

→ Definitions of Production?

- i). Production is process of converting Raw materials into finished goods.
- ii). Production is transformation of inputs into output.
- iii). Value addition.
- iv). According to "Prof. Marshall" Production is Creation (addition of utility).
- v). Any Economic Activity, including charitable services.

Factor of Production



(Input, means, sources, Resources)

- i). Land :- All Natural Resources
Reward :- Rent (heterogeneous)

* Man can never create matter.

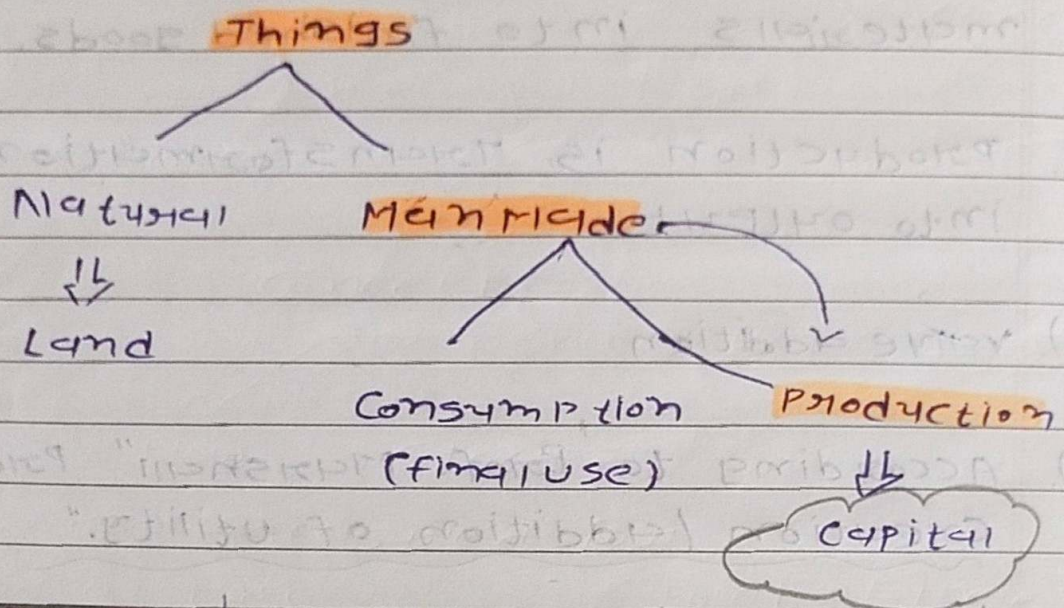
- ii). Labour :- Any Exertion (effort, श्रम) of mind or body for new goods.

- All human efforts / Exertion

- Reward = wages

It is ~~immobile~~ (fixed)

iii). Capital :-



	Capital	Wealth
1	X	Gold, Diamonds, Land
2	X	Car, Banglow, Laptop
3	✓	factories, Machines, Stock

- Produced means of Production
- Capital is manmade factor used for further production
- It is productive wealth (except land)
- Reward = interest
- Primary factor of Production

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iv). Entrepreneurship :- (Business man)

- Organiser (Arranging + managing)
- ★ Risk & uncertainty bearing [F.F. Knight]
- ★ Innovator [Joseph Schumpeter]
- Reward = Profit

Production function

- Production function is a functional relationship between input & output.
- It is quantity of input needed to get a given level of output.
- It is maximum resulting output, from given level of input.
- It is technical relationship between physical input & physical output.
- $Q = f(a, b, c, d, \dots, n, \bar{T})$ or $Q = f(L, K)$

Q = output qty. $a, b, c, d, \dots, n$ = input

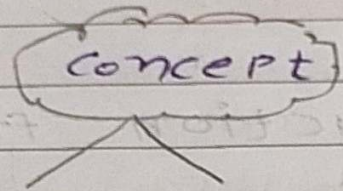
$\bar{T}$ = constant technology

L = Labour

K = Capital

Features of Production function

- i). Quantitative concept = Not a qualitative concept
- ii). Physical concept = Not a monetary concept
- iii). Flow concept =



flow stock

measured for
Period of time point of time

- iv). Two Attributes of Inputs (Labor & Capital)
 - a). Complementary to each other
 - b). Substitutes of each other

e.g output

Input	1	200	Change	Types	2000	201000
Cloth (mts)	3	300	✓	VI	✓	✓
Labour (Hrs)	2	200	✓	VI	✓	✓
Electric units)	5	500	✓	VI	✓	✓
Machine	1	1	x	FI	20 ✓	✓
Table	1	1	x	FI	20 ✓	✓
Land (sq.ft)	500	500	x	FI	500 x	✓
	Short Run					Long Run
	Run					Run

④. fixed input: input whose quantity does not change with output level.

⑥. variable input: input whose quantity changes along with output quantity.

vii. Two Types of Production functions:-

④. Short run:-

- which includes some fixed & some variable inputs
- Production increase due to increase in variable inputs only
- It exists as long as at least one input is fixed.

(b) Long run;

- when all inputs are variable
- Production increases due to increase in fixed as well as variable inputs (all inputs)

LAW of variable Proportion

- Related to short run.
- Also law of diminishing Returns & law of Returns to factor.

Assumptions

- Technology is constant / same
- There are some fixed & some variable inputs.
- Labour is only variable input.
- All Labour are Homogeneous.

