Financial Management

6th Semester

Unit-6

Capital Expenditure Decisions-I

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Capital Expenditure Decisions-I

Concept and Meaning:

Capital-Expenditure decisions or Capital Budgeting may be defined as the decision-making process by which firms evaluate the purchase of major fixed assets, including building, machinery equipment etc., which are not meant for sale. Therefore, it is the process of making investment decisions in capital expenditure. In other words, it deals exclusively with major investment proposal which are essentially long term projects, the benefit of which are expected to be received over a period of time longer than one year. Apart from the long-term investment proposals, capital budgeting is also concerned with the firm's scarce financial resources among the available market opportunities with some degree of risk and uncertainty.

Nature of capital budgeting: Capital expenditure decisions involve acquisition of assets that have a long life span and which provide benefits spread over a long period of time.

•Substantial Investments: Capital expenditure decisions involve large amounts of funds. Such decisions have its effect over a long span of time.

•Irreversible Decision: Capital expenditure decisions once approved represent long term investments that cannot be reversed or withdrawn any time. Withdrawal or reversal of such decisions may lead to considerable financial losses to the firm.

•Estimation of Future Cash Inflows: Preparation of capital expenditure budget involves forecasting of cash inflows over several years for evaluating the profitability of projects.

•Maximization of Shareholder's Wealth: It helps protect the interest of the shareholders as well as of the firm because it avoids over investment and under-investment in fixed assets.

Purpose of Capital Expenditure Decisions: The capital expenditure decision or capital budgeting is a process that plans to ascertain the long-term investments of the firm. The main purpose of capital budgeting is to recognize as well as prioritize capital investments on the basis of maximum returns to the business. It is also considered as a managerial tool required for efficient management of collected capital of the firm.

Objectives of Capital Expenditure Decisions: Financing decisions are one of the most crucial and critical decisions of a firm as they have a significant impact on the profitability of the firm. There are number of objectives of capital expenditure decisions, some of which are:

•Increasing Output: Output may be increased by utilizing existing facility or through expansion by installing new plant and machinery.

•Cost Reduction: The existence of a firm depends on profitability, which in turn depends on the production of goods or services at a reasonable price. This is possible if over/under-investment in fixed assets is avoided.

•Providing Contemporary Goods: Consumer tastes change every day. To satisfy the new demands from customers, either proper utilization of existing facility or installation of the latest machinery is necessary—which is not possible without proper capital expenditure decision.

Importance of Capital Expenditure decision: Capital budgeting is important, because it creates accountability and mediocrity. Any business that wants to invest its resources in a project without understanding risk and returns, it will be considered irresponsible by its owners or shareholders. Except this, if a business has no way to measure the effectiveness of its investment decisions, then it is likely that the business will have less chance of survival in the competitive market.

Any Businesses are present to earn profits. The capital budgeting process is a measurable way for businesses to determine the long term economic and financial profitability of any investment project. Capital budgeting is also important for a business. Importance of Capital Expenditure decision:

•Construction of Decision: When a capital budgeting process occurs, a company is then able to make a set of decision rules, which can classify that which projects are acceptable and which projects are unacceptable. The result is a more efficient business that is better to quickly find out whether to move ahead with a project. Or stop early in the process, saving the company both time and money.

•Difficult to make decision in Capital budgeting: Capital budgeting decisions for management is a difficult and complicated exercise. These decisions require all the assessments of future events which are uncertain. It is actually the marathon job to accurately estimate the benefits and costs in the future, due to uncertainties of economic, political, social and technical factors.

•Risk and uncertainty in Capital budgeting: The capital budget decision is surrounded by a large number of uncertainties. Investment is in present or in the future. The future is uncertain and full of risks. The longer your project, you have the risk, and the uncertainty may be high. Estimates about cost, revenue and profits can't be accurate.

•Maximize the worth of Equity Shareholders: The value of equity shareholders increases with the acquisition of fixed assets through the capital budget. Instead of investing more than a fixed capital budget there is an optimum investment in the fixed assets is done. Management selects only the most profitable capital project. Those can have a very high value. In this way, capital budget maximizes the value of equity shareholders.

