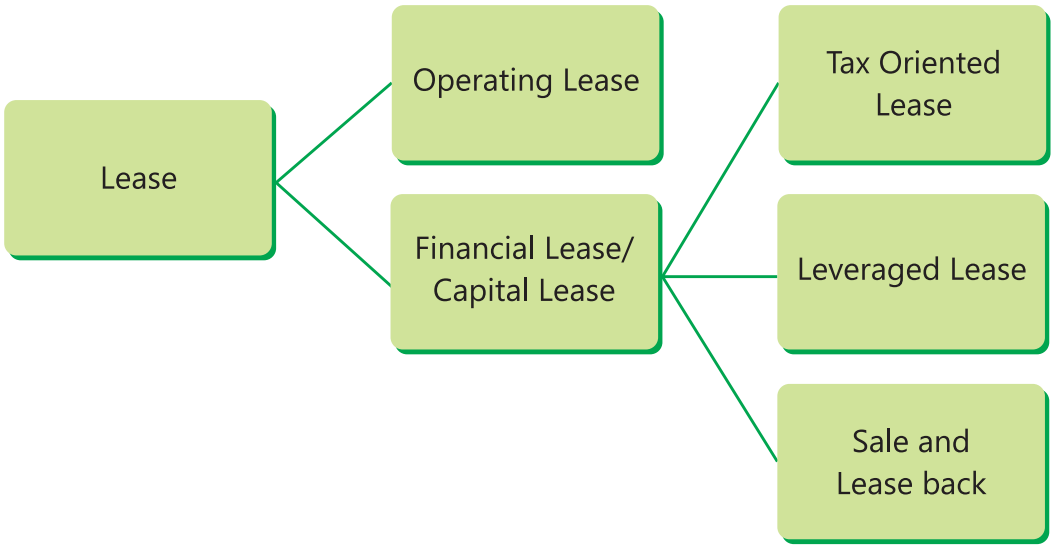
CHAPTER 9

LEASE FINANCING

LEARNING OUTCOMES

- Describe Lease financing
- Discuss the concept, classification, significance and limitations of Lease financing.
- Discuss different types of lease financing for decision making.
- Discuss Financial Evaluation of Lease Financing.

CHAPTER OVERVIEW



9.1 INTRODUCTION

9.1.1 Concept of Leasing

From the standpoint of finance, assets are acquired to generate cashflow. Finance executives or managers understand that the cash flows are generated by *use* of assets and not by owning them (the assets). Almost any asset that can be bought (sold) can also be taken (given) on lease. For example, a firm having a factory 20 km away from Nagpur city requires a couple of buses for transportation of staff from city to the factory site. The firm can either purchase the buses by using its own fund (equity financing) or by taking loan from bank (debt financing) or partly by own fund and partly by loan (equity and loan financing). Alternatively, the firm can take the buses on lease. Therefore, lease is nothing but an alternative financing arrangement. More specifically, lease is a financing decision. First, a firm has to make an investment decision in an asset that will generate cash flow. After that the finance manager has to decide whether the asset is to be bought by using internal fund or borrowing or by both or by taking the asset on lease.

Before we can compare lease with other modes of financing (equity or debt) it is necessary to understand how lease arrangements work and the differences between types of lease. Later in this chapter we shall make an analysis comparing lease vis-à-vis owning through equity or debt based on valuation after considering the tax implication for decision.

9.1.2 What is lease

Lease can be defined as a right to use equipment or capital goods on payment of periodical amount. This may broadly be equated to an instalment credit being extended to the person using the asset by the owner of capital goods with small variation.

9.1.3 Parties to a Lease Agreement

There are two principal parties to any lease transaction as under:

- *Lessor :* Who is actual owner of equipment permitting use to the other party on payment of periodical amount.
- *Lessee :* Who acquires the right to use the equipment on payment of periodical amount.

9.1.4 Lease vis-à-vis Hire Purchase

Hire-purchase transaction is also almost similar to a lease transaction with the basic difference that the person using the asset on hire-purchase basis is the owner of the asset and full title is transferred to him after he has paid the agreed installments. The asset will be shown in his balance sheet and he can claim depreciation and other allowances on the asset for computation of tax during the currency of hire-purchase agreement and thereafter.

In a lease transaction, however, the ownership of the equipment always vests with the lessor and lessee only gets the right to use the asset. Depreciation and other allowances on the asset will be claimed by the lessor and the asset will also be shown in the balance sheet of the lessor. The lease money paid by the lessee can be charged to his Profit and Loss Account. However, the asset as such will not appear in the balance sheet of the lessee. Such asset for the lessee is, therefore, called off the balance sheet asset.

9.2 HOW DOES LEASING WORK

In the most basic sense a lease is an agreement between the two persons whereby the owner of the asset (called lessor) allows the other person (called lessee) to use the asset for a regular periodic payment. Lease arises out of contract between the lessor and lessee. The terms of lease agreement are the most vital in understanding the type of lease and their financial implication on lessor and lessee.

Example 1– X Car rental Ltd., agrees to use Y Builders Ltd. – a luxury sedan car for ₹ 25000/ - per month for 2 years to be used for showing the customers the flats developed by the latter located at different places in Delhi ,NCR region. X Car Rental is lessor and Y Builders Ltd is the lessee under the arrangement.

Comparison between Financial Lease and Operating Lease

	Financial Lease	Operating Lease
1.	The risk and reward incident to ownership are passed on to the lessee. The lessor only remains the legal owner of the asset.	The lessee is only provided the use of the asset for a certain time. Risk incident to ownership belong wholly to the lessor.
2.	The lessee bears the risk of obsolescence.	The lessor bears the risk of obsolescence.
3.	The lessor is interested in his rentals and not in the asset. He must get his principal back along with interest. Therefore, the lease is non-cancellable by either party.	As the lessor does not have difficulty in leasing the same asset to other willing lessor, the lease is kept cancellable by the lessor.
4.	The lessor enters into the transaction only as financier. He does not bear the cost of repairs, maintenance or operations.	Usually, the lessor bears cost of repairs, maintenance or operations.
5.	The lease is usually full payout, that is, the single lease repays the cost of the asset together with the interest.	The lease is usually non-payout, since the lessor expects to lease the same asset over and over again to several users.

9.3 TYPES OF LEASE

Depending upon the terms of the agreement lease takes two fundamental forms – namely-(1) Operating Lease, (2) Financial or Capital lease. Financial or Capital Lease may be – (i) Tax-oriented Lease, (ii) Leveraged Lease and (iii) Sale and Lease Back arrangement.

9.3.1 Operating Lease

If under the lease agreement the lessor is entitled to take back the possession of the asset leased from the lessee – the arrangement is considered as operating lease. Operating lease is a genuine lease where ownership for tax and accounting purpose remains with the owner. When ownership remains with the owner for tax purpose then the lease is called *tax oriented lease*. Tax orientation has a significant importance in determining and measuring cash flow impact of lease transactions and their valuation. Operating lease is always a tax oriented lease. Under lease agreement lessor is required to maintain and service the leased asset. A common example is licensing agreement of flats in big cities. Under the agreement the landlord leases his (her) flat for eleven months for monthly rental renewable at the option of the landlord after the expiry of eleven months. The landlord bears the cost of maintenance and service (security, lift etc). An important feature of operating lease is - lease period is sufficiently less than the economic life of the asset. This means total lease rental recovered based on the lease period is substantially less than the cost of the asset.

Example 2 : Suppose in example 1 above, the cost of the car given on lease by X rental is ₹ 20 lacs. The economic life of the car is 8 years - implying that the car will create cash flow for next 8 years. Now, from the lease rental for 2 years total recovery will be ₹ 600,000 (₹ 25000 X 12X 2). In 2 years' lease cost of car remains unrecovered. The economic life of the asset is far more so that the cost can be recovered by further leasing or selling the car. Hence, this is an example of operating lease.