Statement :-

"other things being constant when variable input such as labour is increased one by one initially output increases at increasing rate ($TP \uparrow, MP \uparrow$) after some time output increases at diminishing rate ($TP \uparrow, MP \downarrow$) & finally output falls ($TP \downarrow, MP \text{ very}$)"

Simple words: "other things being under certain conditions MP decreases, eventually."

Stages	SFI	CLUB) SFI	TP	AP	MP	Law of
1 st - ends	4	1 ↑	20 ↑	20 ↑	20 ↑	Increasing
AP = MP	4	2	50	25	30	Return (MP↑)
^{0.57} APTS	4	3	90	30	40	(up to 3 rd unit)
highest	4	4 ↑	120	30	30 ↓	Diminishing
2 nd - ends	4	5	140 ↑	28	20	Returns
cover	4	6	150	25	10	(MP↓)
MP = 0	4	7	150	21.4	0 ↓	(from 4 th - 7 th unit)
TP is highest	4	7	150	21.4	0 ↓	
3 rd	4	8	148	18.5	-2	Negative
	4	9	143	15.8	-5	Returns
						(MP -ve)

Explanation:

- During Ind stage

- TP ↑ at ↓ rate
- AP ↓ & MP ↓

- During IIIrd stage

- TP ↓
- AP ↓ but remain +ve
- MP becomes -ve

Reasons:

Law of Increasing Return

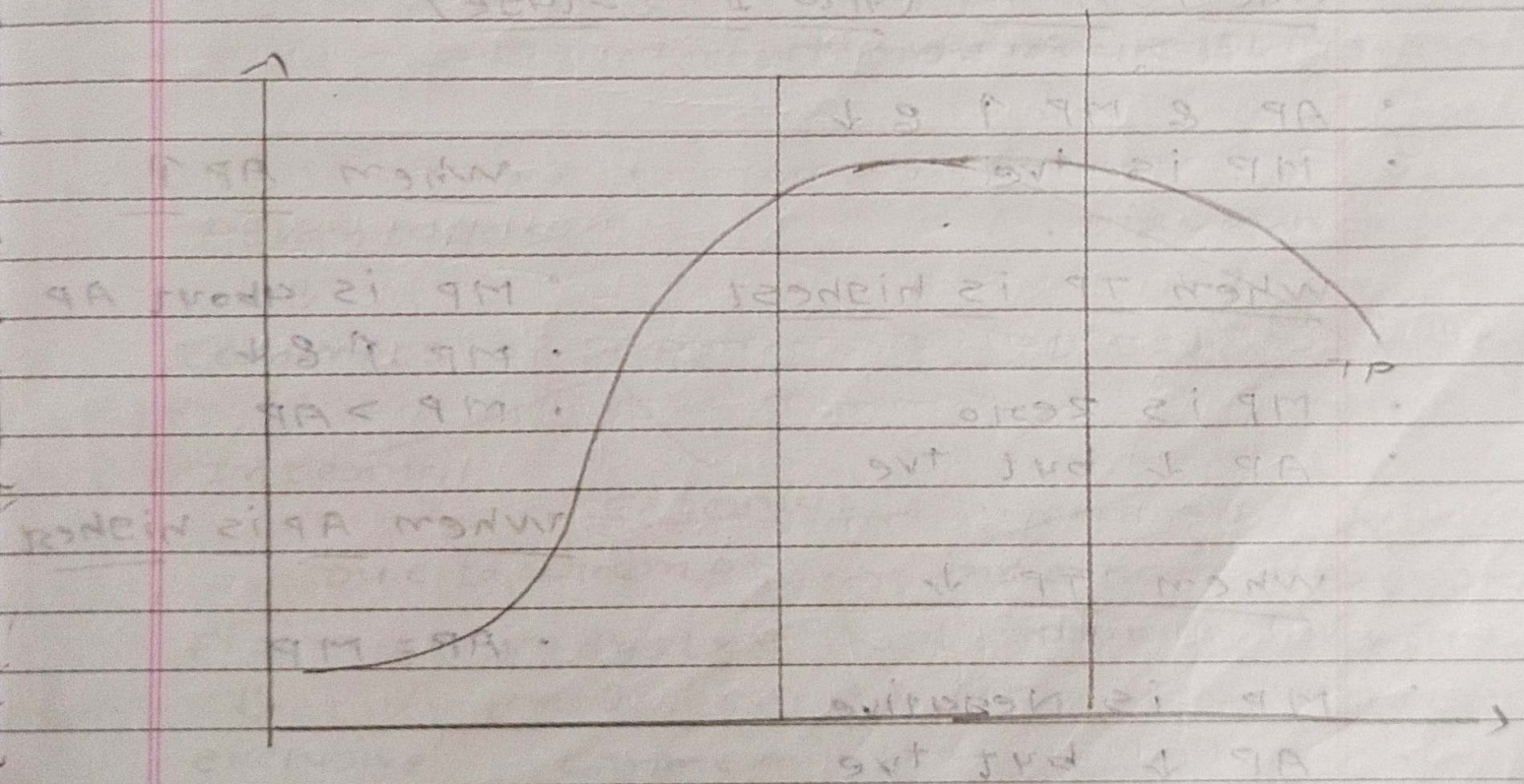
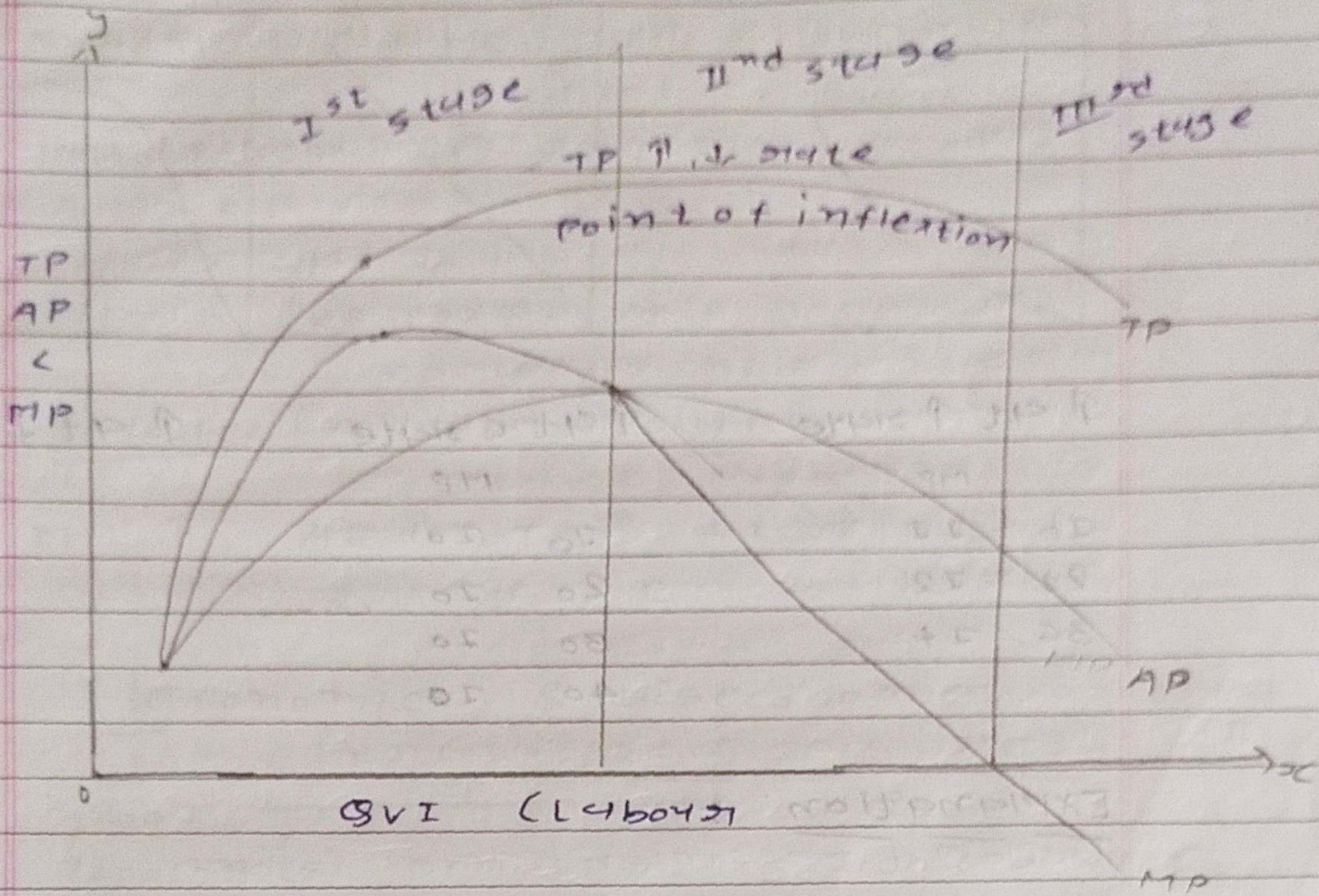
- FI are efficient & indivisible
- VI are proportionately less
- FI are underutilised.
- With $\uparrow$ in VI, FI are better exploited, hence $\uparrow$ in prod. $\uparrow$ at $\downarrow$ rate

