematics. The situations in trade and business not only involve money transactions but also transactions of material and human resources. The key idea of "rate" studied in the unit on per cent is very important in trade and business. The idea of rate is involved in some way or the other in all business activities and areas such as taxation, discount, interest, banking, production, distribution, lending and borrowing, shares, bonds and debentures, instalment plans, wholesale and retail trade. The idea of rate is most conveniently expressed in percent terms. The teaching of topics in commercial mathematics is most effective if you link them with the ideas of percent and percentage which the students have learnt earlier. This unit presents the content and techniques of teaching certain important ideas in commercial mathematics.

8.2 OBJECTIVES

At the end of this unit, you will be able to :

- clarify to your students the concepts of principal, time and rate of interest;
- help students develop the skills of computing simple and compound interest, given adequate data;
- help the students solve daily life problems based on simple and compound interest;
- develop in your pupils the skill to apply their knowledge of compound interest to problems of compound annual growth, say of population, problems in biology (bacterial culture), economics etc.;

- help the students learn to apply the concepts of percent in problems of instalment buying and solve related problems;

- clarify to the students the concept of banking and help them discriminate between different types of bank accounts;

- give them the necessary information about the importance of banks and their role in the management and security of money;

- make them understand the use of other facilities in the bank, such as drafts, cheques, travellers' cheques, credit cards and lockers;

- help the students solve problems involving bank deposits and calculation of interest;

- help them to know the procedures of operating·bank accounts;

- clarify to them the concepts of stocks, shares, bonds, dividend, and debentures;

- help them understand the functioning of a stock exchange and the techniques of dealing in shares;

- develop in your students the skills and abilities to solve problems related to stocks and shares;

- help them understand and appreciate the application of simple ideas of mathematics to complex problems of commerce and trade;

- develop in your students interest in the study of commercial mathematics.

8.3 INTEREST

To understand this unit, a fairly adequate knowledge of the concept of percentage, rate and related terms is necessary. This may be tested before starting this unit.

The unit may be introduced by taking a real life example.

Ask the students to recall the annual day celebrations in school or a wedding at home where furniture, tents, etc., were hired and returned after the function along with the rent (or money) for its use. Relate this to borrowing money from moneylenders and banks, that is, the use of someone else's money. The money is returned to the lender along with some extra "fee" for its use. This fee is called "interest".

The person receiving the money is called **borrower.** The person or agency who provides the money is known as **lender**. The amount borrowed or lent is termed a **loan** or the **principal.** The borrower uses the money for a certain period, then returns it to the lender. This period is termed as **time.** The payment of extra money in addition to the principal, which is known as the interest, is made on certain terms and conditions which are agreed to before the money is lent. These conditions define how much interest would be paid, and when it would be paid. Generally, the interest is paid in terms of a certain percentage of the principal per unit of time. This amount paid as interest as a percentage of the principal per unit of time is termed the **rate** of interest.

8.3.1 Simple Interest

Main Teaching Point : Formula for finding simple interest.

Teaching-Learning Process : Suppose a person desires to set up an industry and borrows Rs. 55,000 from a moneylender for a period of 5 years. But the moneylender lends the money on condition that he would charge 10% per year as interest. In this situation, the amount borrowed or the principal is Rs. 55,000, the rate of interest is "10% per year" and the time is 5 years The rate of interest shows that the moneylender would charge 10 percent extra for each year. So, the interest per year is

$$\text{Rs. } 55{,}000 \times \frac{10}{100} = \text{Rs. } 5{,}500$$

But the money is used for 5 years. Therefore, the total interest would be

$$Rs.\ 55,000 \times \frac{10}{100} \times 5 = Rs.\ 27,500$$

So, the moneylender will receive Rs. 27,500 as interest. Here one important point is to be noted, that is, for each year of time the principal is the same (Rs 55,000). When interest is computed in this way, it is called **simple interest**. Now, the entire situation may be presented as follows:

Principal = Rs. 55,000

rate of interest = 10% per annum

time = 5 years

Simple Interest = Rs. $55,000 \times \frac{10}{100} \times 5$ = Rs 27.500

Algebraically, the interest may be computed by the following equation

$I = Prt$

where

P = Principal, r = rate percent (per annum)

t = time (in years), I = Interest

After clarifying the basic concepts and the method of computing, the teacher may help the students solve a few examples for purposes of practice so that learning is stabilized and retention is ensured. The following types of examples may be considered.

Example 1 : An industrialist borrows Rs. 1,35,000 from a financial institution for 4 years at 8% interest rate per annum. Compute the total amount paid by him after 4 years.

Solution :

Principal	=	Rs. 1,35,000
rate of interest	=	8% per annum
time	=	4 years
Interest	= Prt =	Rs. $1,35,000 \times \frac{8}{100} \times 4$ = Rs. 43,200

Total amount repaid = Principal + Interest

= Rs. 1,35,000 + Rs. 43,200

= Rs. 1,78,200

Example 2 : A person borrowed Rs. 25,600 from a moneylender and repaid Rs. 32,400 after 4 years including interest. Find the interest rate per annum.

Solution : In this problem the amount of interest may be computed as follows·

Interest = total amount repaid − Principal

Rs. 32,400 − Rs. 25,600

Rs 6,800

Now, time = 4 years

Interest = Prt

Rs. 6,800 = Rs. 32,400 × r × 4 (Let r = $\frac{x}{100}$)

Rs. 32,400 × $\frac{x}{100}$ × 4

$\therefore x = 6,800 \times \frac{100}{32400 \times 4}$ = 5.25 approx.

Therefore, rate = 5.25 % per annum

Example 3 : Find the interest on Rs. 5200 at 8% per annum from September 5,1995, to January 29, 1996.

Solution : In this problem, the principal and the rate are clearly mentioned, but time has to be counted in terms of number of days.

Principal = Rs. 5,200

rate of interest = 8% per annum

Time	:	September,	1995	:	25 days (30 - 05)
		October,	1995	:	31 days
		November,	1995	:	30 days
		December,	1995	:	31 days
		January,	1996		29 days
			Total		146 days

So, time = 146 days = 146/365 years

$$\text{Interest} = \text{Prt}$$
$$= \text{Rs. } 5,200 \times \frac{8}{100} \times \frac{146}{365}$$
$$= \text{Rs. } 5,200 \times \frac{8}{100} \times \frac{2}{5}$$
$$= \text{Rs. } 166.40$$

The teacher should provide a wide variety of problems in the classroom. Here, the situation involves four quantities principal, rate. time and interest. Given three of these the fourth may be computed. This implies that four different kinds of problems may be given. One can compute one of these quantities when the other three are given in the data. The teacher may give some problems as an assignment to be done at home.