The significant features of operating lease are :

- Payments by way of lease rental over the period of lease are not enough to cover the cost of leased asset.
- The lesser generally takes back the possession of the asset on the expiry of the lease period.
- The lesser bears the cost of insurance, maintenance, tax etc. of the leased asset
- The lessee has the right to cancel the lease before the expiry of the lease term.
- The lessor remains the owner of the asset in the legal and economic sense (in substance).
- Operating lease is always a tax oriented lease.

3.9.2. Finance Lease (Capital Lease)

Under finance lease the lease rental is fixed in such a manner that the lessor recovers the entire price of the leased equipment plus a return on investment (made for purchasing the equipment leased) within the lease period through lease rent. In such a situation the lessee normally retains the possession of the equipment even after the lease period is over as he pays the price of the equipment. In this case, *in substance* there is no difference between – 'borrow to buy' and lease. Example 3 will clarify the matter.

Example 3: X Leasing Ltd. (the lessor) purchases a special equipment for ₹10,00,000/. The special equipment is necessary for port to handle cargo. X leases the equipment to Bombay port (lessee) at lease rental of ₹ 4,02,100 per annum for 3 years payable at the end of each year for 3 years. After the lease period the port will have option to retain the equipment upon the payment of additional ₹100.

Here, after 3 years, the lessee pays a token ₹100 to own the asset - an option lessee will obviously exercise.

From above it is clear that total payment of lease rental for 3 years = 3 × ₹4,02,100 = ₹ 12,06,300. Out of ₹ 12,06,300, cost is ₹10,00,000 and remaining ₹2,06,300 (12,06,300-10,00,000) is the return on investment.

The total return ₹ 2,06,300, X Leasing Ltd. would have earned the amount by lending ₹10,00,000 at 10%. The question is how do we calculate 10%? The answer is: On a principal of ₹ 10,00,000, total earning is ₹ 2,06, 300/ over a 3 year period without considering the time value of money. ₹ 4,02,100 each year (for 3 years) includes a part payment of principal plus interest return). From our knowledge about time value of money, we can say - total present value (PV) of ₹ 4,02,100 at the end of each year for 3 years must be equal to ₹ 10,00,000. That means, ₹ 10,00,000 is the PV of a 3 year annuity of ₹ 4,02,100/ . Let r be the interest or return on investment . Then, we have -

$$10,00,000 = \frac{4,02,100}{(1+r)} + \frac{4,02,100}{(1+r)^2} + \frac{4,02,100}{(1+r)^3} \qquad \text{.....(1)}$$

By trial and error we find that r = 10% (after rounding off). That is, interest or return on investment or finance charges is 10%.

Alternatively, the lessee could 'borrow and buy' the asset. That is, instead of taking the asset on lease the port could borrow ₹ 10,00,000 at 10 %, and buy the asset. The result would have been the same. In the table 1 below we give the transaction details showing, lease payment , break up of lease rental into principal component and return on investment (interest or finance charges) of the lease .

Table 1: Lease Payment Schedule*				
Year	**Opening Balance**	**Interest @10%**	**Lease Rental**	**Closing Balance**
(1)	(2)	(3) =(2) X10%	(4)	(5)=(2)+(3)-(4)
1	10,00,000	1,00,000	4,02,100	6,97,900
2	6,97,900	69,790	4,02,100	3,65,590
3	3,65,590	36,559	4,02,100	49

(1) The balance at the end of 3 years should be zero. ₹.49 arises due to rounding off difference.

***Note:** We would get the same repayment schedule as table 1 if the lessee would have gone for 'borrow and buy' option. In that case, the above Lease Payment Schedule (table 1) we term as – 'Loan Repayment Schedule' and in column 4 of the schedule we use the term Repayment Instalment instead of Lease Rental. Principal component of instalments would be, year 1 - ₹(4,02,100 -1,00,000) = ₹3,02,100, year 2- ₹(402100-69,790) = ₹3,32,310 and year 3 – ₹(4,02,100-36,559) = ₹3,65,541 respectively. Thus, finance lease is nothing but alternative to' borrow and buy' decision.

9.3.2.1 The significant features of finance lease are :

- Lease rental over the lease period covers the cost of leased asset plus a return on investment made by the lessor for the leased asset
- Though the lesser may continue to remain the legal owner of the asset, but for all practical purposes (i.e. in substance), risk and reward associated with ownership is substantially transferred to the lessee since the inception of the lease.
- The lessee bears the maintenance cost, insurance and taxes of the asset.
- Under the lease agreement, the lessee is not entitled to cancel or terminate the lease except at a very high penalty. This means lessee must pay the lease instalment otherwise lessor will sue him for nonpayment of unpaid instalments with cost and damage in the capacity of a creditor.

9.3.2.2 Classification of Financial Lease

(i) Tax-oriented Lease: In financial lease, we have pointed out that risk and reward of ownership are substantially transferred to lessee in economic sense. Nevertheless in a financial lease if the lessor is considered as the owner of the asset for claiming tax benefit of depreciation, then the financial lease is considered as 'tax -oriented lease'. Deduction of depreciation from lease rental reduces profit of lessor which is then subjected to tax. In other words, depreciation reduces the tax burden. Depreciation is a non-cash expenditure that results in 'tax saving'. Putting differently we can say there is a cash inflow arising out of tax saving due to depreciation. This

is a genuine benefit that arises from depreciation being a tax deductible non-cash expenditure. The lesser can pass on a part of depreciation benefit to the lessee making the arrangement attractive for the lessee. This enhances the competitive advantage of the lessor. If in place of lessor, lessee is entitled to claim depreciation for tax purpose then it is not a 'tax oriented lease'. In that case, the tax treatment will be same as that of owning an asset through borrowing.

Depreciation benefit of tax is of paramount importance in lease versus buy decision in determining cash flow implication to the lessor and lessee and the subsequent value of the lease to the respective parties.

Important Note : It is to be noted that in India in case of operating lease there is no confusion as to tax treatment of depreciation on leased asset. It is always the lessor who is entitled to claim depreciation on asset leased as he fulfills the two criteria for claiming depreciation namely – 'ownership of asset' and 'use of asset for the purpose of business'. But in case of financial lease the lessor's right to claim depreciation is a contentious issue. The CBDT circular (no 2/2001) doesn't make any direct distinction between the operating and financial lease. It mentions that if the transaction is not hire purchase transaction, the lessor is entitled to claim depreciation if the taste of 'ownership' and 'use' are met. Thus, according to the circular financial leases may be termed as 'tax-oriented leases'. But some recent tribunal and high court rulings have made a distinction between operating and financial lease holding financial lease is nothing but purchase of asset by the lessee through a loan. Lease payments constitute part repayment of principal with interest please refer to Note to table 1 above) , as such, it is the lessee who is entitled to claim depreciation as owner because risk and reward relating to ownership get transferred to lessee since inception of the lease. Further, it is the lessee who uses the asset in business. However, the issue remains debatable till the principles of law in the matter are ultimately settled by the apex court.

Example 4: A Leasing Ltd leases X Builders Ltd an earth moving equipment for ₹ 50,00,000 for 5 years. Salvage value is nil. After 5 years X will have option to buy the equipment by paying ₹1,000. The I-T Act allows straight line depreciation @20% on cost and tax rate is 40%. a) If lessor is entitled to claim depreciation then what type of lease arrangement is this ? b) What will be tax saving per year to the lessor ? c) If 12% is the required rate of return, how much lease rent the lessor can charge ? d) What will be net cash outflow on account of lease rental to the lessee?