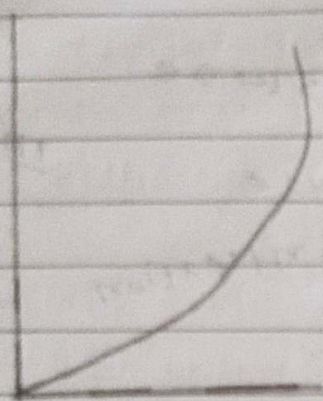
Law of Diminishing Return.

- Efficiency of F.I is declining.
- Labour is not perfect substitute of Machine
- $\therefore$ Prod $\uparrow$ at $\downarrow$ rate

Law of Negative Return

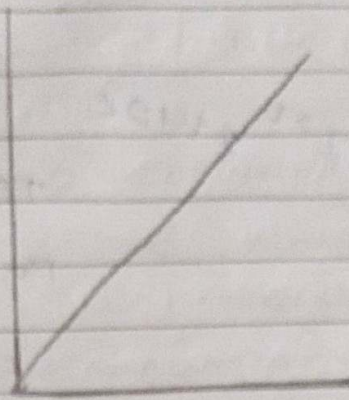
- Efficiency of F.I is very low.
- over crowding of VI
- $\therefore$ Prod. $\downarrow$





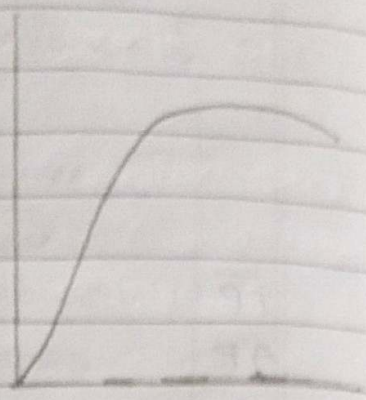
$\uparrow$ Ct $\uparrow$ rate
MP

10	11
22	22
36	34



$\uparrow$ Ct $<$ rate
MP

10	10
20	10
30	10
40	10



$\uparrow$ Ct $\downarrow$ rate

Explanation

when TP $\uparrow$ (upto 1st stage)

- AP & MP $\uparrow$ & $\downarrow$
- MP is +ve

when AP $\uparrow$

when TP is highest

- MP is zero
- AP $\downarrow$ but +ve

- MP is about AP
- MP $\uparrow$ & $\downarrow$
- MP $>$ AP

when TP $\downarrow$

when AP is highest

- MP is Negative
- AP $\downarrow$ but +ve

• AP = MP

when AP ↓

- MP is below AP
- $AP > MP$
- MP is also ↓
- MP is +ve to & -ve

Before inflexion point

- $MP \uparrow$, $AP \uparrow$, $TP \uparrow$ at $\uparrow$ rate.

Economics & diseconomies of Scale

2001

2023

1000 units

1,00,000 units

Large Scale / Long Run

Advantages

Dis-advantages

Economics of Scale

Dis-economics of Scale

Internal

External

Due to growth of firm industry

Internal External
Due to growth of firm industry

exclusive common

exclusive common

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(I). Internal Economics: With $\uparrow$ in qty = Cost Per unit

- i). Labour economics (due to Specialisation & Division of Work)
- ii). Purchase side economics
- iii). Sales side economics
- iv). Managerial economics
- v). Technical economics
- vi). Financial economics
- vii). Risk - buying economics through diversification

(II). Internal Diseconomies:

- Beyond efficient level (when AC is minimum) with $\uparrow$ in quantity cost per unit $\uparrow$ it's called internal Dis-economies.
- All internal economics turn into diseconomies.

(III). External Economics:

common advantages to entire Industry

- i). Technical innovations
- ii). Cheap materials & equipments
- iii). Availability of skilled workers
- iv). Growth of ancillary units (supporting industries)
- v). Economics of information

vi). Better transport, storages & marketing facilities.

(IV). External Dis-economics

- i). Shortage of Raw materials
- ii). $\uparrow$ in Price of Raw materials
- iii). Natural calamities.

LAW OF RETURNS TO SCALE

- Related to Long Run.
- "Other things being constant, when All inputs are increased in some proportion initially output increases at higher proportion then output increases at equal proportion & finally output increases at lower proportion.

$I \uparrow (\text{for}) < Q \uparrow$ Increasing returns to scale (IRS)

$I \uparrow (\text{for}) = Q \uparrow$ Constant returns to scale (CRS)

$I \uparrow (\text{for}) > Q \uparrow$ Diminishing Returns to scale (DRS)

Reasons

IRS = Economics ($\Delta Q > \Delta I$)

CRS = eco = disecono ($\Delta Q = \Delta I$)

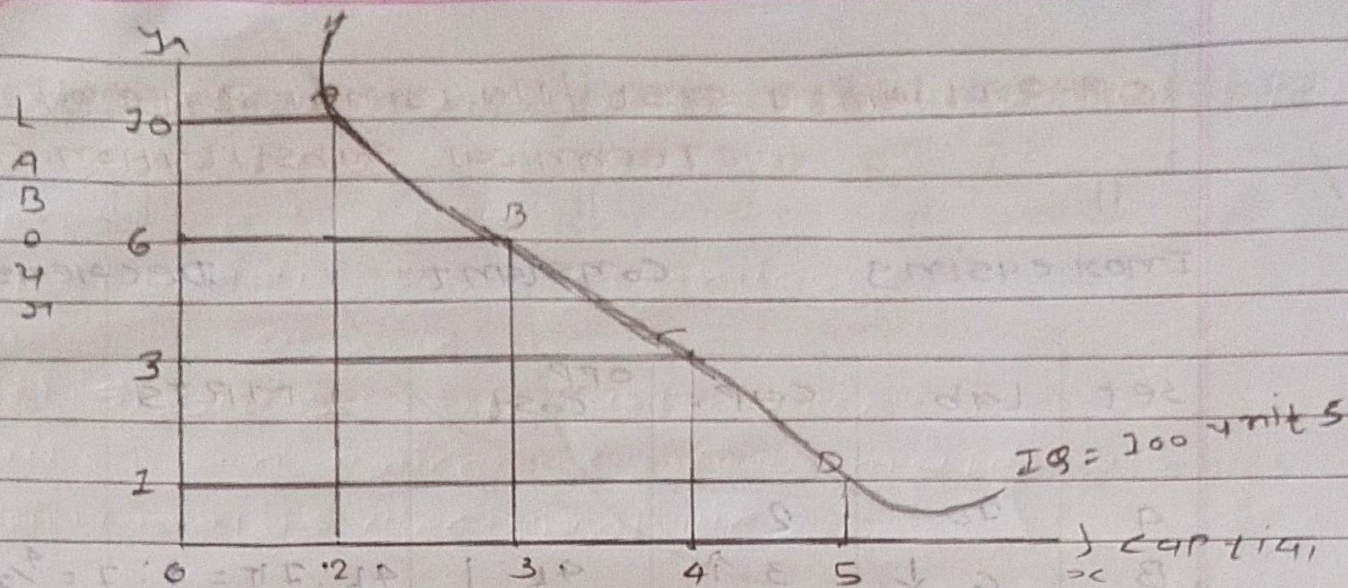
DRS = Diseconomics ($\Delta Q < \Delta I$)