•Facilitate the transfer of information: Provide facility of transfer of information from that time, when a project starts in the form of an idea for the time. And that project is accepted or rejected. Then, many decisions have to be made at various levels of the Authority. The capital budgeting process facilitates to the appropriate decision makers the transfer of information within a company.

•Estimate and forecast future cash flows: Estimate and forecasts of future cash flows make time for businesses with time. Capital budgets enable the authorities to take the possible project and estimate its future cash flow, which then helps in determining whether such a project should accept.

•Monitoring and Control of Expenditures: According to a budget definition, monitoring and control of expenditure identify the expenditure and R & D for an investment project. Since a good project may get spoiled, if the expenditure has not meticulously controlled or monitored. Then this step is an important benefit of the capital budget process.

•Long-term impact on profitability: Capital expenditure has a great impact on the commercial profitability in the long run, if the capital budget was spent properly. Then the profitability of the firm is likely to increase.

•The complaint of investment decisions: Generally, long-term investment proposals are more complex in nature. Apart from this, the purchase of fixed assets is a continuous process. Therefore, management should understand the complexities associated with each project.

•Long-term Implications of Capital Budgeting: The decision of the capital budget has a long-term impact and essentially influences the cost structure and development of the company's future. A wrong decision can prove disastrous for the firm's long-term survival. On the other hand, the lack of investment in the asset will affect the firm's competitive position. So capital budgeting decisions determine the company's future destiny.

Features of Capital Budgeting: Capital budgeting is the process of identifying, analyzing and selecting of profitable investment proposals from which returns or cash inflows are expected to realize over a series of years beyond the current year. Capital budgeting decisions have few extinguishing features that are stated below:

•Current funds are invested with the expectation of realizing future benefits.

•The future benefits will occur to the firm over a series of years and not in one year alone.

•Expenditure and benefits of an investment proposal should be measured in terms of cash flows and not in terms of accounting profit.

•Decision under capital budgeting is subject to high degree of business risk as it depends on such factors that are variable in nature.

•Selection of profitable investment proposal on the basis of capital budgeting technique helps to satisfy the prime goal of the firm which may be shareholders wealth maximization, profit maximization or maximization of the value of the firm.

•The time gap between the initial outlays and the first inflow of cash may often being longer.

•Capital expenditure is incurred at a particular point of time but the benefit of such expenditure may realize over a series of years in the future.

•Capital budgeting is futuristic in nature.

CAPITAL BUDGETING PROCESS:

•Project identification and generation: The first step towards capital budgeting is to generate a proposal for investments. There could be various reasons for taking up investments in a business. It could be addition of a new product line or expanding the existing one. It could be a proposal to either increase the production or reduce the costs of outputs.

•Project Screening and Evaluation: This step mainly involves selecting all correct criteria's to judge the desirability of a proposal. This has to match the objective of the firm to maximize its market value. The tool of time value of money comes handy in this step. Also the estimation of the benefits and the costs needs to be done. The total cash inflow and outflow along with the uncertainties and risks associated with the proposal has to be analyzed thoroughly and appropriate provisioning has to be done for the same.

•Project Selection: There is no such defined method for the selection of a proposal for investments as different businesses have different requirements. That is why, the approval of an investment proposal is done based on the selection criteria and screening process which is defined for every firm keeping in mind the objectives of the investment being undertaken. Once the proposal has been finalized, the different alternatives for raising or acquiring funds have to be explored by the finance team. This is called preparing the capital budget. The average cost of funds has to be reduced. A detailed procedure for periodical reports and tracking the project for the lifetime needs to be streamlined in the initial phase itself. The final approvals are based on profitability, Economic constituents, viability and market conditions.

•Implementation: Money is spent and thus proposal is implemented. The different responsibilities like implementing the proposals, completion of the project within the requisite time period and reduction of cost are allotted. The management then takes up the task of monitoring and containing the implementation of the proposals.