(a) The problem implies that the lease arrangement is such that the lease rental must cover cost + 12 % return on cost. This is a case of financing lease and X will obviously exercise the option of paying ₹1,000 and retain the equipment. As lessor is entitled to claim depreciation and tax saving arising therefrom – hence, it is a case of 'tax oriented lease'.

(b) Per year tax saving will be = Rate of depreciation × tax rate = 0.20X0.4 =0.08 =8% on cost = 50,00,000 × 8% = ₹4,00,000. Check, depreciation charged =20% on ₹50,00,000. = ₹10,00,000. Tax (savings) on depreciation = 40% on ₹10,00,000 = ₹400,000. Tax saving on depreciation in finance is known as ' depreciation tax shield'

(c) If L be the lease rent, then cash flow after tax from lease will be

= Profit after tax from lease rent + Depreciation

= (L- 10,00,000) × (1 - 0.4) + 10,00,000

= 0.6 L + 4,00,000 .....(1)

The amount in equation (1) will be the cash flow after tax for each year for 5 years, Present value of the cash flow at 12% discount rate for 5 years must be = ₹50,00,000. Thus,

$$50,00,000 = \frac{0.6L + 4,00,000}{(1+0.12)} + \frac{0.6L + 4,00,000}{(1+0.12)^2} + \ldots\ldots\ldots \frac{0.6L + 4,00,000}{(1+0.12)^5}$$

Using present value of annuity, we have -

(0.6 L + 4,00,000) × 3.605 = 50,00,000

When L = 16,44,936, i. e. ₹16,44,900 (approximately).

Note : Tax savings on depreciation enables lessor to keep the lease limited to ₹16,44,900 to earn post tax return of 12%, otherwise, the lease rental would have been = $\frac{50,00,000}{3.605 \times 0.6}$ =₹23,11,600 (approx.) to earn the same 12 % post tax rate of return.

(d) The lessee will pay lease rental of ₹16,44,900. This will be a tax deductible expenditure against lessee's income. Net cash outflow, that is, cash outflow net of tax will be ₹16,44,900 × (1-0.40) = ₹9,86,940 for lessee.

(ii) Leveraged Lease: A leveraged lease is tax oriented lease where the lessor borrows substantial amount from the lender to purchase the asset he leases. But an arrangement is made in such a way through tripartite agreement between the lender (financier of the leased asset), lessor and the lessee , so that, in case of default of payment of lease rental by the lessee , the lessor is not liable to make loan repayment to the lender. Instead of lessor, the lender has to take appropriate steps to recover the loan instalments due on loan to purchase the leased asset from the lessee. Leveraged lease is a complicated arrangement and normally entered in case of very high value transactions.

(iii) Sale and Lease Back: It is arrangement under which an entity sells the asset to another party and simultaneously takes it back from the other party under a lease arrangement.

Example 5 : S Technologies Ltd sells 40 computers to M Leasing Ltd. at ₹. 30,00,000 and immediately takes back on lease for a lease rental of ₹12,00,000 per annum for 3 years. After 3 years S Ltd is entitled to retain the computers.

Actually under this arrangement through a sale deed ownership is transferred to lessor (M Leasing Ltd.) but possession continues with the lessee (S Technologies Ltd here) and the lessee continues to use the asset. This is a sale and lease back transaction. As the cost of the asset is recovered through lease rental plus as the lessor (M) gets a return on cost of the asset, the nature of lease is finance lease.

The important features of sale and lease back arrangement are:

(a) The lessee gets a lumpsum amount as sale consideration of the asset.

(b) The lessee continues to use the asset.

(c) If the terms of the lease make it an operating lease or tax oriented finance lease, the buyer -cum-lessor is entitled to get tax benefit of depreciation.

9.4 REASONS FOR LEASING/ADVANTAGES OF LEASING

(1) Lease may be low cost alternative: Leasing is alternative to purchasing. As the lessee is to make a series of payments for using an asset, a lease arrangement is similar to a debt contract. The benefit of lease is based on a comparison between leasing and buying an asset. Many lessees find lease more attractive because of low cost. For example – you are transferred to another city for 6 months. For daily travel you need a car. If you buy car in your own name then as per Motor Vehicles Act you have to pay one time road tax and incur other expenses besides cost of car. You can always sell the car after 6 months before leaving. It may be economical to take a car on lease for 6 months as lease rental may be less than net cash outflow arising from difference between total cost of the car and sale value you realise.

(2) Tax benefit: In certain cases tax benefit of depreciation available for owning an asset may be less than that available for lease payment. In other words, differential tax treatment between owning an asset and taking it on lease may result in a decision in favour of lease. For example – if a firm owns an asset, it gets tax saving for depreciation on book value as per the I-T law (in case of MAT, depreciation on the book value is as per the depreciation schedule of the Companies Act, 2013, based on useful life), but in case of lease rent entire lease rental is tax deductible. In some cases this differential tax treatment means a higher tax savings for lease, implying lease is a smarter decision subject to other factors.

(3) Working capital conservation: When a firm buy an equipment by borrowing from a bank (or financial institution), they never provide 100% financing. Depending

upon the firm's credit rating bank may finance 75% or 60% (say) of total cost of equipment. The rest 25% or 40% (as the case may be), the firm has to bring in – the amount that the firm provides as down payment from its own source is called margin money. Margin money requirement naturally reduces firm's working capital (and liquidity). In case of high value asset the amount may be substantial having an adverse impact on operation. But in case of lease one gets normally 100% financing in the sense that one needn't bring in margin money generally for taking an asset on lease. This enables conservation of working capital.

(4) Preservation of Debt Capacity: As per the accounting standard operating lease is not capitalised in the books of the lessee. Operating lease payment is treated as expenditure in the profit and loss account. Neither the asset taken on lease appears as asset nor does the liability representing present value of future lease payment (cost of leased asset) appear as liability in the balance sheet. That is, operating lease doesn't have any balance sheet impact. So, operating lease does not matter in computing debt equity ratio. This enables the lessee to go for debt financing more easily. The access to and ability of a firm to get debt financing is called debt capacity (also, reserve debt capacity). Operating lease, if it is properly structured, can work efficiently as a substitute of debt though there may hardly be any difference between the two in respect of regular cash out flow; but at the same time it keeps the debt capacity in fact.

However, it is to be noted the above preservation of debt capacity is not generally applicable for finance lease as the present value of future lease payment (cost of leased asset) appears as liability in the balance sheet of the lessee and to be duly considered in calculating debt equity ratio.

(5) Obsolescence and Disposal: After purchase of leased asset there may take place technological obsolescence of the asset. That means a technologically upgraded asset with better capacity may come into existence after purchase. To retain competitive advantage the lessee as user may have to go for the upgraded asset. The obsolete old asset may fetch a small portion of the book value upon disposal resulting in capital loss. In case of cancellable operating lease the lessee can terminate the contract in such circumstances. However, it is to be kept in mind that where there is a possibility of technological obsolescence the lessor will cover the risk by fixing a higher lease rental.

(6) Restrictive Conditions for Debt Financing: When a company takes loan to purchase equipment (say), in the loan agreement lender may impose several restrictions on the borrower company to protect his interest. Apart from creating charge on the equipment purchased (primary security), lender may ask for collateral securities on other assets, like -mortgage of landed property, pledging fixed deposit receipts with the bank, asking for guarantor etc. The lender can

impose other conditions too - like restriction on payment of dividend, putting lender's representative on the board to ensure proper utilization of fund etc. In case of lease such tight conditions are not imposed as lessor remains the owner of the asset legally and he can recover the asset if the lessee fails to abide by the lease terms and conditions.

