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Thursday

Capital Budgeting (Replacement) → (We need to budget our capital, so that we can consider the fact of replacing our machines after specific time.)

Methods

① Payback Period - After which or when your investment is coming back.
↳ Returns could be constant / variable

② Average Rate of Return - tell you the % of Return
payback में only investment की, यहाँ पर Net investment ली।
Scrap - कबाड़ का भाव, एक मशीन की।
3 lakh की मशीन, 10,000 rupees पर
Net investment = 3 lakh - 10,000
= 2.90 lakhs

③ Net Present Value Method

④ Internal Rate of Return

BDAT

* Payback period method - The payback period represents that period in which the total investment in permanent asset pays back itself. The payback period is the duration of time required to recover the cost of investment. This is an important determinant of whether to take the project or not as longer payback periods are non-desirable for investment positions.

$$\text{Payback Period} = \frac{\text{Cash outlay of the project}}{\text{Annual Cash Inflows}}$$

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(i) calculate - annual cash inflows (Profit) before depreciation & after tax.

(Constant Return)

Ques. The project cost ₹1,00,000 and generates the annual cash inflow of ₹20,000 for 8 years. Calculate its payback period.

Sol^n. Payback period = $\frac{100000}{20000} = 5$ years

life is 8 years, Rest 3 years will give us profit.

Ques. Calculate the payback period when cash outlay is ₹10,000 and annual inflows :- (Variable Return)

Year	Inflows
1	2000
2	4000
3	3000
4	2000

Sol^n.

Year	Inflows	Cumulative return
1	2000	2000
2	4000	6000
3	3000*	9000* → Investment was ₹10,000
4	2000	11000

3-4 years → to find months = $\frac{1000}{2000} = \frac{1}{2} = 0.5$

3.5 years | or 0.5 X 12 = 6 month

3 years 6 month

* ADAT

Average Rate of Return - The Rate of Return method takes into consideration the earnings expected from the investment over its whole life. In this method the average profit will be after depreciation and after tax.

$$\text{Average Rate of Return} = \frac{\text{Average Annual Profits}}{\text{Net Investments}} \times 100$$

Ques The project requires investment of ₹5,00,000. It has the scrap value of ₹20,000 after 5 years. It is expected to generate the profits of

Years		
1	40,000	(Profits)
2	60,000	
3	70,000	
4	50,000	
5	20,000	= 2,40,000

Sol:

$$ARR = \frac{2,24,000}{4,80,000} \times 100 = 46.67\% = 10\%$$

$$ARR = \frac{48000}{480000} \times 100 = 10\%$$

Present value of money

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* **Net Present Value Method** - Present value method is a discounted method in which the present values of money is taken into consideration.

Ques Calculate the net present value of the two projects and suggest which one should be selected :-

		Project X	Project Y
Initial investment		₹20,000	₹30,000
Estimated life		5years	5years
Scrap value		₹1,000	₹2,000
Profits	1	5,000	20,000
	2	10,000	10,000
	3	10,000	5,000
	4	3,000	3,000
	5	2,000	2,000

The discounting factor is 10%.

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Project X

Solution

Year	Cash flow	Present value of ₹1 @ 10% discounted factor		Present value of Net cash flow
1	5000	× 0.909	=	4545
2	10,000	× 0.826	=	8260
3	10,000	× 0.751	=	7510
4	3,000	× 0.683	=	2049
5	2,000	× 0.621	=	1242
(Scrap) 5	1,000	× 0.621	= +	621
				24,227

Investment = 20,000 Profit = 24,227 - 20,000 = ₹4,227

Project Y

Year	Cash flow	Present value of ₹1 at 10% DF		Present value of Net cash flow
1	20,000	× 0.909	=	18,180
2	10,000	× 0.826	=	8,260
3	5,000	× 0.751	=	3,755
4	3,000	× 0.683	=	2,049
5	2,000	× 0.621	=	1,242
5	2,000	× 0.621	= +	1,242
				34,728

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Investment = ₹ 30,000

Profit = 34,728 - 30000 = ₹ 4,728

Project Y is best than Project X

₹ 4728 > ₹ 4227

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Wednesday (Theory topic)

* Challenger and Defender

In replacement analysis the existing (currently owned) asset is known as defender. Whereas its new alternatives are referred to as Challenger.

* Reasons for Replacement

1. Inadequacy: The old machines/asset are inadequate to make max. profit.
2. Working conditions: " " " " may take more time, more money to operate.
3. Economy:
4. Obsolescence: The technology is updating, the old technology will be obsolete.
5. Decline performance.