•Performance review: The final stage of capital budgeting involves comparison of actual results with the standard ones. The unfavorable results are identified and removing the various difficulties of the projects helps for future selection and execution of the proposals.

FACTORS AFFECTING CAPITAL BUDGETING:

Availability of funds	Structure of capital	Management decisions	Accounting methods	Taxation policy
Earnings	Working capital	Capital return	Need of the project	Government policy

Accounting or Average Rate of Return (ARR):

ARR is based on the accounting concept of return on investment. This may be defined as the annualized after tax profit expressed as percentage of average investment or net investment is calculated as:

$$\text{ARR} = \frac{\text{Average annual after tax profit}}{\text{Average investment}} \times 100$$

Where,

$$\text{Average Investment} = \frac{(\text{Initail cost including installation} + \text{working capital required}) + (\text{scrap} + \text{working capital recovery})}{2}$$

Decision rule: If ARR ≥ Predetermined or industry rate of return, Project should be accepted.
In case of mutually exclusive projects, project with highest ARR is to be accepted.

Merits:

- Easy to calculate
- Easy to understand
- Goes with accounting concept of profitability
- Accounting profits are easily available

Demerits:

- Ignores time value of money
- Accounting profits rather than cash-flows are taken into account
- May be affected due to accounting policy
- Fails to distinguish between two projects having different life
- Does not recognize size of investment- can't compare two projects of different initial investment.

Payback Period (PBP):

PBP is the length of time required to recover initial cost of investment. It is the break-even point of the project. It refers to the time period within which net cash flows recover the initial cash outflow. It can be calculated as follows:

When net annual cash flows are equal,

$$PBP = \frac{Initial\ Investment}{Expected\ Annual\ Cash\ Inflows}$$

Advantages:

•Simple and easy in concept and also in application

•Gives an indication of liquidity

•In broader sense, it deals with risk also, as lesser the future the lesser is the risk

•Helpful in capital rationing also

•Takes cash flows into account

Limitations:

•Does not consider time value of money

•Ignores cash flows after the payback period

•Also ignores salvage value and total economic life of the project

•It is more a method of capital recovery rather than a measure of profitability

•Fails as a criterion when there is no or little initial investment

Payback Profitability: The net cash flows remaining after the recovery of initial investment on a project is termed as Payback Profitability.

Payback Profitability = Annual Cash Inflows × (Estimated life – PBP)

Payback Reciprocal:

$$Payback\ Reciprocal = \frac{Expected\ Annual\ Cash\ Inflows}{Initial\ investment}$$

[2006] – Compute the pay back period for the project: *(5 marks)*

End of Year	1	2	3	4	5
Book Value of Fixed Assets	90	80	70	60	50
Profit after Tax	20	22	24	26	28

Ans. Statement showing Data Analysis and Computation of Payback Period

Year	PAT	Depreciation	CFAT	Cumulative CFAT
1	20	10	30	30
2	22	10	32	62
3	24	10	34	96
4	26	10	36	132
5	28	10	38	170

Therefore, Pay-Back Period = $3 \text{ years} + \frac{(100-96)}{(132-96)} \text{Years}$

= 3 years + 0.1 years

= 3.1 years (Approx)

Note: In the above problem, it can been seen that the value of fixed assets declines at the end of each year by 10. Hence 10 is the annual depreciation. So initial investment on fixed assets at the beginning of first year = 90 + 10 = 100

[2009] – The cost of a plant is ₹ 30,000. The expected life of the plant is 3 years. It is expected to generate EBDIT (Earnings before depreciation, interest and taxes) ₹ 13,000, ₹ 15,000, ₹ 17,000 respectively. Compute Accounting Rate of Return assuming 50% tax, and straight line method of depreciation. *(5 marks)*

Ans. Statement showing Accounting Rate of Return (ARR)