9.5 LIMITATIONS OF LEASING

(1) The lease rentals become payable soon after the acquisition of assets and no moratorium period is permissible as in case of term loans from financial institutions. The lease arrangement may, therefore, not be suitable for setting up of the new projects as it would entail cash outflows even before the project comes into operation.

(2) The leased assets are purchased by the lessor who is the owner of equipment. The seller's warranties for satisfactory operation of the leased assets may sometimes not be available to lessee.

(3) Lessor generally obtains credit facilities from banks etc. to purchase the leased equipment which are subject to hypothecation charge in favour of the bank. Default in payment by the lessor may sometimes result in seizure of assets by banks causing loss to the lessee.

(4) Lease financing has a very high cost of interest as compared to interest charged on term loans by financial institutions/banks.

Despite all these disadvantages, the flexibility and simplicity offered by lease finance is bound to make it popular. Lease operations will find increasing use in the near future.

9.6 LEASE EVALUATION

9.6.1 Lessee Perspective

A lease can be evaluated either as an investment decision or as a financing means. If an investment decision has already been made, a firm (lessee) has to evaluate whether it will purchase the asset equipment or acquire it on lease basis. The lease rentals can be taken as interest on debt. Thus leasing in essence is alternating source of financing to borrowing. The lease evaluation thus is debt financing versus lease financing. The decision criterion used is Net Present Value of leasing NPV (L) / Net Advantage of Leasing (NAL). The discount rate used is the marginal cost of capital (K_e) for all cash flows other than lease payments and the Pretax cost of long term debt for lease payment (K_d). The value of the interest tax shield is included as forgone cash flow in the computation of NPV (L) / NAL.

Calculation of NPV (L) / NAL:

Cost of Asset

Less PV of Lease rentals (LR) (Discounted at K_d)

Add PV of tax shield on LR (Discounted at K_e)

Less PV of interest on debt tax shield. (Discounted at K_e)

Less PV of tax shield on depreciation (Discounted at K_e)

Less PV of salvage value (Discounted at K_e)

If NAL / NPV(L) is positive, the leasing alternative to be used, otherwise borrowing alternative would be preferable.

9.6.2 Evaluation of Lease Methods

There are three methods of evaluating a leasing proposal viz. Present Value analysis, Internal Rate of Return analysis, and the Bower Herringer Williamson method.

(a) Present Value Analysis: In this method, the present value of the annual lease payments (tax adjusted) is compared with that of the annual loan repayments adjusted for tax shield on depreciation and interest, and the alternative which has the lesser cash outflow will be chosen.

(b) Internal rate of return analysis: Under this method there is no need to assume any rate of discount. To this extent, this is different from the former method where the after-tax cost of borrowed capital was used as the rate of discount. The result of this analysis is the after tax cost of capital explicit in the lease which can be compared with that of the other available sources of finance such as a fresh issue of equity capital, retained earnings or debt. Simply stated, this method seeks to establish the rate at which the lease rentals, net of tax shield on depreciation are equal to the cost of leasing

(c) Bower-Herringer-Williamson Method: This method segregates the financial and tax shield aspects of lease financing. The model compare the financing benefit of leasing with tax advantage/operating benefit of leasing.

The procedure of evaluation is briefly as follows :

1. Compare the present value of debt with the discounted value of lease payments (gross), the rate of discount being the gross cost of debt capital. The net present value is the financial advantage (or disadvantage).
2. Work out the comparative tax benefit during the period and discount it at an appropriate cost of capital. The present value is the operating advantage (or disadvantage) of leasing.
3. If the net result is an advantage, select leasing

9.6.3 Lease Valuation

Decision as regards -'buy or lease' depends on whether lease results in incremental value creation (over buying). If the asset use is for short term period (less than one year) lease is better than buy generally. For capital asset or equipment the benefit of which accrues over a period of time, then at the outset it is a capital budgeting decision. When we use DCF technique, first we ensure whether NPV of the asset use is positive by applying appropriate cost of capital. Once the investment decision is finalized by using NPV criterion we find out whether lease results in additional value or not. It also may happen that usual DCF technique for project evaluation creates a negative value (i.e. negative NPV), but when we consider the advantage of lease in a particular situation we might get positive value. Even in cases where by statute a firm has to install an equipment compulsorily, in valuation term its NPV may be negative - still we find out whether leasing creates less negative value or not. A perfect example is installation of air pollution control equipment (APCE) to be compulsorily installed by statutory requirement. APCE doesn't generate cash flow in economic sense as such APCE in itself is a negative NPV project. But we may find that leasing creates less negative value than buying.

Operating lease involves a 'buy versus borrow' decision. In this case risk and reward associated with ownership remains with the lessor hence it is less risky for lessor. Lease rental may be substantial lower (reflecting low risk), whereas in case of buy decision as the risk of ownership is on the lessee it may be a costlier option. Finance lease is a 'borrow versus lease ' decision. As the substantial risk associated with ownership is transferred to the lessee where he has to assume the business risk of owning and operating the asset, for valuation purpose finance lease becomes just an alternative way of borrowing money for the leased asset.

Example 6 : A Ltd (A) is engaged in manufacturing a special component of Maruti car. There is another supplier to Maruti of the same component. There occurs a huge backlog in the order book of A. A immediately needs to increase its capacity either by purchasing another machine producing the component or taking it on lease. If A purchases the machine, it will cost A- ₹ 10,00,000. Its economic life is 5 years after which it will be worthless. Corporate tax rate is 40%. The new machine will save electricity cost to the tune of ₹ 60,000 per annum. X leasing ltd offers to lease the machine to A at lease rental of ₹ 2,50,000 per annum payable at the end each year for next 5 years. A has to meet insurance and operating expenses of the machine. It is a tax oriented lease. If loan is taken to purchase the machine interest cost of loan will be 10%.

Mr. Z, the CFO of the company is to analyze borrow-to- buy and lease options and then take a decision.

Z goes through the facts and figures carefully. His analysis reveals the following –

(1) Lease period equals the economic life of the machine and total lease rental for 5 years (= 5 × 2,50,000 = ₹ 12,50,000) covers the cost of the asset (₹ 10,00,000) plus financing cost of ₹ 2,50,000 (12,50,000-10,00,000), hence it is finance lease.

(2) Whether A purchases or accepts the lease, the saving in cost on account of electricity being same, both under lease and buy will have no impact.

(3) In case of lease cash outflow for lease rental is ₹ 2,50,000/. Lease rental is a tax deductible expense. Hence, cash outflow net of tax = (1-0.40)X2,50,000= ₹ 1,50,000

(4) If the machine is purchased there will be an immediate cash outflow of ₹10,00,000. Depreciation will be = 10,00,000/5 = ₹ 2,00,000 per annum. Tax savings or tax shield on depreciation per annum = 40% on ₹ 2,00,000 = 0.40 × 2,00,000 = ₹ 80,000. Lease will not entitle the lessee to have depreciation tax shield in a tax oriented lease. The advantage will accrue to lessor.

The cash flow impact of the analysis (for lessee) is given in a table 2 below showing cash outflow as negative (-) .

Table 2 : Cash flow impact of lease compared to buying

Lease over Buy	Year 0	Year1	Year 2	Year 3	Year 4	Year 5
Net of tax	0	-1,50,000	-1,50,000	-1,50,000	-1,50,000	-1,50,000
Cost of the	10,00,000*					
Depreciation tax shield	0	-80,000	-80,000	-80,000	-80,000	-80,000
Net Cash flow	10,00,000	-2,30,000	-2,30,000	-2,30,000	-2.30.000	-2,30,000

***Note** : If the machine is taken on lease, the cost of machine need not be paid. Leasing saves the initial cost of the machine and hence ₹10,00,000 is positive.