Methodology used : The lecture-cum-discussion method is used for the concept. The formula can be derived through inductive reasoning and for solving word problems the Heuristic approach may be used

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Check Your Progress

Notes :   a)   Write your answers in the space given below.

       b)   Compare your answers with those given at the end of the unit.

1. Compute simple interest when

     Principal = Rs. 75,000, rate = $12\frac{1}{2}$ % and time = 3 years

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2. Compute the rate of interest when

     Principal = Rs. 1,200, time 5 years, Interest = Rs. 330

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3. Compute time when

     Principal = Rs. 10,500, rate = $7\frac{1}{2}$ %, Interest = Rs. 3,150

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4. Compute principal when

   Interest $-$ Rs 9.600. rate 12%. time $= 12\frac{1}{2}$ years

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5. A shopkeeper borrowed Rs 1,28.000 from a bank at an interest rate of 20% per annum. He repaid Rs. 1,92,000. Compute the time for which he used the money.

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6. Mohan purchased a cow for Rs. 5,500 on May 15, 1994, but paid the amount including interest at the rate of 12% per annum on July 27 the same year. Find the total amount paid by Mohan.

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8.3.2 Compound Interest

Main Teaching Points : a) Concept of compound interest.

b) Formula for calculating compound interest.

Teaching-Learning Process : To introduce compound interest give the following problem to students. Arun deposited Rs. 1,000/- in a finance company for one year. If the rate of interest is 10% per annum, compute the amount he receives after one year.

It is clear that

Interest $= 1,000 \times \frac{10}{100} \times 1 =$ Rs 100/-

Amount $=$ Principal + Interest

$=$ Rs 1,000 + Rs. 100 = Rs. 1,100/-

Now, suppose he invests this entire money (Principal + Interest) again for one year under the same conditions. The interest he would receive at the end of the second year will be

Interest $=$ Rs. 1,100 $\times \frac{10}{100} \times 1 =$ Rs. 110/-

This interest is more than the interest received at the end of the first year. This is because the interest earned in the first year is included in the principal for the second year Therefore, when interest accrues on the interest of the previous years, we say that compound interest has been charged

In order to explain the idea of compound interest to the pupils, teachers should relate it with the concept of simple interest discussed in the preceding section The pupils should be made to recollect that in simple interest the principal remains the same for the entire period for which it is borrowed. On the other hand, in the case of compound interest, interest for each year is added to the principal making it the principal of the following year Suppose a man borrows Rs. 500 for 3 years at 10% interest rate compounded annually.

interest for the first year = Rs. 500 × $\frac{10}{100}$ × 1 = Rs. 50

The total amount after one year = Rs 500 + Rs. 50 = Rs. 550

Now, the principal for second year = Rs. 550

Interest for the second year = Rs. 550 × $\frac{10}{100}$ × 1 = Rs. 55 Now, principal for the third year
= Rs. 550 + Rs. 55 – Rs. 605 Interest for the third year = Rs. 605 × $\frac{10}{100}$ × 1 = Rs. 60.50

Now the amount paid as interest = Rs. 50 + Rs. 55 + Rs. 60.50 = Rs. 165.50

The teacher should give a few more examples so that the basic difference between simple and compound interest becomes clear to the students. Then, the teacher should help the pupils understand the logic and sequence of steps in the long process of computing compound interest.

If P is the principal, r is the rate and the time is t years, and if the interest is compounded annually then, the interest for the first year = Pr /100 because t = 1 year

Total amount after the first year $\quad = \quad P + Pr/100$

$\qquad\qquad = \quad P(1 + r/100)$

Now, the principal for the second year $= P(1 + r/100)$

Interest for the second year $[P(1 + r/100)](r/100)$ because t = 1 year

Total amount after the second year

$= P(1 + r/100) + P(1 + r/100) r/100 = P(1 + r/100)(1 + r/100) = P(1 + r/100)^2$

$\qquad$ Principal $\qquad$ Interest

Principal for the third year $= P(1 + r/100)^2$,

Interest for the third year $= P(1 + r/100)^2 (r/100)$ because again t = 1 year

Total amount after the third year

$= P(1 + r/100)^2 + P(1 + r/100)^2 r/100 = P(1 + r/100)^2 (1 + r/100)^2 = P(1 + r/100)^3$

The pattern of the process indicates that if the time is t years, the total amount after t years
$= P(1 + r/100)^t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$

$A = P(1 + r/100)^t$

But the initial principal = P

Therefore, interest after t years $= P(1 + r/100)^t - p$

$\text{Interest} = P[(1 + r/100)^t - 1] \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$

At this stage the pupils should be made to realise that equation (1) and (2) are very useful and may be used for direct computation of the total amount and the interest without following the long process of computing these quantities for each year in turn. The following examples will clarify the Methodology.

Example : Find the interest on Rs. 1,200 for 3 years at 5% interest rate compounded annually.

Solution : Here, P = Rs. 1200, r = 5, t = 3 years.

$\qquad$ Equation (1) may be used to compute total amount after 3 years,

$\qquad$ total amount $\quad = \quad P(1 + r/100)^t$

$\qquad\qquad\qquad = \quad 1,200(1 + 5/100)^3$

$\qquad\qquad\qquad = \quad 1,200(105/100)^3$

$\qquad\qquad\qquad = \quad 1200 \times \left(\frac{105}{100}\right) \times \left(\frac{105}{100}\right) \times \left(\frac{105}{100}\right)$

$\qquad\qquad\qquad = \quad 1389.15$

$\qquad$ Therefore compound interest = Rs. 1,389.15 – Rs. 1,200 = Rs. 189.15

Example : Find the interest on Rs. 900 for 2 years at 10% interest rate compounded half-yearly.

Solution : In this problem, since the interest is to be compounded half-yearly, the unit of time for this purpose is 6 months or half a year. The teacher should clarify this point to his students. Here

Principal = Rs. 900

rate   =   Rs. 10% per annum (compounded 5% half-yearly)

time   =   2 years = 4 half-years

total amount after 2 years $= P(1 + r/100)^t$

$$= \quad 900\,(1 + 5/100)^4$$

$$= \quad 900 \times \left(\frac{105}{100}\right) \times \left(\frac{105}{100}\right) \times \left(\frac{105}{100}\right)$$

$$= \quad \text{Rs. } 1093.95$$

Interest = Rs. 1093.95 – Rs. 900 = Rs. 193.95

It should be made clear to the students that if the interest had been compounded annually then the amount of interest would have been different. In that case

total amount   = $P(1 + r/100)^t$

= $900\,P(1 + 10/100)^2 = 900 \times (110/100) \times (110/100) = $ Rs. 1089

Interest = Rs. 1089 – Rs. 900 = Rs. 189, which is less than the earlier amount.