Average EBDIT	(13,000 + 15,000 + 17,000) / 3	15,000
Less: Depreciation	30,000 / 3	10,000
EBIT	EBDIT – Depreciation	5,000
Less: Tax @50%	50% of ₹ 5,000	2,500
(a) Average PAT	5000 – 2,500	2,500
(b) Average Investment	½ (Initial Investment + Salvage) = ½ × 30,000	15,000
(c) ARR = a / b	2,500 / 15,000	16.67%

[2010] – From the information given below compute the Pay Back period:

Initial outlay		₹ 80,000
Estimated life		5 years
Profit after tax :		₹
End of year	1	6,000
	2	14,000
	3	4,000

4	6,000
5	10,000

Depreciation has been calculated under the straight line method. *(5 marks)*

Ans. Annual Depreciation = ₹ 80,000 / 5 years = ₹ 16,000

Statement showing Pay Back Period of the Project:

Years	PAT	Depreciation	CFAT	Cum. CFAT
1	6,000	16,000	22,000	22,000
2	14,000	16,000	30,000	52,000
3	4,000	16,000	20,000	72,000
4	6,000	16,000	22,000	94,000
5	10,000	16,000	26,000	1,20,000

Therefore, Pay-Back Period = 3 years + $\frac{(80,000 - 72,000)}{22,000}$ Years

= 3 years + 0.36 years

= 3.36 years (Approx)

[2013(H)] – From the following information of MAK Ltd., calculate Pay Back Period:

(i) Purchase price of New Machinery – ₹ 10,00,000
(ii) Installation Expenses – ₹ 1,50,000
(iii) Workers' Training Expenses incurred to put the asset to use – ₹ 50,000
(iv) Subsidy from Govt. 60% of Purchase price
(v) Working Capital – ₹ 3,00,000
(vi) Useful life of the machine – 5 years
(vii) Book Salvage Value – 10% of Purchase price
(viii) Cash Salvage Value – ₹ 1,20,000
(ix) Method of Depreciation – Straight Line
(x) Tax Rate – 30%
(xi) Sales units – 1,00,000 unit p.a.

Initial selling price per unit is ₹ 10 and variable cost is 40% of initial selling price. Annual fixed cost other than depreciation is ₹ 2,00,000 *(10 marks)*

Ans. Statement Showing Annual CFAT

Particulars		₹
Sales (1,00,000 units ₹ 10)		10,00,000
Less: Variable Cost (40%)		4,00,000
Contribution		6,00,000
Less: Fixed Cost	₹ 2,00,000	
Depreciation (12,00,000 – 1,20,000) / 5	₹ 2,16,000	4,16,000
Profit Before Tax		1,84,000
Less: Tax @ 30%		55,200
Profit After Tax (PAT)		1,28,800
Add: Depreciation		2,16,000
Cash Flow After Tax (CFAT)		3,44,800

Net Initial Investment = Purchase price of Machine + Installation Exp. + Workmen's Training Exp.+ Working Capital – Subsidy from Govt.

= 10,00,000 + 1,50,000 + 50,000 +3,00,000 – 6,00,000 = 9,00,000

Therefore Pay back Period = 9,00,000 / 3,44,800 = 2.61 years.

[2014(G)] – Fresco Ltd. is contemplating to purchase a machine. Two machines are available, each costing ₹ 5 lakhs. In comparing the profitability of the machines, a discounting rate of 10% is to be used. The machine is to be written off in five years by straight line method of depreciation with no residual value. Cash flows after tax are expected to be as follows:

Year	Machine A ₹	Machine B ₹
1	150,000	50,000
2	200,000	150,000
3	250,000	200,000
4	150,000	300,000
5	100,000	200,000

Indicate which machine would be profitable using Average rate of return method.