If A takes the machine on lease then it saves ₹10,00,000 immediately but latter on pays ₹2,30,000 for 5 years. So, the decision is whether saving ₹10,00,000 now and paying ₹ 2,30,000 each year for next 5 years is a nice idea or not. The decision is same as A borrowing ₹10,00,000 and then paying post tax interest amounting to ₹ 2,30,000 for 5 years –Here, according to the problem post tax interest = 10 X (1-0.40) = 6%

A financial lease is better to 'borrow and buy' if present value of negative annuity of ₹ 230000 as lease rental over 5 years is less than ₹.10,00,000 taking discount rate as 6% .

$$\text{NPV of lease} = 10,00,000 - \frac{2,30,000}{(1+0.06)} - \frac{2,30,000}{(1+0.06)^2} - .... - \frac{2,30,000}{(1+0.06)^5}$$

$$= 10,00,000 - 9,68,852 = ₹\ 31,148.$$

We find that NPV of lease as compared to buy option is positive. This means initial cost saving of ₹10,00,000 by not buying the machine and , instead taking it on lease and paying lease rental has a net positive impact in the form of value creation to the tune of ₹ 31,148. This positive NPV is called value of benefit of lease over buy

decision for the lessee. It may be noted that if the lessor's tax benefit of depreciation and required of return are same, (i.e. net of tax 6%) he will have a negative NPV of ₹31,148. Naturally, he will not be interested in the arrangement. It means that the lesser must be having a different tax benefit of depreciation, and /or different post tax required rate of return yielding a positive NPV to make leasing attractive to him as well. The approach of valuing lease mentioned here is most popular globally.

Based on above we conclude lease is better than 'borrow to buy' from the point of view of lessee.

So, lease valuation consists of the following steps –

1. Compute after tax cash flow from leasing in lieu of buying.
2. Calculate after tax rate of interest of equivalent loan.
3. Discount the cashflow of (1) by using the discount rate determined in (2)
4. If the result of (3) is positive we can consider lease adds value and, therefore, lease is better, if it is negative then lease destroys value and we conclude – buy is better.

MISCELLANEOUS ILLUSTRATION

ILLUSTRATION 1

M/s Gama & Co. is planning of installing a power saving machine and are considering buying or leasing alternative. The machine is subject to straight-line method of depreciation. Gama & Co. can raise debt at 14% payable in five equal annual instalments of ₹ 1,78,858 each, at the beginning of the year. In case of leasing, the company would be required to pay an annual end of year rent of 25% of the cost of machine for 5 years.

The Company is in 40% tax bracket. The salvage value is estimated at ₹ 24,998 at the end of 5 years.

Evaluate the two alternatives and advise the company by considering after tax cost of debt concept under both alternatives.

SOLUTION

Calculation of Cost of the Machine

Beginning of Year	Cl. Balance at the beginning	Installment	Interest	Principal component
5	0	1,78,858	21,965	1,56,893
4	1,56,893	1,78,858	41,233	1,37,625
3	2,94,518	1,78,858	58,134	1,20,724
2	4,15,242	1,78,858	72,960	1,05,898
1	5,21,140	1,78,858	0	1,78,858
		Total		6,99,998

Cost of the machine is ₹ 6,99,998

Alternatively it can be computed as follows:

$$\text{Annual Payment} = \frac{\text{Cost of Machine}}{\text{PVAF}(14\%, 0-4)}$$

$$1,78,858 = \frac{\text{Cost of Machine}}{3.91371}$$

Cost of Machine = 6,99,998

Year	Total Payment	Interest	Principal component	Principal Outstanding
0	1,78,858	0	1,78,857	5,21,139
1	1,78,858	72,959	1,05,899	4,15,240
2	1,78,858	58,134	1,20,725	2,94,516
3	1,78,858	41,232	1,37,626	1,56,890
4	1,78,858	21,964	1,56,894	0
Total			6,99,997	

Buying Option

$$\text{Depreciation per annum} = \frac{₹\,6,99,998 - ₹\,24,998}{5} = \frac{₹\,6,75,000}{5}$$

Depreciation per annum = ₹ 1,35,000

Tax Saving on interest & Depreciation

Year	Interest (₹)	Dep. (₹)	Total (₹)	Tax Saving (₹)
1	72,960	1,35,000	2,07,960	83,184
2	58,134	1,35,000	1,93,134	77,254
3	41,233	1,35,000	1,76,233	70,493
4	21,965	1,35,000	1,56,965	62,786
5	0	1,35,000	1,35,000	54,000

Present Value of Out flow

Year	Installment (₹)	Tax Saving (₹)	Net outflow (₹)	PV @ 8.4%	P.V. (₹)
0	1,78,858	0	1,78,858	1.0000	1,78,858.00
1	1,78,858	83,184	95,674	0.9225	88,259.26
2	1,78,858	77,254	1,01,604	0.8510	86,465.36
3	1,78,858	70,493	1,08,365	0.7851	85,077.34
4	1,78,858	62,786	1,16,072	0.7242	84,059.40
5	Salvage Value	54,000	-54,000	0.6681	-36,077.00
	P.V. of Outflow				4,86,641.47
			24,998	0.6681	16,701.17
					4,69,940.30

Leasing Option

Lease Rent 25% of ₹ 6,99,998 i.e. ₹ 1,74,999.50 app. ₹ 1,75,000

Lease Rent payable at the end of the year

Year	Lease Rental (₹)	Tax Saving (₹)	Net outflow (₹)	PV @ 8.4%	P.V. (₹)
1-5	1,75,000	70,000	1,05,000	3.9509	4,14,844.50

Decision – The company is advised to opt for leasing as the total PV of cash outflow is lower by ₹ 55,095.80

ILLUSTRATION 2

XYZ Ltd. requires an equipment costing ₹ 10,00,000; the same will be utilized over a period of 5 years. It has two financing options in this regard :

(i) Arrangement of a loan of ₹ 10,00,000 at an interest rate of 13 percent per annum; the loan being repayable in 5 equal year end installments; the equipment can be sold at the end of fifth year for ₹1,00,000.

(ii) Leasing the equipment for a period of five years at an early rental of ₹ 3,30,000 payable at the year end.

The rate of depreciation is 15 percent on Written Down Value (WDV) basis, income tax rate is 35 percent and discount rate is 12 percent.

Advise which of the financing options should XYZ Ltd. exercise and why?

SOLUTION

Option A

The loan amount is repayable together with the interest at the rate of 13% on loan amount and is repayable in equal installments at the end of each year. The PVAF at the rate of 13% for 5 years is 3.5172, the amount payable will be

$$\text{Annual Payment} = \frac{₹\ 10,00,000}{3.5172} = ₹\ 2,84,320 \text{ (rounded)}$$

Schedule of Debt Repayment

End of Year	Total Payment ₹	Interest ₹	Principal ₹	Principal Amount Outstanding ₹
1	2,84,320	1,30,000	1,54,320	8,45,680
2	2,84,320	1,09,938	1,74,382	6,71,298
3	2,84,320	87,269	1,97,051	4,74,247
4	2,84,320	61,652	2,22,668	2,51,579
5	2,84,320	32,741*	2,51,579	------

* Balancing Figure

Schedule of Cash Outflows: Debt Alternative

(Amount in ₹)

(1)	(2)	(3)	(4)	(3) + (4)	(5)	(6)	(7)	(8)
End of year	Debt Payment	Interest	Dep		Tax Shield [(3)+(4)] 0.35	Cash outflows (2) – (5)	PV factors @ 12%	PV
1	2,84,320	1,30,000	1,50,000	2,80,000	98,000	1,86,320	0.893	1,66,384
2	2,84,320	1,09,938	1,27,500	2,37,438	83,103	2,01,217	0.797	1,60,370
3	2,84,320	87,269	1,08,375	1,95,644	68,475	2,15,845	0.712	1,53,682
4	2,84,320	61,652	92,119	1,53,771	53,820	2,30,500	0.636	1,46,598
5	2,84,320	32,741	78,301	1,11,042	38,865	2,45,4565	0.567	1,39,173
								7,66,207
Less: PV of Salvage Value								(56,700)
								7,09,507

Total present value of Outflows = ₹ 7,09,508

Option B

Lease Rent	330,000
Tax Shield	(1,15,500)
Outflow	2,14,500
	× 3.605
	₹ 7,73,273

Since PV of outflows is lower in the Borrowing option, XYZ Ltd. should avail of the loan and purchase the equipment.