Example : A sum of Rs. 10,000 becomes Rs. 20,150 after 6 years when interest is compounded annually. Find the rate of interest.

Solution : This problem involves use of logarithms.

By the usual equation

total amount, $A = P(1 + r/100)^t$

In this problem $P = $ Rs.10,000, t = 6 years,

A = Rs. 20,150

therefore

20,150   = $10,000\,(1 + r/100)^6$

log 20150   =   log 10,000 + 6log (1 + r/100)

or 4.3043   =   4 + 6log (1 + r/100)

or 6 log (1 + r/100) = 4.3043 – 4 = 0.3043

log (1 + r/100) = (1/6) × (0.3043) = 0.0507

1 + r/100   =   Antilog 0.0507

=   1.124

or r/100 = 1.124 – 1 = .124

r = .124 × 100 = 12.4

Therefore rate = 12.4% per annum .

Before coming to such problems, the teacher should ensure that pupils have the working knowledge of logarithms and their applications. The problems in which "time" is to be calculated also require the use of logarithms.

Example : After how long will an amount double itself at 12% interest rate compounded annually.

Solution : In this problem "time" is to be calculated. Let the Principal = P

total amount including interest = 2P

therefore $2P = P\,(1 + r/100)^t$

or   2   = $(1 + 12/100)^t = (112/100)^t$

or   log 2   =   t (log 112 – log 100)

or   0.3010   =   t (2.0492 – 2)

=   .0492 t

or   t = 0.3010/0.0492 = 6.12 years

It is important for the teacher to clarify to the students that the procedure used in compound interest is useful whenever "compound growth rate" is involved. The followings example will clarify the idea.

Example: The population of India increased from 360 million in 1951 to 844 million in 1991. Find the compound annual growth rate.

Solution : Here the initial population in 1951 may be taken as principal and the final population in 1991 may be taken as the total amount after 40 years (time = 40 years) therefore

$$A = P (1 + r/100)^t$$

$$844 = 360 (1 + r/100)^{40}$$

$$\log 844 = \log 360 + 40 \log (1 + r/100)$$

$$2.9263 = 2.5563 + 40 \log (1 + r/100)$$

$$40 \log (1 + r/100) = 2.9263 - 2.5563 = 0.3700$$

$$\log (1 + r/100) = (1/40) \times (0.3700) = 9.25 \times 10^{-3}$$

$$= .00925$$

or $\dfrac{10}{100}$ = Antilog (0.00925)

$$= 1.021$$

or r/100 = 1.021 − 1 = .021

or r = 100 × .021 = 2.10%

Therefore, India's population has grown at 2.1% compound annual growth rate during the 40 years from 1951 to 1991.

Methodology used: The formula for compound interest may be derived using the discussion method with inductive reasoning. Sufficient practice is required to stabilize the learning for which the drill method is most suitable.

Check Your Progress

Notes :   a)   Write your answers in the space given below.

   b)   Compare your answers with those given at the end of the unit.

7.   Find the compound interest on Rs. 9,600 for 3 years at 9% interest compounded annually.

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8.   A person borrowed Rs. 7,500 from a moneylender for two and a half-years. If the rate of interest is 12% per annum compounded half-yearly, find the total amount payable after the expiry of the stipulated period.

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9.   A man wants to triple his money. If the rate of interest in a bank is 10.5% compounded annually, find out for how long should he keep the money in the bank?

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10. The estimated population of India in December, 1994 was 900 million What will be the population in December, 2000 if the compound annual growth rate is 2%

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8.4 INSTALMENT BUYING

Main Teaching Point : The meaning and calculation of the rate of carrying charge

Teaching-Learning Process : Instalment buying is a very common phenomenon in business There are certain articles which are costly but useful For example, a television set a washing-machine, a motor-cycle and a car, are costly items, but these are very useful and essential for daily life. Sometimes a man may not be able to purchase these items by paying the full price in cash. Nevertheless he may be capable of buying them on easy instalments, that is, by paying a part of the price in cash and the rest in a few months' time. An example will make the idea clear. Let us assume that the cash price of a television set is Rs. 15,000. A dealer promises to sell it on the following terms:

a) a cash down payment of Rs. 6,000 and

b) ten monthly instalments of Rs. 1,170 each In this situation the actual amount paid by the customer is Rs. 6,000 + Rs. 1,170 × 10, or Rs. 17,700 But. the cash price of the television set is Rs. 15,000. So, the dealer has charged some extra amount. The extra amount charged by the dealer

= Rs. 17,700 – 15,000

= Rs. 2,700

This amount (Rs. 2,700) is known as the 'carrying charge' The teacher, at this stage, should clarify to the students that this amount is not interest. Interest would be far more than this. The carrying charge is some percentage of the balance left after the cash down payment. In the present example, Rs 2,700 (carrying charge) is 30% of the balance Rs. 9,000 left after the cash down payment of Rs 6,000. The carrying charge is added to the balance left after paying the cash down part of cash price and the sum is divided by the number of instalments to compute the amount of each instalment. The following examples will make the idea clear.

Example : The cash price of a motor-cycle is Rs 18,000. The cash down payment is Rs 7,000. If the rate of carrying charge is 10% find the monthly instalment for a 12-month contract.

Solution :

Cash price	=	Rs. 18,000
Cash down payment	=	Rs. 7,000
balance due	=	Rs. 18,000 – Rs. 7,000 = Rs 11,000
Carrying charge	=	10% of Rs 11,000
	=	(10/100) × 11,000 = Rs. 1,100
Total amount payable in 12 instalments		
	=	Rs. 11,000 + Rs. 1,100 = Rs. 12,100
Monthly instalment	=	Rs 12,100/12
	=	Rs. 1,008.33 (approx.)

So, the customer will pay 12 instalments of Rs. 1,008.33 each.