* Factors for Replacement

1. Technical factors — linked with Technology
2. The financial or cost factor — eg. cost of repair, cost of maintance.
3. Tangible factor —

(automation) → unemployment
(many companies avoid tangible replacement)

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Method

(4) Internal Rate of Return : It also takes into consideration the time value of money.

Under internal rate of return method, the cash flows of the project are discounted at a suitable rate by hit and trial method, which also equates the net present value of the calculated the amount of investment.

Present value factor = Initial outlay / annual ~~cashflow~~ (cashinflow)

Time factor is not there

1. Payback Period — X 2 years, Y 4 years, Z 6 years (min. time)
2. Average Rate of Return — X 10%, Y 15% (max. return), Z 8%

Time factor is included

3. Net Present value Method → (Present value of money)
4. Internal Rate of Return

use fixed 10% → this comes out to be 20% (rejected), 8% (rejected)

* **Breakeven point** → The point where there is no Profit, no loss

Manufacturing cost (₹100) → Selling Cost (₹100)

Breakeven point

Fixed is same

say Rent

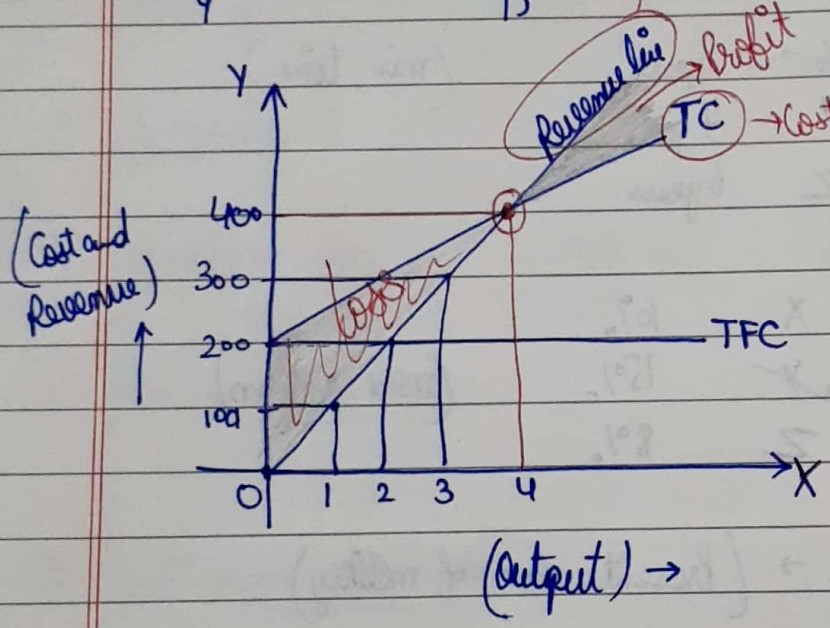
say Raw materials

Output	Total Fixed Cost	Total Variable Cost
0	15	0
1	15	20
2	15	28
3	15	32
4	15	36

TFC + TVC = Total Cost

15

30



TC - TFC

start at same point

4 Shirts = ₹400

Breakeven point

1 Shirt - ₹100

← left

→ Right

Loss ← Breakeven point → Profit

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Breakeven Point (No Profit / No Loss)

Profit = Sales - Cost of Sales
TC = TFC + TVC
Sales = TFC + TVC + P
S = F + V + P
S - V = F + P
at breakeven point (no Profit)

$$S - V = F$$

$$BEP = \frac{F}{S-V} = \text{\_\_\_ units}$$

S - Sales
F - Fixed Cost
V - Variable cost
P - Profit

Selling Price - Rs./units
Variable Cost - Rs./units
Fixed cost - Rs.