ILLUSTRATION 3

Sundaram Ltd. discounts its cash flows at 16% and is in the tax bracket of 35%. For the acquisition of a machinery worth ₹10,00,000, it has two options – either to acquire the asset by taking a bank loan @ 15% p.a. repayable in 5 yearly installments of ₹2,00,000 each plus interest or to lease the asset at yearly rentals of ₹3,34,000 for five (5) years. In both the cases, the instalment is payable at the end of the year. Depreciation is to be applied at the rate of 15% using 'written down value' (WDV) method. You are required to advise which of the financing options is to be exercised and why.

Year	*1*	*2*	*3*	*4*	*5*
P.V factor @16%	*0.862*	*0.743*	*0.641*	*0.552*	*0.476*

SOLUTION

Alternative I: Acquiring the asset by taking bank loan:

Years		**1**	**2**	**3**	**4**	**5**
(a)	Interest (@15% p.a. on opening balance)	1,50,000	1,20,000	90,000	60,000	30,000
	Depreciation (@15% WDV)	1,50,000	1,27,500	1,08,375	92,119	78,301
		3,00,000	2,47,500	1,98,375	1,52,119	1,08,301
(b)	Tax shield (@35%)	1,05,000	86,625	69,431	53,242	37,905
	Interest less Tax shield (a)-(b)	45,000	33,375	20,569	6,758	(-)7,905
	Principal Repayment	2,00,000	2,00,000	2,00,000	2,00,000	2,00,000
	Total cash outflow	2,45,000	2,33,375	2,20,569	2,06,758	1,92,095

	Discounting Factor @ 16%	0.862	0.743	0.641	0.552	0.476
	Present Value	2,11,190	1,73,398	1,41,385	1,14,130	91,437

Total P.V of cash outflow = ₹ 7,31,540

Alternative II: Acquire the asset on lease basis

Year	Lease Rentals ₹	Tax Shield @ 35%	Net Cash Outflow	Discount Factor	Present Value
1	3,34,000	1,16,900	2,17,100	0.862	1,87,140
2	3,34,000	1,16,900	2,17,100	0.743	1,61,305
3	3,34,000	1,16,900	2,17,100	0.641	1,39,161
4	3,34,000	1,16,900	2,17,100	0.552	1,19,839
5	3,34,000	1,16,900	2,17,100	0.476	1,03,340
Present value of Total Cash out flow					7,10,785

1. Advice -By making Analysis of both the alternatives, it is observed that the present value of the cash outflow is lower in alternative II by ₹20,755 (i.e.₹731,540 – ₹7,10,785) Hence, it is suggested to acquire the asset on lease basis.

ILLUSTRATION 4

Fair finance, a leasing company, has been approached by a prospective customer intending to acquire a machine whose Cash Down price is ₹ *3 crores. The customer, in order to leverage his tax position, has requested a quote for a three year lease with rentals payable at the end of each year but in a diminishing manner such that they are in the ratio of 3: 2: 1.*

Depreciation can be assumed to be on straight line basis and Fair Finance's marginal tax rate is 35%. The target rate of return for Fair Finance on the transaction is 10%.

Required:

Calculate the lease rents to be quoted for the lease for three years.

SOLUTION

Capital sum to be placed under Lease

	₹ in lakhs
Cash Down price of machine	300.00

Less: Present value of depreciation Tax Shield

$100 \times .35 \times \frac{1}{(1.10)}$	31.82	
$100 \times .35 \times \frac{1}{(1.10)^2}$	28.93	
$100 \times .35 \times \frac{1}{(1.10)^3}$	26.30	87.05
		212.95

If the normal annual lease rent per annum is *x*, then cash flow will be:

Year	Post-tax cash flow	P.V. of post-tax cash flow
1	$3x$ x (1 - .35) = $1.95x$	1.95 *x* (1/1.10) = $1.7727x$
2	$2x$ x (1 - .35) = $1.3x$	1.30 *x* [(1/(1.10)^2] = $1.0743x$
3	*x* x (1 - .35) = $0.65x$	0.65 *x* [1/(1.10)^3] = $0.4884x$
		$3.3354x$

Therefore 3.3354 *X* = 212.95 or *X* = ₹ 63.8454 lakhs

Year-wise lease rentals:

Year		₹ in lakhs
1	3 x 63.8454 lakhs	= 191.54
2	2 x 63.8454 lakhs	= 127.69
3	1 x 63.8454 lakhs	= 63.85

SUMMARY

- The chapter provides a fundamental idea about lease in general, types of lease, reasons of lease, cash flow implication and lease valuation.
- Lease is a financing arrangement. Basically lease can be of two types - operating and financial. In operating lease lessor is the owner of the asset in legal and economic sense, he takes back the possession of the asset on the expiry of the lease, lease rental only covers a part of the asset cost and it is cancellable. Finance lease in economic sense, is a substitute for 'borrow to buy agreement', the risk and reward of ownership is substantially transferred to lessee, lease rental covers the cost of the asset plus a return on cost and is non-cancellable.

- Financial lease is 'tax oriented' implying for tax purpose lessor is entitled to get the advantage of tax saving on depreciation of the leased asset. Tax saving on depreciation has significant impact on cash flow and valuation lease.
- There are various reasons for taking an asset on lease, namely cost consideration, tax saving, working capital conservation, sustaining reserve debt capacity and so on
- Lease valuation implies incremental value generated by lease over 'borrow to buy'.

TEST YOUR KNOWLEDGE

MCQs Based Questions

1. You have sufficient fund and you need a car for 5 months. You will -
   (a) Purchase the car using your fund, use for 5 months and sell the car after 5 months.
   (b) Purchase the car by borrowing, use for 5 months, sell the car and repay the loan.
   (c) You will take the car on lease for 5 months and return it after lease period is over.
   (d) None of the above.
2. From finance angle -
   (a) Lease has advantage over bank loan as lease requires no margin money and hence means 100% financing.
   (b) Bank loan is always preferable despite margin money requirement.
   (c) Margin money is not an important consideration in borrow and buy versus lease decision.
   (d) Margin money requirement is the only criterion for which lease is always considered better than bank loan.
3. Leasing –
   (a) Increases earning per share.
   (b) Reduces earning per share.
   (c) Has no impact on earnings per share.
   (d) Can't say – varies on case to case.
4. Long term financial lease is –
   (a) An off balance sheet item and has no impact on debt equity ratio.
   (b) A balance sheet item and increases debt equity ratio.
   (c) A balance sheet item and reduces debt equity ratio.
   (d) A balance sheet item and has no impact on debt equity ratio.