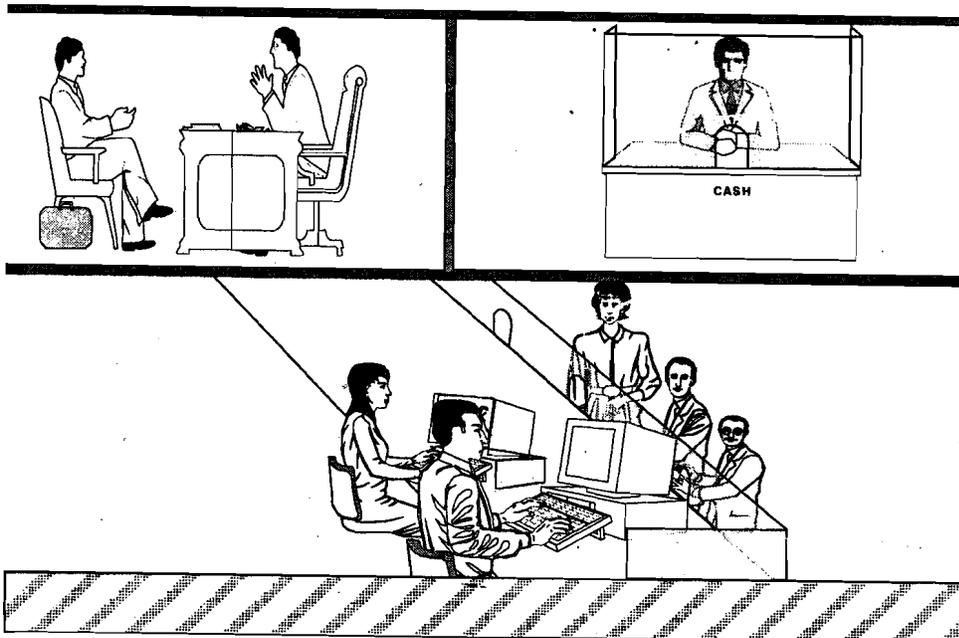**Methodology used :** The lecture-cum-discussion method is used with suitable illustrations.

11.   The cash price of a refrigerator is Rs. 12,000. If the trade is valued at Rs 3,000 with a carrying charge rate of 12%, find the monthly instalment for a 20-month contract

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12.   The cash price of a washing-machine is Rs. 7,500. The trade is valued at Rs. 2,500. The balance is paid in 12 monthly instalments of Rs. 500 each Find the rate of the carrying charge.

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8.5 BANK DEPOSITS

It is expected that most of your students have seen a branch of a bank. They are also, probably, aware of the functions of a bank. However, the topic on banking may be introduced by asking them questions regarding money. Give the students a situation like the one below:

Nikhil has Rs. 50,000/- which he does not need for some time. What should he do with the money?

Give some options to the students like:

- He should keep it at home.
- He should keep it with someone.
- Invest it in shares.
- Deposit it in a bank.
- Buy something.

Initiate a discussion on each option and direct it towards the best alternative, that is, to deposit the money in a bank. The advantages cited should include; safety against theft/ cheating, avoidance of loss (as possible in shares) and an incentive in the form of interest. Then conclude that: when someone has some spare money and wants to keep it at a safe place to avoid the risk of losing it by theft, one approaches a bank Spare money can be deposited in the bank. Keeping the money in the bank has two advantages — the money remains safe, and the depositor gets interest on the amount deposited. On the contrary, businessmen may borrow money from the bank for their business needs. So, the bank is an institution that receives deposits and lends money to those who need it. It pays interest to the depositors and takes interest from the borrowers.

8.5.1 Bank Account

For depositing money one has to open an account with a bank. For this purpose one must fill up an application form available in the bank. (An application form for opening the bank account is given in the next page.) The bank keeps specimen signatures of all its depositors. These specimen signatures help in the withdrawal and deposit of the money. Whenever a customer visits the bank to deposit or withdraw money, his signatures are tallied with the specimen signature kept in the bank.

There are several types of bank accounts. People belonging to small and middle income groups, such as salaried people, open a **Savings Bank Account**. The main purpose of such an account is to encourage small savings. This account may be opened with a small amount. The money kept in this account earns interest.

The current rate of interest on savings bank account is 5% per annum, but the rate may change from time to time. Generally, businessmen, companies, corporations and other such institutions make frequent money transactions, sometimes several times a day. A bank cannot pay interest on such money. Such money is kept in the **Current Account**. There are certain facilities which are available in the current account but not in the savings bank account. There is no restriction on the amount number of withdrawals from current account.

Sometimes, a depositor may wish to keep his money in the bank for a fixed period. He may open a **Fixed Deposit Account**. Money can be drawn from this account only after the expiry of the fixed period specified at the time of opening the account This period may vary from a few days to several years, depending on the depositor's need.

The bank is free to utilize that money during the period of deposit and, therefore, it offers a higher rate of interest on such deposits. Normally, the rate of interest on fixed deposits varies from 8% to 12% depending on the duration of the deposit. However, these rates may be revised from time to time.

In certain cases, the depositor chooses a specified period of time during which he deposits a certain amount every month. Such an account is called **Recurring Deposit Account**. The rate of interest on this account is nearly the same as for fixed deposit accounts.

In the case of the Savings Bank Account and the Current Account, the bank issues a pass- book to the depositor in which details of deposits and withdrawals are entered at every transaction. In the case of fixed deposits and recurring deposits, term deposit certificates are issued. Minor children below the age of 18 years may also open accounts in the bank under certain conditions.

ACCOUNT OPENING FORM FOR INDIVIDUALS (SINGLE AND JOINT) SAVINGS FUND/CURRENT ACCOUNT

The Manager,

Date _____

Saving Fund/Current Account No. _____

Date of Majority _____

BO : _____

(for minors)

Dear Sir,

Please open a Savings Fund/Current Account in my/our name/in the name of _____. I/We agree to comply with and be bound by Bank's rules now and from time to time in force for conduct of such accounts. Please furnish me/us with a Pass Book and a Cheque Book. $

In case of Joint Accounts
indicate choice of Operation

MODE OF OPERATION _____

_____

1. Either or Survivor
2. Former or Survivor
3. Any one of use or Survivor(s) etc.
4. Any other (To be specified.)

The power to operate includes power to give instructions to transfer the Account to any other branch of the Bank from time and to close the Account.

FULL NAME(S)	OCCUPATION	ADDRESS & TELEPHONE NO.	SPECIMEN SIGNATURE(S)
1.			
2.			
3.			

Yours faithfully,

$ (Strike off the words "Cheque Book" if the same is not required by the Account Holder).

Signature(s)

FORM DA-1

Nomination under Section 45 ZA of Banking Regulation Act, 1949 and Rule 2(1) of the Banking Companies (Nomination) Rules 1985 in respect of Bank Deposits. I/We nominate _____ the following person(s) to whom in the event of my/our/minor's death the amount of (Name & Address(es))

deposit in the above Account may be returned by the Punjab National Bank,

BO . _____

(Name & Address of BO)

PARTICULARS OF NOMINEE

Name	Address	Relationship with Depositor, if any	Age	If nominee is minor, his date of birth

*As the nominee is minor on this date. I/we appoint Sh./Smt./Kum. _____

(Name(s) address(es) and age)

_____ to receive the amount of deposit on behalf of the nominee in the event of my/our/minor's death during the minority of the nominee.

Place :

Date .