The discounting factors at 10% are —

Year	1	2	3	4	5
Discounting factors	0.909	0.826	0.751	0.683	0.621

(6 marks)

Ans. Statement Showing Discounted Cash Flow After Tax (DCFAT)

Year	Cash Flow After Tax (CFAT)		Discounting Factor @10%	Discounted Cash Flow After Tax (DCFAT)	
	Machine A	Machine B		Machine A	Machine B
1	1,50,000	50,000	0.909	1,36,350	45,450
2	2,00,000	1,50,000	0.826	1,65,200	1,23,900
3	2,50,000	2,00,000	0.751	1,87,750	1,50,200
4	1,50,000	3,00,000	0.683	1,02,450	2,04,900
5	1,00,000	2,00,000	0.621	62,100	1,24,200
Total	8,50,000	9,00,000		6,53,850	6,48,650

Average Investment :-

Machine A = ½ (5,00,000 + Nil) = 2,50,000

Machine B = ½ (5,00,000 + Nil) = 2,50,000

Average DCFAT :-

Machine A = 6,53,850 / 5 = 1,30,770

Machine B = 6,48,650 / 5 = 1,29,730

Therefore, Average Rate of Return (ARR) = Average DCFAT / Average Investment

Machine A = 1,30,770 / 2,50,000 = 52.308%

Machine B = 1,29,730 / 2,50,000 = 51.892%

Hence Machine A will be profitable, as its Average rate of Return is higher than Machine B.

[2014(H)] – Following information available for two machines :

	X(₹)	Y(₹)
Initial Investment	1,00,000	1,00,000
Life	7 years	10 years
Net cash inflow	25,000	20,000
Realisable value after 5 years	50,000	75,000

With the help of pay back period method, evaluate the efficient one. ***(5 marks)***

Ans. Pay Back Period of:

Machine X = 1,00,000 / 25,000 = 4 years

Machine Y = 1,00,000 / 20,000 = 5 years

Machine X is more efficient, as its pay back period is low.

[2014(H)] – The cost of a plant is ₹ 60,000. The expected life of the plant is 3 years. It is expected to generate EBDIT (Earnings before depreciation, interest and taxes) ₹ 26,000, ₹ 30,000, ₹ 34,000 respectively. Compute Accounting Rate of Return assuming 30% tax and straight line method of depreciation. ***(5 marks)***

Ans. Statement showing CFAT

Average EBDIT (Earning before Depreciation and Tax)	
(26,000 + 30,000 + 34,000) / 3	30,000
Less: Depreciation (60,000 / 3)	20,000
Average EBT (Earning Before Tax)	10,000
Less: Tax @ 30%	3,000
Average EAT (Earning After Tax)	7,000

Average Investment = ½ (Initial Investment + Scrap Value)

= ½ (60,000 + Nil) = 30,000

ARR = Average PAT / Average Investment = 7000 / 30,000 = 23.33%

[2015(G)] – A project requires an initial cash outlay of ₹ 20,00,000 having a life of 6 years. The expected average annual profit from the project before tax is ₹ 5,45,454. Compute the pay back period of the project assuming tax rate at 45% and the rate of depreciation at 10% p.a. on straight line basis. ***(6 marks)***

Ans.

EBT	= ₹ 5,45,454
Less: Tax @45%	= ₹ 2,45,454
Add: Depreciation (10% of ₹ 20,00,000)	= ₹ 2,00,000
CFAT	= ₹ 5,00,000

Therefore, Payback Period = 20,00,000 / 5,00,000 = 4 years.

[2015(H)] – Compute pay back period of a project of which the following details are available:

End of year	1	2	3	4	5
Book value of Fixed Assets (₹ in lakh)	450	400	350	300	250
Profit after Tax (₹ in lakh)	80	88	96	104	112

(5 marks)

Ans. Annual Depreciation = Difference in the book value of asset i.e. ₹ 50 lakhs
Therefore, Initial Investment = ₹ (450 + 50) = ₹ 500 lakhs

Statement showing Pay Back Period (₹ In Lakhs)

Years	PAT	CFAT = PAT + Depreciation	Cumulative CFAT
1	80	130	130
2	88	138	268
3	96	146	414
4	104	154	568
5	112	162	730

Pay Back Period = 3 years + [(500 - 414) / 154] years = 3 years + 0.56 years = 3.56 years.