5. Lease has value, when –
   (a) Post-tax cost lease of lease rental < an equivalent loan principal and post-tax interest.
   (b) Post-tax cost lease of lease rental > an equivalent loan principal and post-tax interest.
   (c) Post-tax cost lease of lease rental = an equivalent loan principal and post-tax interest.
   (d) None of the above
6. An operating lease is –
   (a) Non-cancellable
   (b) Cancellable at the option of either lessor or lessee.
   (c) Cancellable at the option of lessor only
   (d) Cancellable at the option of lessee only.
7. From the lessee's angle, the risk of –
   (a) Operating lease is same as that of financing lease.
   (b) Operating lease is greater than that of financing lease
   (c) Operating lease is lesser than that of financing lease.
   (d) Operating lease is not comparable with that of finance lease
8. Lease rental –
   (a) Will increase minimum alternative tax
   (b) Has no impact on minimum alternative tax.
   (c) Is tax neutral, being balance sheet item.
   (d) May reduce minimum alternative tax.

Theoretical based Questions

1. Who is entitled to claim tax shield of depreciation in case of operating lease?
2. What is tax oriented lease?
3. What is a sale and lease back transaction?
4. What are the characteristic features of Financial and Operating Lease?
5. Discuss limitations of Lease Financing?
6. What are the evaluation methods of Lease Financing?

Practical Problems

1. Your company wants to purchase a sophisticated electronic equipment for ₹ 7,50,000. It will be completely obsolete in 3 years. Your option is to borrow the money for 3 years @ 10% bank interest or take it on lease. If taken on lease, the lease rental will be ₹ 2,70,000 payable at the end of each year for next

3 years. If you buy the equipment straight-line depreciation is available to zero in 3 years. The tax rate is 34%. Answer the following questions

(a) What should you do – lease or buy?

(b) What is the NPV to the lessor?

(c) At what lease rental lessor and lessee will break even?

2 ABC is in the manufacturing aluminum component. It wants to expand for which it needs additional machine. The firm can either buy or take the machine on lease. The machine can be purchased for ₹ 30 lacs. It will have a useful life of 5 years with residual value of ₹ 2,00,000 after the expiry of 5 years. The purchase can be financed by 15% loan payable in equal instalments (principal +interest) payable at the end of each year for 5 years. Else the machine can be taken on lease at a lease rental of ₹ 9,00,000 per annum payable at the end of each year for 5 years. The depreciation for tax purpose is to be charged as per reducing balance method. The rate of depreciation is 25% per annum. Tax rate is 40%. Maintenance expenses of the machine is ₹ 50,000 per annum and the expenditure is to be born by the lessee. Show which option is better – lease or buy? Clearly demonstrate cash flow analysis and other workings.

3 ABC Ltd. is contemplating have an access to a machine for a period of 5 years. The company can have use of the machine for the stipulated period through leasing arrangement or the requisite amount can be borrowed to buy the machine. In case of leasing, the company received a proposal to pay annual end of year rent of ₹ 2,40,000 lakhs for a period of 5 years.

In case of purchase (which costs ₹ 10,00,000/-) the company would have a 12%, 5 years loan to be paid in equated installments, each installment becoming due to the beginning of each years. It is estimated that the machine can be sold for ₹ 2,00,000/- at the end of 5th year. The company uses straight line method of depreciation. Corporate tax rate is 30%. Post tax cost of capital of ABC Ltd. is 10%.

You are required to advice

(i) Whether the machine should be bought or taken on lease.

(ii) Analyse the financial viability from the point of view of the lessor assuming 12% post tax cost of capital.

	PV of ₹ 1 @ 10% for 5 years	PV of ₹ 1 @ 12% for 5 years
1	.909	.893
2	.826	.797
3	.751	.712
4	.683	.636
5	.621	.567

ABC Ltd. is considering a proposal to acquire a machine costing ₹ 1,10,000 payable ₹ 10,000 down and balance payable in 10 annual equal instalments at the end of each year inclusive of interest chargeable at 15%. Another option before it is to acquire the asset on a lease rental of ₹ 15,000 per annum payable at the end of each year for 10 years. The following information is also available.

(i) Terminal Scrap value of ₹ 20,000 is realizable, if the asset is purchased.

(ii) The company provides 10% depreciation on straight line method on the original cost.

(iii) Income tax rate is 50%.

You are required to compute the analyse cash flows and to advise as to which option is better.

ANSWERS/SOLUTIONS

Answers to the MCQs based Questions

1. (c) **2.** (a) **3.** (d) **4.** (b) **5** (a) **6** (b)
7. (c) **8.** (d)

Answers to Theoretical based Questions

1. Please refer paragraph 9.3
2. Please refer paragraph 9.3
3. Please refer paragraph 9.3.1
4. Please refer paragraph 9.2
5. Please refer paragraph 9.5
6. Please refer paragraph 9.6

Answers to Practical problems

1

Working Note :

(1) The buy or lease decision means computation of NPV arising from lease decision i.e. computation of valuation advantage of lease over buy. If the value is positive then we go for lease, otherwise we buy.

(2) The valuation process involves – a) finding incremental cash flow of lease over buy, and then, b) discounting the incremental cash flow by net of tax interest rate of equivalent loan (to purchase the asset in question). In the given example if the equipment is taken on lease, then we have incremental cash flow in year '0' by way of purchase cost saving. Subsequently, there is cash outflow in the form of net of tax lease rent from year 1 to 3. Net of tax lease rent = ₹ 270000 × (1-0.34)= ₹ 178200. Again, if the equipment had been purchases there would

have been tax saving of depreciation = Depreciation × tax rate = (7,50,000/ 3) × 0.34 = ₹ 85000. The tax saving or tax shield is available for 3 years. But under lease the benefit accrues to lessor. For lessee it is a negative cash flow as advantage is not available to him under lease arrangement as lessor is considered the legal owner of the asset for claiming depreciation under Income tax law. The entire cash flow analysis of lease over buy decision is summarised in table 1 below.

(3) Interest cost of equivalent loan is 10%. Net of tax interest cost = 0.10 × (1-.34) = .066.

Table 1 :Cash Flow Impact of Lease over Buy				
Net of tax lease rent	0	-1,78,200	-1,78,200	
Cost of the machine	7,50,000*			
Depreciation tax shield	0	-85,000	-85,000	-85,000
Net Cash flow	7,50,000	-2,63,200	-2,63,200	

*Cost saving under lease in year 0 under lease over buy decision.

$$NPV = 7,50,000 - \frac{2,63,200}{(1+.066)} - \frac{2,63,200}{(1+.066)^2} + \frac{2,63,200}{(1+.066)^3}$$

= 7,50,000 – 6,95,800 = 54,200.

NPV or value of lease is positive, so the equipment should be taken on lease.

b) The NPV of the lessor will be – 54,200.[Note : The lessor will not be interested in the lease transaction if his after tax required rate of return is 6.66% as he will have a negative NPV . He will be interested in going for the lease arrangement only if the required rate of return is sufficiently low to make the NPV of the net cash flow (of lease decision) positive to him]

c) Break even means at what lease rental NPV of will be 'zero.' Let x be the net cash flow from lease decision, so we have –

$$0 = 7,50,000 - \frac{x}{1+.066} - \frac{x}{(1+.066)^2} - \frac{x}{(1+.066)^3}$$

Solving, we get = 2,83,715.

i.e. Net cash flow = 2,83,715.

Net of tax lease rent = 2,83,715 – 85,000 = 1,98,715

So, break even lease rental = 1,98,715/ 0.66 = ₹ 3,01,083

2

Working Notes–

1. The buy or lease decision means computation of NPV arising from lease decision i.e. computation of valuation advantage of lease over buy. If the value is positive then we go for lease, otherwise we buy.