Iso - quant curve

Same Qty Production

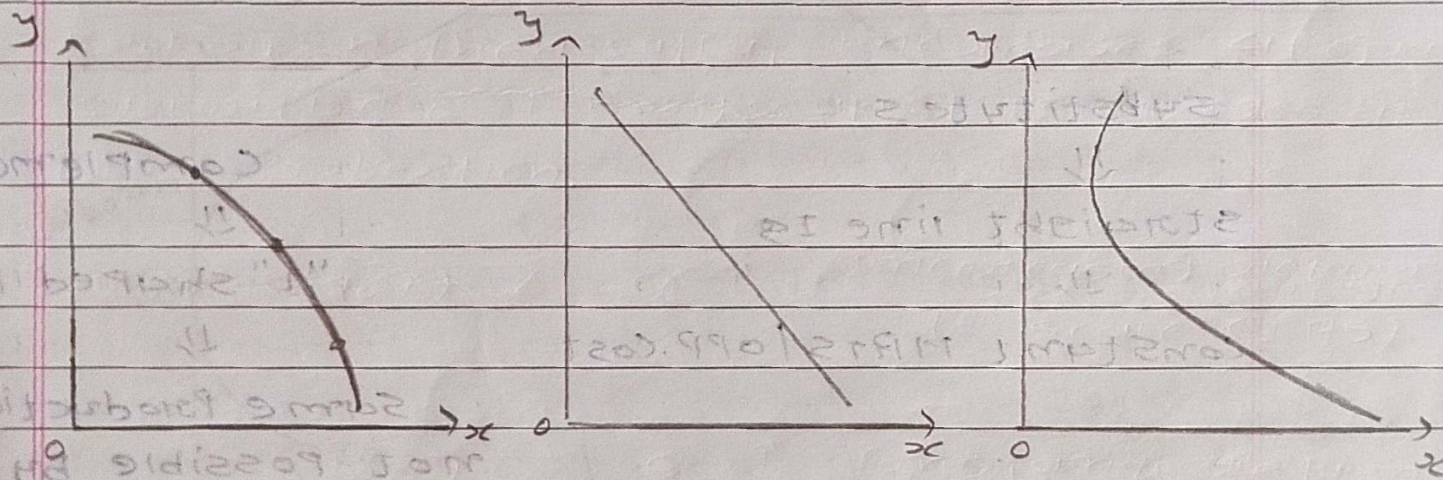
IQ refers to a loci of different combinations of 2 factors which gives equal level of Production

Set	Labor	Capital	Output
A	10	2	100 units
B	6	3	100 units
C	3	4	100 units
D	1	5	100 units



i). IQ is always Downward sloping.

ii). IQ is always Convex to origin Due to
↓ OPP. cost / MRTS



concave /
Bowed out /
Convexity

Straight line /
Linear

Convex /
Rectangular
Hyperbola

Opportunity cost / Marginal Rate of Technical Substitution (MRTS)

Increasing

Constant

Decreasing

set	Lab.	Cap.	opp. cost.	MRTS
A	20	2		
B	6 ↓	3 ↑	4L	$4L:2K = 4:2 = \frac{4}{2} = 2$
C	3 ↓	4 ↑	3L	$3L:2K = 3:2 = \frac{3}{2} = 1.5$
D	2 ↓	5 ↑	2L	$2L:2K = 2:2 = \frac{2}{2} = 1$