[2015(H)] – Project I costs ₹ 8,00,000 and project II costs ₹ 12,80,000. Both have a ten year life. Uniform cash receipts expected from project I — ₹ 1,60,000 and project II — ₹ 3,20,000. Salvage value expected are project I ₹ 5,60,000 declining at an annual rate of ₹ 80,000 and project II ₹ 6,40,000 declining at an annual rate of ₹ 1,60,000.
Which one is to be selected? *(5 marks)*

Ans. Pay Back Period = Initial Investment / Annual Cash Receipt
Therefore, Pay Back Period from Project I = 8,00,000 / 1,60,000 = 5 years
Pay Back Period from Project II = 12,80,000 / 3,20,000 = 4 years
Hence, Project - II shall be selected as its payback period is less than that of Project – I

[2016(G)] – Beta company is considering the purchase of one of the following machines, relevant data provided below:

	Machine A	Machine B
Original cost	₹ 1,00,000	₹ 1,00,000
Estimated Life	3 years	3 years
Earnings (after tax):	₹	₹
Year 1	30,000	20,000
Year 2	50,000	80,000
Year 3	40,000	40,000

The firm follows the straight line method of depreciation, estimated salvage value of both the machine is zero. Determine the ARR of both machines. *(6 marks)*

Ans. Statement Showing ARR of the following two machines

Particulars	Machine A	Machine B
(a) Initial Investment	1,00,000	1,00,000
(b) Scrap Value	-	-
(c) Average Investment [(a + b) / 2]	50,000	50,000
Annual Depreciation [(a - b) / 3]	33,333	33,333
Earning After Tax (PAT) for year –1	30,000	20,000
– 2	50,000	80,000
– 3	40,000	40,000

Cash Flow After Tax (CFAT) for year – 1	63,333	53,333
(PAT + Depreciation) – 2	83,333	1,13,333
– 3	73,333	73,333
Average CFAT (Total CFAT / 3)	73,333	80,000
ARR = Avg. CFAT / Avg. Investment	**146.67%**	**160%**

Machine B is preferable, as its ARR is higher than that of Machine A.

[2016(H)] – A company decided to start a project at a cost of ₹ 120,000, part of which will be financed by long-term debt. Following are the expected result for first year of the project.

Sales : 5000 units @ ₹ 50

Variable cost per unit ₹ 30 and Fixed operating cost ₹ 18,000 (excluding depreciation)

Depreciation: as per books of account ₹ 20,000

as per Income Tax rules ₹ 24,000

Interest on loan (to finance the project) ₹ 8,000 & Applicable tax rate 30%.

You are required to calculate net cash flow (NCF) for the first year. ***(5 marks)***

Ans. Statement showing Cash Flow After Tax

Particulars	Amount (₹)
Sales (5000 units @ ₹ 50 each)	2,50,000
Less: Variable Costs (5000 units @ ₹ 30 each)	(1,50,000)
Contribution	1,00,000
Less: Fixed Costs (Excluding Depreciation)	(18,000)
Less: Depreciation (As per Income Tax Rule)	(24,000)
Earning Before Interest & Tax (EBIT) or Operating Profit	58,000
Less: Interest on Borrowings	(8,000)
Earning Before Tax (EBT)	50,000
Less: Tax @ 30%	(15,000)
Profit After Tax (PAT)	35,000
Add: Depreciation (Being Non-Cash Item)	24,000
Net Cash Flow After Tax	**59,000**

[2016(H)] – A company is considering an investment proposal to install a new machine at a cost of ₹ 50,000. The facility has a life expectancy of 5 years with ₹ 5,000 salvage value. For the project additional working capital of ₹ 10,000 will also be required. The applicable income tax rate is 30%.

Estimated EBDIT from the proposal are: ₹ 20,000; ₹ 22,000; ₹19,000; ₹ 17,000 and ₹ 24,000 respectively for 5 years.