S - V = contribution per unit

e.g. F = ₹ 2,00,000
S = ₹ 30 / unit
V = ₹ 15 / unit

$$BEP = \frac{2,00,000}{30-15} = \frac{2,00,000}{15} \text{ units}$$

Numerical Verification :-

BEP × S = F → $\frac{2,00,000}{15} \times 30 = 4,00,000$ (breakeven Sales)

BEP × V = F → $\frac{2,00,000}{15} \times 15 = \frac{2,00,000}{15} \times 15 = F$

Q. Calculate sales to earn Profit of ₹60,000 (find no. of units)

Sol":

$$S = \frac{F+P}{C=S-V} = \text{\_\_\_\_ units}$$

$$30 = \frac{2,00,000+P}{30-15}$$

$$30 \times 15 = 2,00,000 + P$$

$$2,00,000 + P = 450$$

$$\text{Sales } (S) = \frac{2,00,000+60,000}{15} = \frac{2,60,000}{15} = 17333.33 \text{ units}$$

$$\text{Sales (in units)} \times \text{selling Price} = \frac{2,60,000}{15} \times 30^{2}$$

$$= 5,20,000$$

Profit = Sales - Variable Cost - Fixed Cost

Margin of Safety = Total Sales - Sales at Breakeven Point

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Ques. Fixed Cost = ₹1,50,000
Selling price = ₹50/unit
Variable cost = ₹35/unit
Calculate (a) Breakeven point
(b) Margin of safety
(c) Breakeven sales
(d) Sales to earn profit of ₹1,05,000

Sol: (a) Breakeven Point = $\frac{1,50,000}{50-35} = \frac{1,50,000}{15}$ = 10,000 units (Sales at breakeven point)

(c) Breakeven Sales = Breakeven Point × selling price
= 10,000 × 50
= ₹5,00,000

(b) Margin of safety = Total sales − sales at breakeven point
= 17,000 − 10,000 = 7,000

Sales = $\frac{1,50,000 + 1,05,000}{S-V} = \frac{2,55,000}{15}$ = 17,000 units (Total Sales)

17,000 units are required to make profit of ₹1,05,000

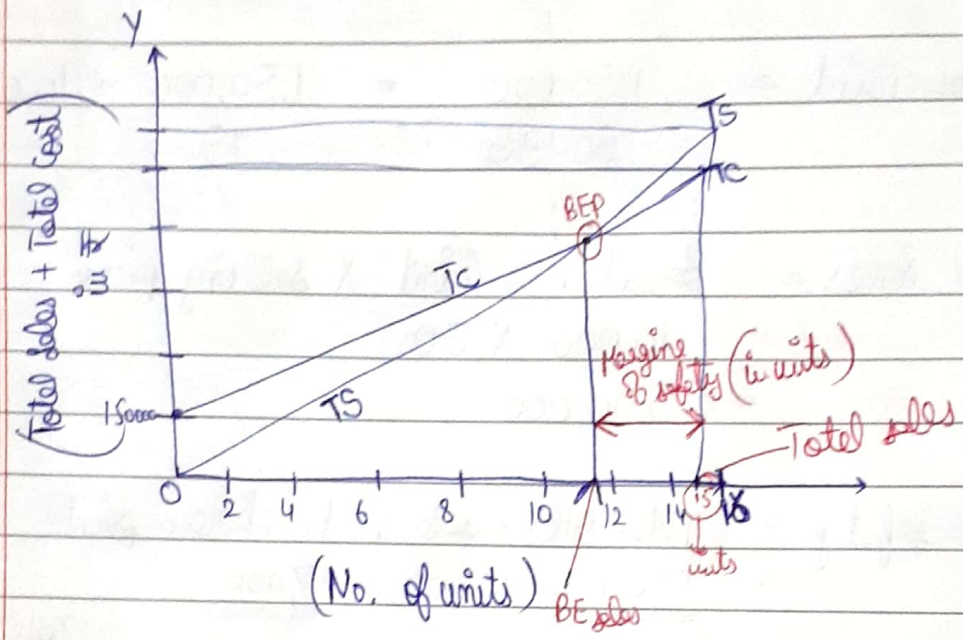
(d) Sales to earn profit of ₹1,05,000 = Sales × Selling price
= 17,000 × 50
= ₹8,50,000

17,000 × 35

Profit = Sales - Variable Cost - Fixed Cost

Profit = 8,50,000 - 5,95,000 - 1,50,000

Profit = 1,05,000



No. of units	FC	VC	TC	TS
0	1,50,000	0	1,50,000	0
15,000	1,50,000	5,25,000	6,75,000	7,50,000

TS - TC = P

= 0 (BEP)

= -ve (Loss)

= +ve (Profit)

S - TVC + TFC = P

S - V - F = P

S - V = F + P

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Wednesday

Internal Rate of Return

Discount Rate (estimate)	Discount factor (table)	Cash Inflow	Present value of cash inflow
18%	3.1272	× 28,000	87562
17%	3.1993	× 28,000	89580 → (90000 - 89580 = 420) more close
16%	3.2743	× 28,000	91680 → (91680 - 90000 = 1680) - 16%
15%	3.3522	× 28,000	93861

$\frac{1680}{2100} = 0.8$

∴ 16% + 0.8% = **16.8%**

16%	-	91680
17%	-	89580
1%		2100

Initial outlay = ₹90,000
Net cash flow per annum = ₹28,000
Estimated life - 5 years
Give your opinion in regard to the proposal if the required rate of return is 10%.