If 2 factors are perfect

substitutes

⇓

Straight line is

⇓

constant MRTS / opp. cost

complementary

⇓

"L" shaped is

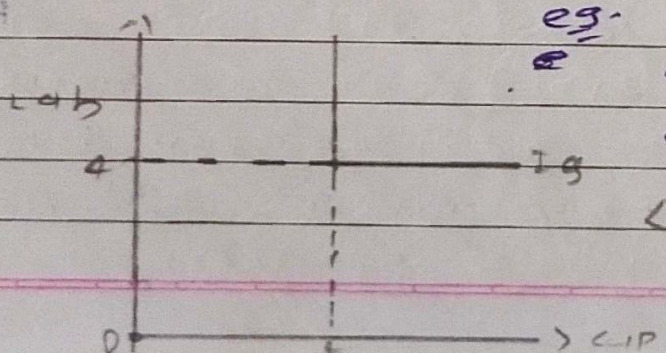
⇓

Some production is not possible by any of her combination of inputs

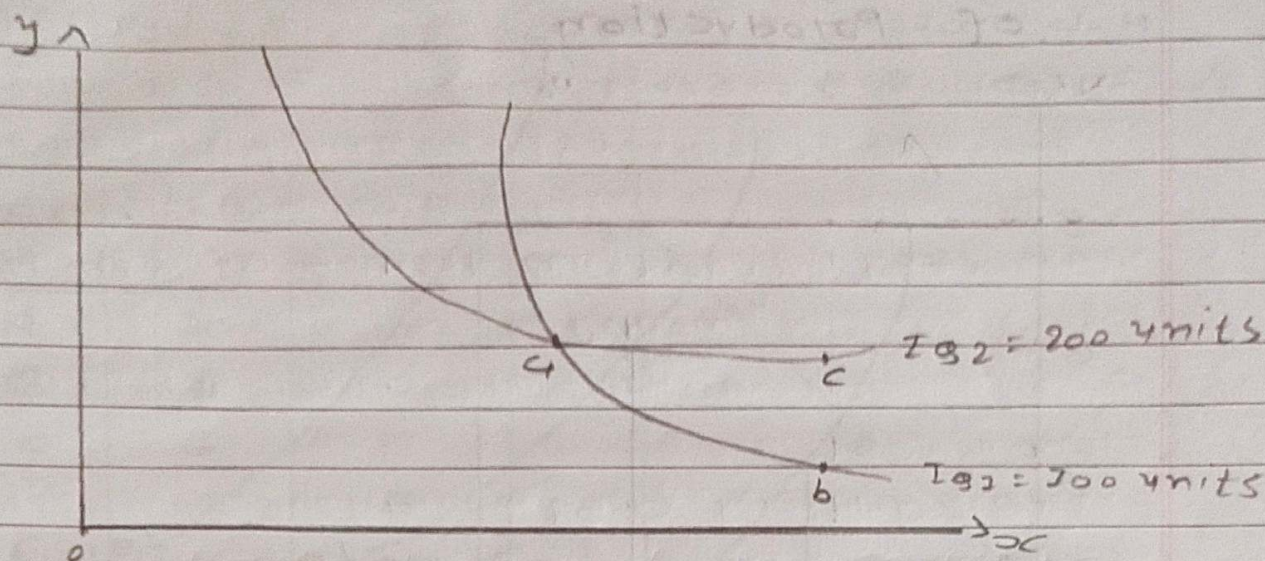
eg. $4L + 4K = 200 \text{ units}$

$20L + 20K \neq 200 \text{ units}$

$20L + 2K \neq 200 \text{ units}$



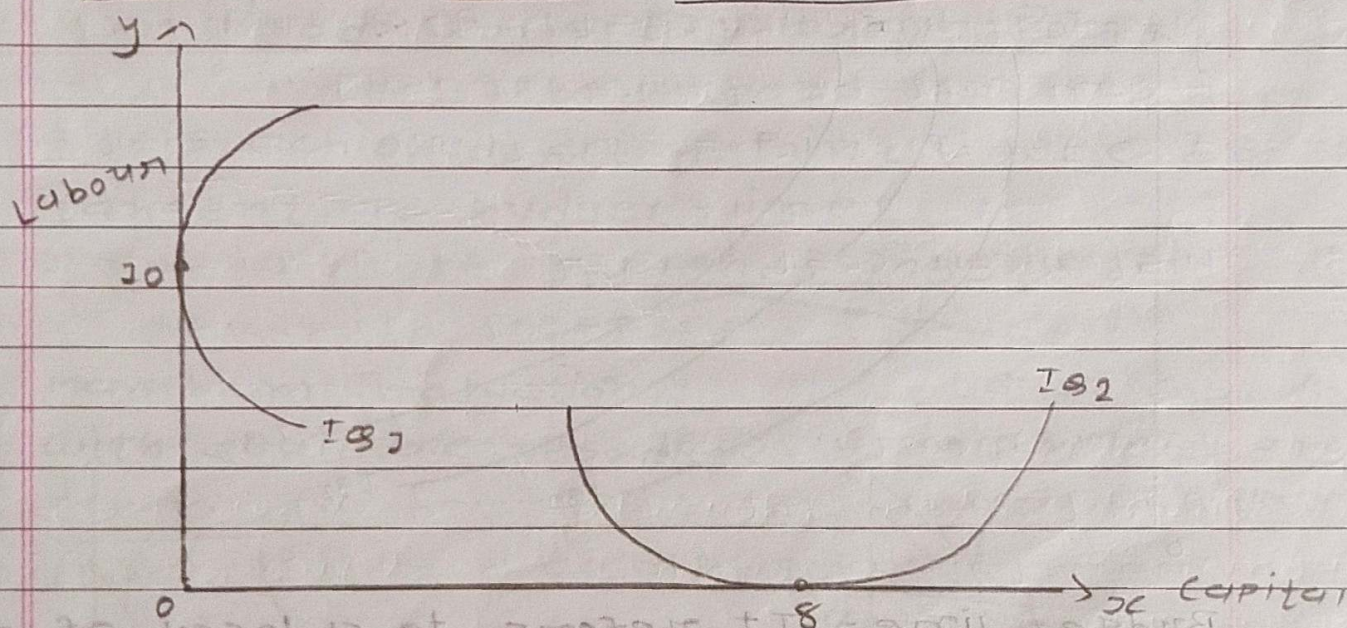
iii). IS's can never intersect each other