Compute the Accounting rate of return for the proposal. ***(5 marks)***

Ans. Annual Depreciation = (Cost of Investment – Scrap Value) / Estimated Life Time

= (50,000 – 5,000) / 5 = 9,000

Statement showing PAT of projected five years

Particulars	Years 1	2	3	4	5
EBDIT (Given)	20,000	22,000	19,000	17,000	24,000
Less: Depreciation	9,000	9,000	9,000	9,000	9,000
EBIT	11,000	13,000	10,000	8,000	15,000
Less: Interest	Nil	Nil	Nil	Nil	Nil
EBT	11,000	13,000	10,000	8,000	15,000
Less: Tax @30%	3,300	3,900	3,000	2,400	4,500
PAT	7,700	9,100	7,000	5,600	10,500

Average PAT = (7,700 + 9,100 + 7,000 + 5,600 + 10,500) / 5 = ₹ 7,980

Average Investment = ½ (Initial Investment + Salvage)

= ½ (50,000 + 10,000 + 5,000) = 32,500

Therefore, Accounting Rate of Return (ARR) = Avg PAT / Avg Investment

= 7,980 / 32,500 =24.55%

[2017(G)] – Compute the pay-back period for the project from the following information:

Cost of Asset — ₹ 100

Depreciation — 15% under straight line method

Profit after tax for the five years —

Year 1 — ₹ 15, Year 2 — ₹ 20, Year 3 — ₹ 25, Year 4 — ₹ 30, Year 5 — ₹ 35 *(6 marks)*

Ans. Annual Depreciation = 100 x 15% = 15

Year	PAT	Depreciation	CFAT	Cum. CFAT
1	15	15	30	30
2	20	15	35	65
3	25	15	40	105
4	30	15	45	150
5	35	15	50	200

Pay Back Period = 2 years + (35 / 40) years = 2.875 years

[2017(H)] – A project of ₹ 3,00,000 is supposed to yield ₹ 40,000 after depreciation @ 12.5% and is subject to income tax @ 40%. Calculate the pay back period of the project. *(5 marks)*

Ans. Cash flow after tax (CFAT) = 40,000 – (40,000 × 40%) + (3,00,000 × 12.5%) = 61,500

Therefore, Pay Back Period = 3,00,000 / 61,500 = 4.88 years.

[2018(G)] – X provides you the following information: *(6 marks)*

(i) Purchase price of machine ₹ 5,00,000

(ii) Estimated salvage value at the end of useful life ₹ 1,00,000

(iii) Useful life 5 years

(iv) Expected annual profits, including depreciation and taxes, for the next 5 years from the project are ₹ 75,000, ₹ 1,75,000 ₹ 2,00,000, ₹ 2,00,000 and ₹ 50,000 respectively.

(v) Tax rate 50%

(vi) Depreciation is charged under the straight line method.

Calculate the Accounting Rate of Return (ARR) of the capital investment.

Ans. Calculation of ARR .

Average Profit	1/5 (75000+175000+200000+200000+50000)	1,40,000
Less: Depreciation	1/5 (5,00,000 - 1,00,000)	80,000
Avg. Profit Before Tax	1,40,000 – 80,000	60,000
Less: 50% Tax	60000 × 50%	30,000
(a) Avg. Profit After Tax	60,000 – 30,000	30,000
(b) Avg Investment	½ (5,00,000 + 1,00,000)	3,00,000
ARR = a/b × 100	**(30,000 / 3,00,000) × 100**	**10%**

[2019(G)] — A project requires an initial investment of 50,000, if the following amounts of cash inflows are taking place from the project in different years, determine the payback period :

Year	1	2	3	4	5
Cash Inflows (₹)	20,000	16,000	12,000	8,000	14,000

(5 marks)

Ans. Statement showing Pay Back Period

Year	CFAT	Cumulative CFAT
1	20,000	20,000
2	16,000	36,000
3	12,000	48,000
4	8,000	56,000
5	14000	70,000

Pay Back Period = 3 years + (2000 / 8000) years = 3 years + 0.25 years = 3.25 years

[2019(H)] — Mr. X needs ₹1,00,000 at the end of 10 years. He has two options:

Option 1 : Deposit some lump sum amount today at 6% rate of interest.