2. The valuation process involves – a) finding incremental cash flow of lease over buy, and then, b) discounting the incremental cash flow by net of tax interest rate of equivalent loan (to purchase the asset in question). In the given example if the equipment is taken on lease, then we have incremental cash flow in year '0' by way of purchase cost saving of ₹ 30,00,000. Subsequently, there is cash outflow in the form of net of tax lease rent from year 1 to 5. Net of tax lease rent per annum = 9,00,000 x (1-.40) = ₹ 5,40,000. Again, if the equipment had been purchases there would have been tax saving of depreciation = Depreciation X tax rate. Here, the tax saving or tax shield is available for 5 years. But under lease the benefit accrues to lessor. For lessee it is a negative cash flow as advantage is not available to him under lease arrangement as lessor is considered the legal owner of the asset for claiming depreciation under Income tax law. The depreciation schedule and tax shield on depreciation are given in table 1.

Table 1

Year (1)	Cost/ opening balance (2)	Depreciation @25% (3)	Closing balance (4)	Tax shield (5)
1	30,00,000	7,50,000	22,50,000	3,00,000
2	22,50,000	5,62,500	16,87,500	2,25,000
3	16,87,500	4,21,875	12,65,625	1,68,750
4	12,65,625	3,16,406	9,49,219	1,26,563
5	9,49,219	2,37,305	7,11,914	94,922

3. After 5 years the equipment is sold for ₹ 200000.

   Loss on sale = ₹ (7,11,914 -2,00,000)

   = ₹ 5,11,914

   Tax savings on loss = 40% of ₹.5,11,914 =₹ 2,04,766

   This further tax shield has to be accounted for in the year 5 .

4. If the equipment is taken on lease, the cash outflow on a/c of lease rental, depreciation tax shield is given in table 2

Table 2

Year (1)	Net of tax lease rental (2)	Depreciation tax shield (3)	Total (4)
1	5,40,000	3,00,000	8,40,000
2	5,40,000	2,25,000	7,65,000
3	5,40,000	1,68,750	7,08,750
4	5,40,000	1,26,563	6,66,563
5	5,40,000	94,922	6,34,922

5. Net of tax interest rate = 0.15X (1-.40) = 0.09.

NPV

$$= 30,00,000 - \frac{8,40,000}{1.09} - \frac{7,65,000}{1.09^2} - \frac{7,08,750}{1.09^3} - \frac{6,66,563}{1.09^4} - \frac{(6,34,922 + 2,04,766)}{1.09^5}$$

$$= 20,239$$

Since, NPV or value of the lease is positive, the equipment should be taken on lease.

3:

(i) Calculation of loan installment:

₹10,00,000 / (1+ PVIFA 12%, 4)

₹10,00,000 / (1 + 3.038) = ₹ 2,47,647

Debt Alternative: Calculation of Present Value of Outflows

(Amount in ₹)

(1) End of year	(2) Debt Payment	(3) Interest	(4) Dep.	(5) Tax Shield [(3)+(4)] x0.3	(6) Cash outflows (2) – (5)	(7) PV factors @ 10%	(8) PV
0	2,47,647	0	0	0	2,47,647	1.000	2,47,647
1	2,47,647	90,282	1,60,000	75,085	1,72,562	0.909	1,56,859
2	2,47,647	71,398	1,60,000	69,419	1,78,228	0.826	1,47,216
3	2,47,647	50,249	1,60,000	63,075	1,84,572	0.751	1,38,614
4	2,47,647	26,305*	1,60,000	55,892	1,91,755	0.683	1,30,969
5	0	0	1,60,000	48,000	(48,000)	0.621	(29,808)
							7,91,497
Less: Salvage Value ₹ 2,00,000 x 0.621							1,24,200
Total Present Value of Outflow							6,67,297

*balancing figure

Leasing Decision: Calculation of Present Value of Outflows

Years 1-5 ₹2,40,000 x (1 - 0.30) x 3.790 = ₹6,36,720

Decision: Leasing option is viable.

(ii) From Lessor's Point of View

		(₹)
Cost of Machine		(-) 10,00,000
PV of Post tax lease Rental (₹2,40,000 x 0.7 x 3.605)	6,05,640	
PV of Depreciation tax shield (₹1,60,000 x 0.3 x 3.605)	1,73,040	
PV of salvage value (₹2,00,000 x 0.567)	1,13,400	8,92,080
NPV		(-) 1,07,920

Decision – Leasing proposal is not viable.

Option I: To buy the asset:

In this option the firm has to pay ₹ 10,000 down and the balance ₹ 1,00,000 together with interest @ 15% is payable in 10 annual equal instalments. The instalment amount may be calculated by dividing ₹ 1,00,000 by the PVAF for 10 years at 15% i.e.

Annual repayment = ₹ 1,00,000/ 5.0188 = ₹ 19,925

The cash flows of the borrowing and purchase option may be computed as follows:

Year	Installment	Interest	Repayment	Balance
	(₹)	(₹)	(₹)	(₹)
1	19,925	15,000	4,925	95,075
2	19,925	14,261	5,664	89,411
3	19,925	13,412	6,513	82,898
4	19,925	12,435	7,490	75,408
5	19,925	11,311	8,614	66,794
6	19,925	10,019	9,906	56,888
7	19,925	8,533	11,392	45,496
8	19,925	6,824	13,101	32,395
9	19,925	4,859	15,066	17,329
10	19,925	2,596*	17,329	–

* Difference between the outstanding balance and the last instalment (i.e. ₹ 19,925 – ₹ 17,329 = ₹ 2,596)

	Installment			Tax Shield 50% (2 + 3)	Net CF (1-4)	PVF	PV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	₹	₹	₹	₹	₹		₹
0	10,000	–	–	–	–	1.000	10,000
1	19,925	15,000	11,000	13,000	6,925	.870	6,025
2	19,925	14,261	11,000	12,631	7,294	.756	5,514
3	19,925	13,412	11,000	12,206	7,719	.658	5,079
4	19,925	12,435	11,000	11,718	8,207	.572	4,694
5	19,925	11,311	11,000	11,156	8,769	.497	4,358
6	19,925	10,019	11,000	10,510	9,415	.432	4,067
7	19,925	8,533	11,000	9,767	10,158	.376	3,819
8	19,925	6,824	11,000	8,912	11,013	.327	3,601
9	19,925	4,859	11,000	7,930	11,995	.284	3,407
10	19,925	2,596	11,000	6,798	13,127	.247	3,242
	Present value of total outflows						–53,806
10	Salvage value (after tax)		10,000	–	–	.247	+2,470
	Net present value of outflows						–51,336

It may be noted that (i) depreciation of ₹ 11,000 has been provided for all the 10 years. This is 10% of the original cost of ₹ 1,10,000. (ii) The asset is fully depreciated during its life of 10 years, therefore, the book value at the end of 10th year would be zero. As the asset is having a salvage value of ₹ 20,000, this would be capital gain and presuming it to be taxable at the normal rate of 50%, the net cash inflow on account of salvage value would be ₹ 10,000 only. This is further discounted to find out the present value of this inflow.

Option II – Evaluation of Lease Option:

In case the asset is acquired on lease, there is a lease rent of ₹ 15,000 payable at the end of next 10 years. This lease rental is tax deductible, therefore, the net cash outflow would be only ₹ 7,500 (after tax). The PVAF for 10 years @ 15% is 5.0188. So, the present value of annuity of ₹ 7,500 is

Present value of annuity of outflow = ₹ 7,500 x 5.0188 = ₹ 37,641.

Advice: If the firm opts to buy the asset, the present value of outflow comes to ₹ 51,336; and in case of lease option, the present value of outflows comes to ₹ 37,641. Hence, the firm should opt for the lease option. In this way, the firm will be able to reduce its costs by ₹ 13,695 i.e. ₹ 51,336 – ₹ 37,641. This may also be referred to as Net Benefit of Leasing.

Note: Students may also discount cash flows under both alternatives at after tax cost i.e. 15% (1 – 0.5) = 7.5%. Discounting will not have any impact on this decision since any discount factor will lead to present value of lease to be less than that of present value of debt.