**Signature(s)/Thumb Impression of depositor(s)

Name(s) Signature(s) and
address(es) of witness(es)***

* Strike out if nominee is not a minor
** Where deposit is made in the name of minor, the nomination should be signed by a person lawfully entitled to act on behalf of the minor.
*** Thumb impression(s) shall be attested by 2 witnesses.

In case of minor's Account :- I hereby declare that the date of birth of above minor who is my _____ _____ is _____ and I am his/her natural and lawful guardian/guardian appointed by court order dated _____ (copy enclosed). I shall represent the said minor in all future transactions of any descriptions in the above Account until the said minor attains majority. I undertake to indemnify the bank against the claim of above minor for any withdrawal/transactions made by me in his/her account.

Signature of guardian

Introduction . I certify that I know Sh./Smt./Kum/ _____
S/F Account for the past _____ years _____ months and confirm his/her

Occupation and address as stated above.

Signature of the Introducer _____
with name, A/c No. and _____
Address _____

Signature verified

Introduction Current A/c

Signature of Introducer with _____
Name, A/c No. & Address _____

Authorised Official

Please also record the registered name of the nominee in the books of the bank, in the Pass Book.	Account opened and Signature(s) Attested by me
Signature(s) of depositor(s)	Signature of Authorised Official alongwith PA No.

8.5.2 Other Facilities in the Bank

Banks provide certain other facilities also. A minor can also open a Savings Bank Account. A person aged less than 18 years is said to be a **minor**. A minor can open an account independently or jointly with his guardian. If his age is less than 12 years (in certain banks), he can open an account jointly with the guardian. Banks also help us in sending money from one place to another through a **Bank Draft** or a Demand Draft. A demand draft is an order from one branch to another branch of the same bank to pay a specified amount to a specified person. The name of the person to whom the amount is payable is mentioned in the demand draft. The person who wants to send money purchases a draft by paying the amount to the bank, which in turn issues him the demand draft. The draft bears the name of the person to whom the amount is payable, and also the name of the specified branch of the bank from where the draft is encashable. For rendering this service, the issuing branch charges some money as a commission, the amount of commission being proportional to the amount transferred.

These days, it is very risky to travel with a large amount of cash. Banks can help us travel without this risk by issuing **travellers' cheques**. Anyone can purchase travellers' cheques from any branch of a bank. These cheques are issued in different denominations such as Rs. 50, Rs. 100 or Rs. 500, etc. A person may purchase any number of travellers' cheques by paying the amount equivalent to their price (denomination). At the time of issue, the buyer must put his signature at a specified place on each of the travellers' cheques. At the time of encashment (in another branch) in a different city, the buyer must sign again on the cheque or cheques. If these signatures tally with the earlier signature on the cheques, the cheques are encashed, otherwise not.

In addition to financial transactions and security of money, banks also keep in safe custody some valuable items such as jewellery, precious metals and important papers. These articles are kept in **lockers**. A locker is a box in an almirah kept in a strong room inside the bank's building. A locker can be hired by paying a specified rent to the bank. However, this facility is available only in selected branches of leading banks. The locker can be operated with the help of double keys one of which is kept by the bank and the other by the customer. What is kept in the locker is not known to bank officials.

8.5.3 How to Operate a Bank Account

A person having opened an account may deposit and/or withdraw money as and when needed. For depositing money, the customer is supposed to use a prescribed form, called a

pay-in-slip, available in the bank free of cost. A pay-in-slip has two parts, a foil and a counterfoil, separated by a perforated line. The details of deposit such as amount, date and account number, etc., are entered on both, foil and counterfoil. The bank retains the foil along with money deposited and the counterfoil is returned to the depositor. This counterfoil serves as an acknowledgement of the receipt of the deposit. Bank officials credit the amount in the account of the depositor.

BANK NAME

VALID ONLY IF DRAWN UPTO RS 7000/-

THIS WITHDRAWAL ORDER FORM IS NOT A CHEQUE THE PASS BOOK SHOULD ACCOMPANY THE WITHDRAWAL ORDER FORM

_____ 19

PAY SELF OR BEARER THE SUM OF RUPEES _____

रु० Rs.

SAVING FUND A/C No. _____

For withdrawing money from one's bank account, a similar procedure is used. For this purpose two types of forms are used; a **withdrawal form** or a **cheque**. The withdrawal form is a slip available in the bank. The particulars of the withdrawal, e.g., amount, date of withdrawal, account number, signature of the account holder, etc., are entered in the withdrawal form at specified places, and presented to the bank official for payment.

Bank officials tally the signatures of the account holder(s) with their official record. If the two signatures tally, the payment is made. Like the withdrawal form, cheques are also a printed form issued by banks. But, the customer does not have to ask for a cheque form every time, the bank issues him a set of 10,20,25 or 100 cheques in the form of a booklet, known as the cheque-book, to be kept with him in safe custody. The cheque is an unconditional order to the bank and is always payable on demand. Again, the details of the withdrawal are entered in the cheque form. If the word "bearer' printed on the cheque form is not crossed out, the

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P A Y..

.... या धारक को OR BEARER

रूपये **RUPEES**...

....अदा करें रु० Rs.

खाता सं. A/c. No.		व प म L F No.	छोटे हस्ता INITIALS

पंजाब नैशनल बैंक

punjab national bank

I.G.N.O.U. Maidan Garhi, New Delhi

RUE

"661527" 110024121:   10

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cheque is known as a **bearer cheque** and can be encashed by anyone who presents it to the bank. A bearer cheque should not be allowed to fall in wrong hands to avoid payment to a wrong person. For safety, the word "bearer' may be crossed and the name of the person to whom the payment is required to be made may be entered on the cheque. This reduces the risk considerably. However, to minimize the risk further a cheque may be **crossed**. To cross a cheque, two parallel slanted lines are drawn on the top left corner of the cheque and between these lines the phrase "A/c payee only" is written. Crossing a cheque may prevent fraudulent encashment or any other type of misuse of the cheque.

8.5.4 Computation of Interest

Main Teaching Points : a) Use of compound Interest tables

b) Interest calculation on savings bank accounts.

Teaching-Learning Process : Interest on bank deposits is computed with the help of readymade tables called ready reckoners which help find the maturity values of various amounts of recurring deposits or fixed deposits for various time periods. The Table 8.1 shows a portion of computation table showing maturity values of 1.1 principal amounts of Rs. 100 at various interest rates compounded quarterly. Tables are also available for interest compounded half-yearly and annually. The process of computation is explained with the help of a few examples.

Example : Amit invested Rs. 100 per month for 2 years in a recurring deposit scheme at 10% interest rate per annum. Find the amount that Amit would get at maturity.

Solution : From the table, it can be seen that Rs. 100 deposited per month for 2 years i.e. Rs. 2400, at the interest rate of 10% becomes. Rs. 2664.3955 at maturity.