Since $a=b$ & $a=c$ then $b=c$ but here $b=100$ units $c=200$ units

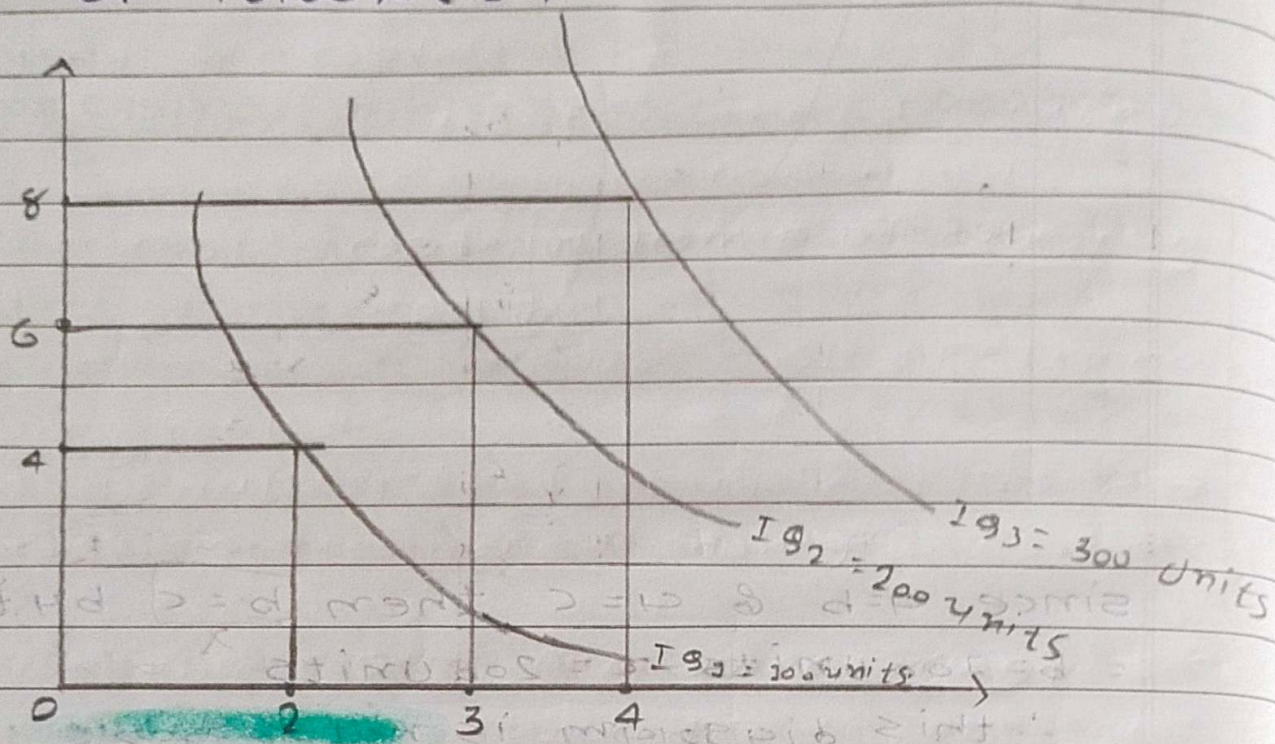
$\therefore$ this diagram is **not possible**.

iv). IS's can never touch either of Axes.

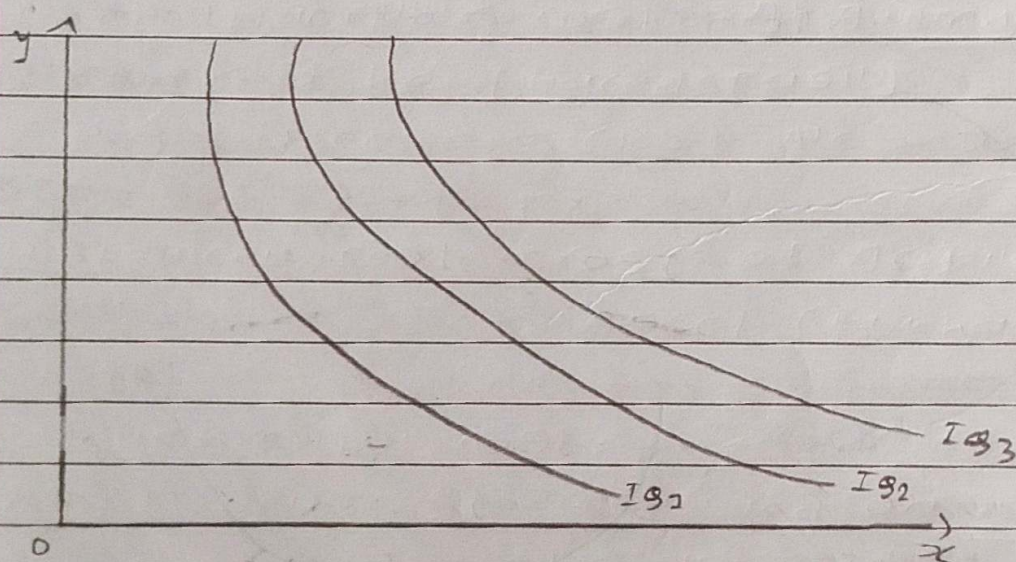


$$\begin{aligned} IS_1 &= 10 \text{ LAB} + 0 \text{ CAP} \\ IS_2 &= 0 \text{ LAB} + 8 \text{ CAP} \end{aligned} \quad \left. \begin{array}{l} \text{Prod}^n \text{ is not} \\ \text{Possible} \end{array} \right\}$$

v). Higher the IS , represents higher level of Production



$IS = -MMP$ = set of IS 's



Budget line = It refers to a locus of diff. combinations of 2 factors which can be bought with available resources.