Option 2 : Make equal payments into a bank account starting a year from now, on which he earns 6% rate of interest.

You are required to :

(a) Find out the amount to be deposited under Option 1 today.

(b) Ascertain what amount must be deposited annually into the bank account under Option 2.

$CVIF_{(6\%, 10)}$ = 1.791, $CVIFA_{(6\%, 10)}$ = 13.181, $PVIFA_{(6\%, 10)}$=7,360, $PVIF_{(6\%,10)}$= 0.558. ***(5 marks)***

Ans.

(a) Fund Needed / $CVIF_{6\%,10}$ = 1,00,000 / 1.791 = ₹ 55,834.73 (Approx)

(b) Fund Needed / $CVIFA_{6\%,10}$ = 1,00,000 / 13.181 = ₹ 7,586.78 (Approx)

[2019(H)] — Mrs. L intends to take a loan of ₹10,00,000 from a bank repayable by an equal annual instalment over a period of five years. The bank charges interest @ 10% p.a. on such loan. How much is she required to pay in each instalment? ***(5 marks)***

Ans. Amount of Installment = Loan Amount / $PVIFA_{10\%,5}$

= 10,00,000 / 3.79 = ₹ 2,63,852.24 (Approx)

[2019(H)] – A company will purchase either Machine X or Machine Y. Following are the information regarding the two. The estimated life of both the machine is five years with no salvage value.

	Cost (₹)	Anticipated Cash flows after tax per year (₹)				
		Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5
Machine X	17,18,750	1,50,000	1,80,000	13,75,000	9,62,000	4,12,000
Machine Y	27,50,000	6,78,500	9,62,500	11,00,000	11,68,750	5,50,000

The company's cost of capital is 10%. You are required to advise the management as to which one should be procured using both (i) NPV and (ii) IRR method of project appraisal.

	Year	10%	12%	14%
Present value of Re. 1	1	.909	.893	.877
	2	.826	.797	.769
	3	.751	.712	.675
	4	.683	.636	.592
	5	.621	.567	.519

(10 marks)

Ans. Since cost of capital is 10%. So 10% would be a factor for both the machineries and 14% (Higher Rate) may be taken as another factor.

Data Analysis for Machine X

Years	CFAT	Discounting Factors		DCFAT	
		10%	14%	10%	14%
1	150000	0.909	0.877	136350	131550
2	180000	0.826	0.769	148680	138420
3	1375000	0.751	0.675	1032625	928125
4	962000	0.683	0.592	657046	569504
5	412000	0.621	0.519	255852	213828
				2230553	1981427

Data Analysis for Machine Y

Years	CFAT	Discounting Factors		DCFAT	
		10%	14%	10%	14%
1	678500	0.909	0.877	616756.5	595044.5
2	962500	0.826	0.769	795025	740162.5
3	1100000	0.751	0.675	826100	742500
4	1168750	0.683	0.592	798256.25	691900
5	550000	0.621	0.519	341550	285450
				3377687.75	3055057

Statement showing NPV and IRR of the machines X and Y

Particulars	X	Y
a. $DCFAT_{10\%,5}$ (LDCFAT)	2230553	3377687.75
b. $DCFAT_{14\%,5}$ (HDCFAT)	1981427	3055057
c. Initial Investment (ICOF)	1718750	2750000
d. NPV (a - c)	511783	627687.75
e. $LR\% + \left[\frac{LDCFAT - ICOF}{LDCFAT - HDCFAT} \times D\right]\%$	18.22%	17.78%

There is a conflict between NPV and IRR of machines. As per NPV, Machine Y is profitable. While as per IRR, Machine X is more profitable. In such a situation we should go with NPV. So the management should go with Machine Y.

THANK YOU FOR WATCHING MY PRESENTATION