Example : Sunanda invested Rs. 300 per month for 1½ years in a recurring deposit scheme at 10% per annum. Find the amount she would receive at maturity.

Solution : From the table, it can be seen that Rs. 100 deposited per month for 1½ years i.e. Rs. 1800 at the rate of 10% becomes Rs. 1948. So, at maturity, Sunanda receives Rs. 1948 × 3 = Rs. 5844.

Table 8.1
Compound Interest Tables of Recuring Deposits
The values in this table should be consistent with the values considered in the aforementioned example.

RECURRING DEPOSIT - MATURITY VALUE
Deposit Amount: Rs. 100 P.M. Interest Rates 6.00 % to 15.00 % P.A. (Compounded Quarterly)

Deposit Period in Months

Interest Rate %P.A.	3	6	9	12	15	18	21	24
6.00	302.9950	610.5350	922.6881	1239.5234	1561.1113	1887.5230	2218.8309	2555.1084
6.25	303.1196	610.9755	923.6416	1241.1931	1563.7064	1891.2589	2223.9294	2561.7979
6.50	303.2442	611.4161	924.5958	1242.8646	1566.3054	1895.0020	2229.0400	2568.5060
6.75	303.3687	611.8588	925.5506	1244.5380	1568.9083	1898.7524	2234.1625	2575.2327
7.00	303.4933	612.2976	926.5061	1246.2132	1571.5152	1902.5100	2239.2971	2581.9781
7.25	303.6178	612.7386	927.4623	1247.8903	1574.1260	1906.2748	2244.4438	2588.7422
7.50	303.7423	613.1797	928.4191	1249.5692	1576.7409	1910.0470	2249.6027	2595.5250
7.75	303.8667	613.6209	929.3765	1251.2499	1579.3597	1913.8265	2254.7736	2602.3266
8.00	303.9912	614.0622	930.3347	1252.9326	1581.9824	1917.6133	2259.9567	2609.1471
8.25	304.1156	614.5037	931.2935	1254.6170	1584.6091	1921.4073	2265.1520	2615.9864
8.50	304.2401	614.9452	932.2529	1256.3033	1587.2399	1925.2088	2270.3595	2622.8447
8.75	304.3645	615.3869	933.2130	1257.9915	1589.8746	1929.0176	2275.5793	2629.7221
9.00	304.4889	615.8287	934.1738	1259.6816	1592.5133	1932.8337	2280.8113	2636.6185
9.25	304.6133	616.2707	935.1352	1261.3734	1595.1560	1936.6572	2286.0556	2643.5339
9.50	304.7376	616.7127	936.0973	1263.0672	1597.8027	1940.4881	2291.3123	2650.4686
9.75	304.8620	617.1549	937.0600	1264.7628	1600.4534	1944.3264	2296.5813	2657.4224
10.00	304.9863	617.5972	938.0234	1266.4603	1603.1081	1948.1721	2301.8627	2664.3955
10.25	305.1106	618.0396	938.9875	1268.1596	1605.7668	1952.0252	2307.1564	2671.3879
10.50	305.2349	618.4822	939.9522	1269.8609	1608.4296	1955.8858	2312.4626	2678.3997
10.75	305.3592	618.9249	940.9176	1271.5639	1611.0964	1959.7538	2317.7813	2685.4308

The procedure of computing interest on deposits in a Savings Bank Account is different. Let us explain this by giving an example.

Consider, Table 8.2 showing a page of the pass-book of a Saving Bank Account holder. Here, the rate of interest is 5% per annum The given page presents the details of deposits and withdrawals for the period between Jan. 1,1995 to June 30,1995. The pass-book page has 6 columns. In column 1, the date of transaction is entered, column 2 indicates mode of transaction. The amounts withdrawn and deposited are entered in columns 3 and 4 respectively. Column 5 shows net balance on the given date. The last column 6 is meant for the signatures of the bank official who deals with the given account. Generally; interest on savings bank account is computed twice a year and entered in the pass-book on the date of computation.

Table 8.2
Page of a Savings Bank Account Pass-Book
(Rate of interest 5% per annum)

1	2	3	4	5	6
Date	Particulars	Withdrawals	Deposits	Balance	Sign.
1995					
Jan. 3	Cash		200.00	200.00	
Jan. 12	Cash		17,500.00	17,700.00	
Feb. 2	Self	3,000.00		14,700.00	
Feb. 15	Cheque		350.00	15,050.00	
Mar. 1	Cash		5,600.00	20,650.00	
Mar. 5	Self	7,500.00		13,150.00	
Apr. 8	Self	500 00		12,650.00	
Apr. 25	Cheque		12,000.00	24,650.00	
May 10	Self	1,100.00		23,550.00	
June 4	Cash		500.00	24,050.00	

The pupils should be told that in the case of Savings Bank Accounts, interest is calculated on the minimum amount which remains deposited between the 10th day and the last day of the month. An amount eligible for interest according to the above criterion is assumed to have remained deposited for the whole month.

In the above pass-book, Principal for the month of

Jan.	Rs.	200.00
Feb.	Rs.	14,700.00
March	Rs.	13,150.00
April	Rs.	12,650.00
May	Rs.	23,550.00
June	Rs.	24,050.00

Total Principal for one month   Rs. 88,300.00

Interest $= \dfrac{Prt}{100}$

$= 88,300 \times 5 \times \dfrac{1}{12} \times \dfrac{1}{100} = $ Rs. 367.92

Interest $=$ Rs. 367.90 (correct to nearest 5 paise)

After explaining the basic concepts associated with banking you should provide some practice exercises in your lesson.

Methodology used : The lecture-cum-discussion method is used.

Check Your Progress

Notes :   a)   Write your answers in the space given below.

b)   Compare your answers with those given at the end of the unit.

13.   A man deposited Rs. 10,000 under a fixed deposit scheme for 5 years at 12% interest per annum in a nationalized bank. Find the amount he would receive at maturity.

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14.   The following table shows the details of entries in a Savings Bank pass-book of a person for the period between July 1, 1994, and December 31, 1994. Compute the total interest for the said period @ 5% per annum.

Date	Particulars	Withdrawals	Deposits	Balance	Sign.
July 3	Cash		1,500.00	1,500.00	
July 24	Cheque		8,500.00	10,000.00	
Aug. 12	Self	1700.00		8,300.00	
Sept. 2	Cash		4,500.00	12,800.00	
Oct. 10	Self	3,000.00		9,800.00	
Oct. 25	Self	1,200.00		8,600.00	
Nov. 5	Cash		9,600.00	18,200.00	
Dec. 3	Cheque		1,700.00	19,900.00	
Dec. 13	Self	1,000.00		18,900.00	

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8.6 STOCKS AND SHARES

It is known to all of us that the economic development of a country depends on productivity There are two main sources of economic growth of a country, agriculture and industry. Our industrial network has two kinds of institutions, small-scale industries and big factories. Small-scale industries require small capital to set up production units while for large-scale production big factories are needed. For setting up a big factory, a large amount of money is required which a single person may not be able to provide.