Step1. When we compare the present value of cash inflow with initial outlay (₹90,000), we consider the internal rate of return necessary to discount the cash inflow of ₹90,000 falls somewhere b/w 16% and 17%.

Step2. Being more closer to 17% than 16%.

Step3. To find out the actual rate, we consider the values for 16% and 17% as follows:-

16% -	91680
17% -	89580
1%	2100

Step4. From 16% the difference is 1680, so to cover this distance of 1680 we have to use the additional discount of this proportionate $\frac{1680}{2100} = 0.8\%$

So the actual internal rate of return is 16.8% (selected)

The proposal of investment should be accepted because the internal rate of return is 16.8% that is, more than required rate of 10%.

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Thursday

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MST-2

① Production and Cost - (Full)

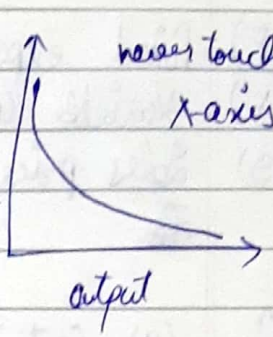
Cost → cost, price, profit, output
TFC, TVC, TC, AFC, AVC, AC, MC, cost curves,
U shaped, Dish shaped, L shaped.

TFC + TVC = TC AFC + AVC = AC

Marginal Cost [difference of TVC or TC]

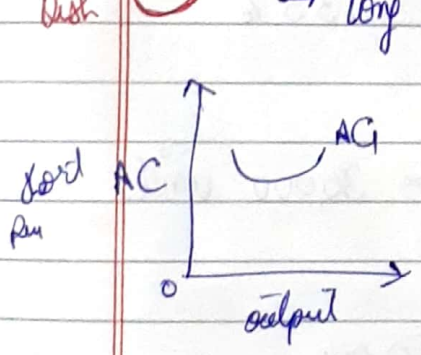
L-shaped (only 1 curve)

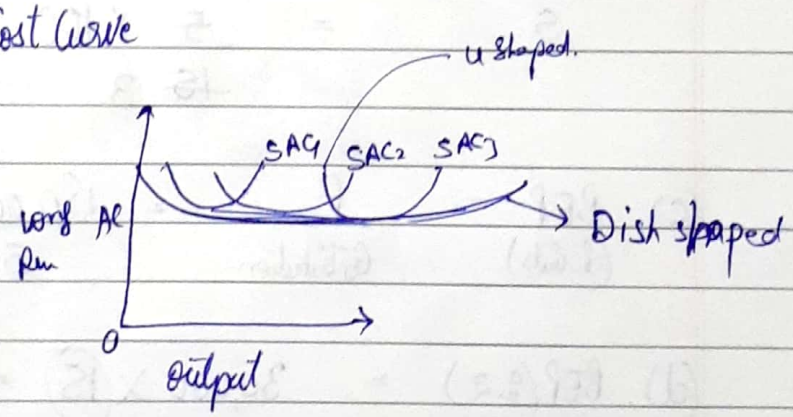
output	TFC	AFC
0	10	0
1	10	5
2	10	3.3
3	10	2.5
4	10	2
5	10	



U → Short Run Cost Curve

Dish → Long Run Cost Curve





② Factor Pricing.-

③ Replacement Studies - ① Reasons for Replacement
② challenger + Defender
Methods - Pay back period, decrease rate of return, Net present value method, internal rate of return.

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Ques. Calculate the breakeven from the following :-
(a) Contribution
(b) P/V Ratio — Profit / Volume
(c) Breakeven in units
(d) Breakeven in rupees
(e) What will be the selling price if breakeven is brought down to 25,000 units?