Sometimes, a group of persons wish to set up a new business or industry but are unable to provide the required capital themselves. In such a situation these persons, with the help of experts, prepare a detailed plan of the project including financial requirements, rules and regulations regarding the functioning of the establishment, and marketing and distribution of

the product. Such an organisation is known as a company which is registered under the Companies Act (1956). Thus, a joint stock company comes into existence. The total investment required for the business under consideration is known as '**capital stock**'. A few top members of the company form a **Board of Directors**. The company has a registered office at an important place, preferably in the vicinity of the factory or place of work.

8.6.1 Shares

The teacher should clarify to the students the idea of shares by giving an example. Suppose a company needs Rs 20 crores for its new business. This amount is divided into convenient units. Each such unit is called a share. The amount of money constituting a share is known as the **par value** of the share. In the case of the given company, if the par value of the share is Rs 10 the total capital would be divided into 2,00,00,000 shares of Rs. 10 each. If the par value of the share is Rs. 100 the total number of shares would be 20,00,000. Generally, companies divide the capital into two types of shares — preference shares and ordinary shares. The preference shares, generally of Rs. 100 each, are issued to the board of directors and their friends and relatives. The ordinary shares are issued to the public through public issue made with the help of a prospectus and advertisements. Suppose the given company divides its capital into 5,00,000 preference shares of Rs. 100 each and 1,50,00,000 ordinary shares of Rs. 10 each. The preference shares are issued to members of the board of directors and their friends and relatives who may be collectively called the "promoters".

For the ordinary shares the company issues an advertisement in national newspapers and invites application from the public. Let us assume that the name of the company is Sunanda Iron and Steel Limited (fictitious). The form of advertisement is given below:

SUNANDA IRON AND STEEL LIMITED
(Incorporated under the Companies Act, 1956)
Registered Office : ....
....
....
Public Issue of 1,50,00,000 equity shares of
Rs. 10 each for cash at par

Along with this advertisement, certain other important information is published. These include the terms and conditions of the share issue and the status of the project, the budgeting of the expenditure, the nature of product and its prospects in the market including risk factors.

The members of the public intending to buy the shares of the company read the prospectus and the details of the advertisement. Then they decide whether to apply or not for the shares. If a person decides to apply, he approaches the nearest bank or share broker for the application form. The application form along with a bank draft for the required amount are lodged with specified branches of specified banks. Instructions regarding the mode of application and payment are given in the advertisement as well as in the application forms. The company normally receives a large number of applications. Sometimes, the number of shares applied for by the public is 10,20 or even 100 times the number of shares to be issued. However the company decides the minimum number of shares to be allotted to a single applicant. When it is not possible for the company to allot shares to every applicant, it uses a lottery system to allot shares. The number of shares allotted to persons who win the lottery is proportional to the number of shares applied. For example, a person applied for 400 shares of the company and sent Rs. 4,000 by bank draft along with the application, but the company issued him only 100 shares valued at Rs. 1,000. In such a case the company would refund the additional amount of Rs. 3,000 to the applicant and retain Rs. 1,000 as the value of 100 shares. Now, the company sends a document to the depositer, usually by registered post. This document is called a share certificate.

A share certificate states that the person concerned owns the given number of shares and, thus, is a shareholder of the company.

8.6.2 Dividend

When a company earns a profit during a company year, which usually coincides with the financial year, part of it is kept in the reserve fund, part in the depreciation account and part is used for payment of Government taxes. The rest of the profit may be distributed among the shareholders in proportion to the number of shares held by them This part of the profit, as a percentage of the total capital (par value of shares), is declared by the company as dividend. This distributed part of the profit called dividend, is given as per share or as a percentage of the total par value of the number of shares held. For instance, if a company declares a dividend of Rs. 2 per share or 20%, a person who holds 100 shares would receive Rs. 200 as dividend for that financial year.

Example : A man was allotted 500 shares of a company of Rs. 10 each at par. During a financial year the company declared 25% dividend, find the amount of dividend received by him.

Solution : The total value of shares at par = Rs 10 × 500 = Rs. 5,000 The amount of dividend

$$= Rs. 5,000 \times \frac{25}{100} = Rs. 1250$$

8.7.3 Marketing of Shares

Main Teaching Point : Sale and purchase of shares in stock exchanges.

Investing in shares has some advantages over fixed deposits where the interest rate is fixed. Shares can be bought or sold in the market just like any other commodity. The share market is known as the stock exchange. Stock exchanges operate only in major cities. The biggest stock exchange in India is located in Bombay. However, Delhi, Madras, Calcutta, Bangalore, Ahmedabad, Kanpur and some other cities also have stock exchanges. As mentioned earlier, the price at which the share is issued is known as the par value. However, in the stock exchange the value or price at which the share may be bought or sold may be higher or lower than the par value depending on several factors, specially the progress and profits of the company. This, price of the share is known as the **market value**. If the market value is more than the par value, the share is said to be quoted above par or at a **premium.** On the contrary, if the market value is less than the par value, the share is said to be **quoted below** par or at a **discount.** If the market value equals par value, the share is said to be **at par.**

The sale and purchase of shares in the stock market is normally done through agents called brokers who charge a commission or brokerage from sellers as well as buyers. A person intending to buy shares from the market has to pay the market value to the seller and the brokerage to the broker, while a seller of shares receives the market price and has to pay brokerage to the broker. If a shareholder sells his shares at a price greater than his cost price, he earns a profit. His cost price may not be the par value of the share because he may have purchased the shares from the market at a premium or at a discount. The brokerage is calculated on the market value of shares.

All the ideas discussed above may be illustrated with the help of the examples given below:

Example : A man was allotted 300 shares of Rs. 10 each at par by a company. He sold these shares in the market for Rs. 25 each (excluding brokerage). Find the profit earned by him.

Solution : The par value of one share = Rs. 10

The selling price of one share = Rs. 25

Net profit on one share = Rs. 25 − Rs. 10 = Rs. 15

The net profit on 300 shares = Rs. 15 × 300

$$= Rs. 4,500 \text{ (Ans.)}$$

Example : Arti was allotted 100 shares of Reliance Industries Limited at the par value of Rs 10 each. She sold these shares at the market value of Rs. 305 each. If the rate of brokerage is 2%, find the net profit that Arti earned

Solution : The value of 100 shares = Rs. 10 × 100

$$= Rs. 1,000$$

The market value of 100 shares = Rs. 305 × 100

= Rs. 30,500

The amount of brokerage paid = Rs. 30,500 × $\frac{2}{100}$ = Rs. 610

The net selling price of the shares = Rs. 30,500 - Rs. 610 = Rs. 29,890

The profit earned by Arti = Rs. 29,890 - Rs 1,000

= Rs. 28,890 (Ans.)

Example : Mr Anand bought 200 shares of a company at the market price of Rs. 18 per share and sold them after one year at the market price of Rs. 45 each. Calculate (a) the brokerage paid by Mr Anand and (b) the net profit earned by him. The brokerage rate is 2%.

Solution : Market price of shares at the time of buying

= Rs. 18 × 200 = Rs. 3,600

Brokerage paid = Rs. 3,600 × $\frac{2}{100}$ = Rs. 72

Net cost price of the shares

= Rs. 3,600 + Rs 72 = Rs 3,672

Market price of the shares at the time of selling

= Rs. 45 × 200 = Rs. 9,000

Brokerage paid = Rs 9,000 × $\frac{2}{100}$ = Rs 180

Net selling price of shares

= Rs. 9,000 - Rs. 180 = Rs. 8,820

Total brokerage paid = Rs 72 + Rs 180 = Rs. 252

The net profit = Rs 8,820 - Rs. 3,672 = Rs. 5,148

The teacher may give a few questions for practice It is possible to frame various types of exercises on the topic.

Methodology used : The lecture-cum-discussion method is used.

Check Your Progress

Notes :   a)   Write your answers in the space given below.

b)   Compare your answers with those given at the end of the unit.

15   Geeta bought 200 shares of a company quoted at Rs 135 and sold them when the price rose to Rs. 213. If the rate of brokerage was 2%, calculate the profit earned by her

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16.   Shantanu was allotted 500 shares of Rs. 10 each at par. He sold these shares in the market when the market price was Rs. 45 and invested the proceeds to buy 100 shares of another company. Find the market value of the new shares.

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8.6.4 Debentures

When the business of a company grows and further expansion and diversification is planned the company may require more money for this purpose. This time the company may not like to issue shares. Instead, it may like to borrow money from the existing shareholders and/or from the public. Again the company divides the required money into convenient units called **debentures**, and issues these units to the eligible subscribers. If the company needs Rs. 15 crores, it may divide this amount into units of Rs 300 each. The total number of debentures in this case would be 5,00,000. These debentures are issued through a prospectus, like shares, but for a fixed period for which the investors receive interest at a specified rate. The issue price of debentures is known as their par value. Debentures may also be traded in the stock exchange. The process of issue and allotment of debentures is the same as that of shares. The main difference is that shareholders receive dividend, but debenture holders receive interest. Debentures are a debt on the company while shares form the capital of the company.

Debentures are of two types, **non-convertible** and **convertible**. Non-convertible debentures are redeemed after the period of their tenure, usually five to seven years, while convertible debentures are converted into equity shares at par or at a premium as laid down in the conditions of the issue given in the prospectus. After conversion, no interest is paid to the investor. On non-convertible debentures, interest is paid to the investor at regular intervals, usually half-yearly or annually. Some companies also issue **partially convertible debentures,** meaning thereby that a portion of the par value of the debenture would be convertible into a specified number of shares at par or at a specified premium. The other part would remain the non-convertible portion and earn interest. The conditions regarding the time and premium of conversion, the rate of interest, and the time of redemption are laid down in the prospectus at the time of the issue of debentures.

All the points given in the above discussion will become clearer through the following example.

Example : Nidhi bought 100 debentures of a company at the price of Rs. 90 each and earned Rs. 1,440 as interest after a year. If the par value of the debentures is Rs. 120, find the rate of interest and net income as a percentage of Nidhi's investment

Solution : The cost of 100 debentures paid by Nidhi

$$= Rs.\ 90 \times 100 = Rs.\ 9,000$$

The interest earned = Rs. 1,440

The par value of the debentures

$$= Rs.\ 120 \times 100 = Rs.\ 12,000$$

Rate of interest = (Rs. 1,440/Rs. 12,000) $\times$ 100 = 12% per annum

Net income as a percentage of Nidhi's investment

$$= (Rs.\ 1,440/Rs.\ 9,000) \times 100 = 16\% \text{ per annum}$$

8.7 LET US SUM UP

In this unit we have studied the content-based techniques of teaching certain applications of percentage to problems of trade and business. The percentage concept may be conveniently used in calculating simple and compound interest. The concepts and methods involved in compound interest may be applied in the problems of population growth and other similar situations. The teacher may extend the idea of simple and compound interest to the teaching of banking and instalment buying.

Banks render many important services in addition to security and management of money. The teacher should clarify to the students the use the fixed deposit scheme, recurring deposits, savings bank accounts, bank drafts, travellers' cheques and lockers. Stocks and shares are another important topic in commercial mathematics. The concepts of company, stock and capital, share, dividend debentures and interest on them should be properly explained to the pupils. The functioning of stock exchanges and the sale and purchase of shares and debentures should be properly taught with the help of examples.

8.8 UNIT-END ACTIVITIES

1. Take your students to a nearby branch of a bank and give them first hand experience of the banking business. Show them pay-in-slips, withdrawal forms, cheques and cheque books, travellers' cheques and lockers. You may request a bank officer to explain to your students the procedures of maintaining accounts and computing interest. ·

2. Take your pupils to a stock broker's office and show them share certificates, application forms and the method of filling them in, share transfer deeds and contract notes. Also, explain to them how shares and debentures are dealt in.

3. You may take your students to the market and show them the articles which may be bought on easy instalments.

8.9 ANSWERS TO CHECK YOUR PROGRESS

1. Simple interest = Rs. 28,125

2. Rate = 5.5% per annum

3. Time = 4 years

4. Rs. 6,400

5. 2 and 1/2 years

6. 5,632

7. Rs. 2,834.28

8. Rs. 10,036.69

9. 11 years

10. 1,013.5 million

11. Rs. 504

12. 20%

13. Rs. 17,623.42

14. Rs. 284.58

15. Rs. 14,208

16. Rs. 225

8.10 SUGGESTED READINGS

Dutton, Wilbur H. & Adams L.J., (1962) : *Arithmetic for Teachers*, Prentice Hall Inc., Englewood Cliffs, pp. 295-317.

Gupta H N. and Shankaran V. (Ed.), (1984) : *Content-cum-Methodology of Teaching Mathematics*, NCERT, New Delhi.

Singh U.N. & Others, (1992) : *Mathematics — A Text Book for Class VIII Part-I*, NCERT, New Delhi.