(F) Fixed expense - ₹ 1,50,000
(V) Variable cost - ₹ 10
(S) Sales price - ₹ 15

Sol^n. (a) Contribution = S - V = 15 - 10 = ₹5

(b) P/V Ratio = $\frac{\text{Contribution}}{\text{Sales}} \times 100$

$= \frac{S-V}{S} \times 100 = \frac{5}{15} \times 100 = 33.33\%$

(c) BEP (in units) = $\frac{F}{\text{Contribution}} = \frac{1,50,000}{5} = 30,000$ units

(d) BEP (in ₹) = $30,000 \times \frac{15}{\text{Sales}} = ₹4,50,000$

16
5 | 80
5
30

(e) $BEP = \frac{F}{S-V}$

$25000 = \frac{150,000}{S-10}$

$25000S - 250,000 = 1,50,000$

$S = \frac{4,00,000}{25,000}$ 80,000 / 5,000

S = ₹16

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Friday

Factor Pricing

Factors of Production :-

		(Rewards)	
①	Land	→ Rent	How to determine this?
②	Labour	→ wages	
③	Capital	→ interest	
④	Enterp	→ Profits	

Rent is the value of money paid for the productivity of land different from other lands.

* Marginal Productivity Theory of distribution :-

It states that Reward to each factor of production must be equal to its marginal product.

Rent acc. to productive capacity of land
Wages " " " " of labour
Similarly so on.

Individual capacity

Worker	Production / unit
1	10
2	9
3	11
4	10.5
5	12 → maximum pay

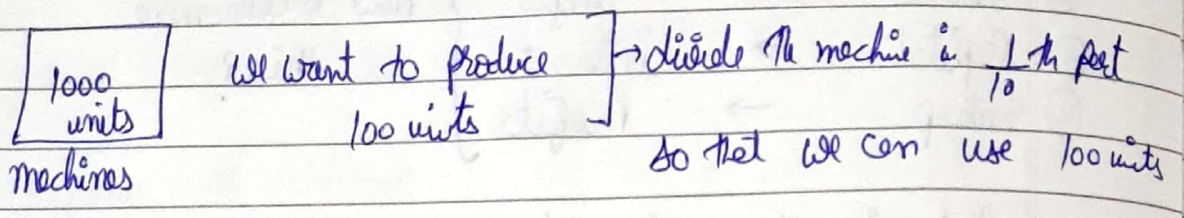
$T_n - T_{n-1}$

जमीन की माँग = जमीन की पूर्ति

जमीन Productive land = जमीन Rent

Assumptions -

1. Marginal product must be measurable.
2. It must be measurable in cardinal terms.
3. Perfect divisibility of factors of production.



4. Factors of production are homogeneous in nature.

Homogeneous = Productivity is same

Productivity of A = Productivity of B (not true in case of labour)

5. Perfect mobility of factors of production

Whenever there is need → we can use it
no scarcity, no abundance
ना ज्यादा, ना घट

Criticism:-

Productivity depends on other types also :- labour → electricity
Type of work

* Where there is Group work → Productivity can't be measured

Perfect mobility, Perfect divisibility of factors of production → Not possible

Explain in +ve way → Assumptions

" " -ve way → Criticism

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Perfect Substitution is possible

Labour — Machine
Capital — Land

] but again not possible 100%

100% labour not substitute machines

Equilibrium → where Marginal Product = Average Product = Average Revenue = Marginal Revenue

$$MP = AP = AR = MR$$

Limitations :-

1. In some cases, we can't measure MP.
2. We can't measure MP in cardinal terms.
   e.g. manager का decision, हमेशा ही ये रहता है।
3. Productivity of human factor can't be homogeneous.
   Two people will not have same productivity.

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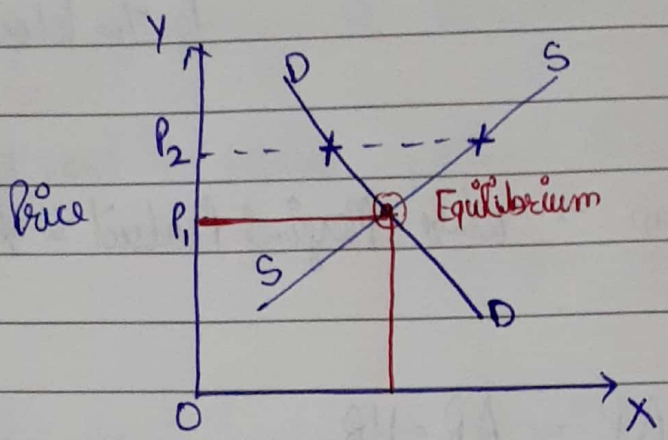
Modern Theory of distribution

Wages rate depends on demand and supply



(Demand and Supply)