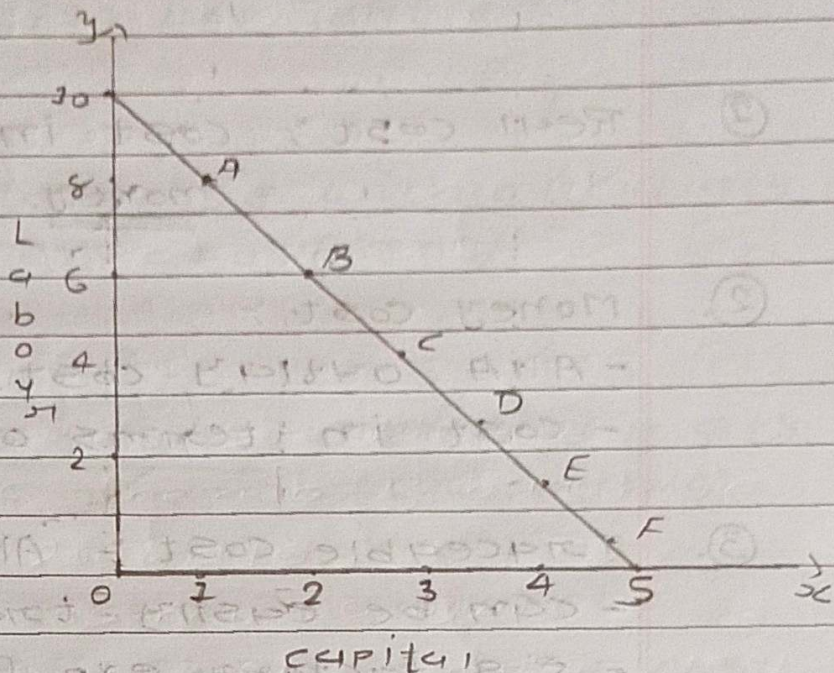
- It shows available resources of producer
- AKA iso-cost line & Price-line.

eg. Available resources = ₹ 200

Price of Labour = ₹ 10 each

Capital = ₹ 20 each

Set	Lab	Cap
A	10	0
B	8	1
C	6	2
D	4	3
E	2	4
F	0	5



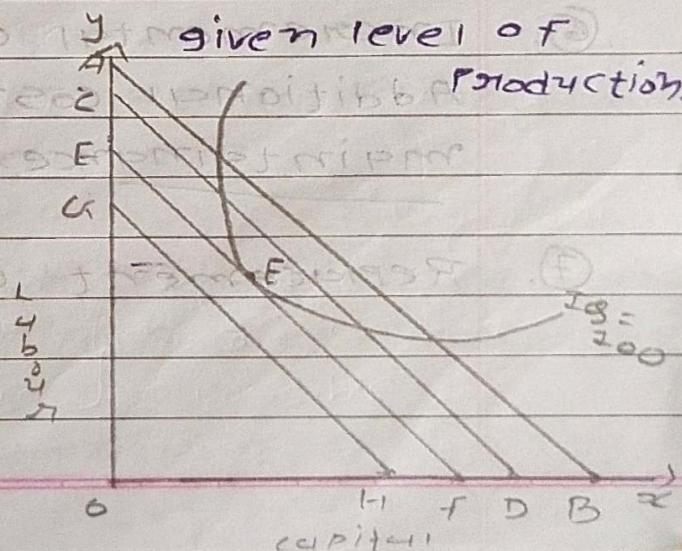
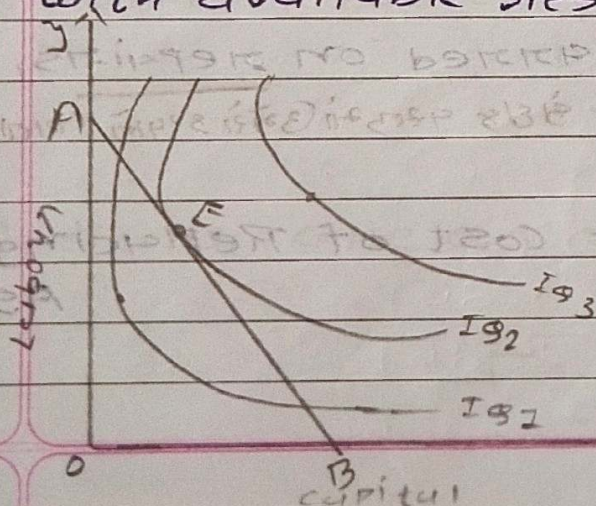
Producer's Equilibrium Point

- It is achieved at a point where IS is tangent to budget-line.

- Two meanings

Maximum Production
with available resources

Least cost for
given level of production



Theory of cost

Types of cost

- ①. Real cost :- cost in terms of other than money.
- ②. Money cost :-
 - AKA outlay cost.
 - cost in terms of money.
- ③. Traceable cost :- AKA Direct Cost
 - can be easily traced
 - e.g factory exp [Trading A/c - Dr side]
- ④. Non-Traceable cost :- AKA Indirect Cost.
 - can not be traced easily.
 - e.g office exp. (P&L A/c - Dr side)
- ⑤. Historical cost :- cost of Acquisition^{ti} of Asset (Purchase Price)
- ⑥. Incremental cost :- Additional cost incurred on repairs, maintenance etc. જેથી વસ્તુમાં ઉમેરો કરવાને બોલાતા અર્થ.
- ⑦. Replacement cost :- cost of Replacing Asset

(8). Sunk cost :- cost which is irrecoverable.

e.g :- Advertisement, specific equipment.
Some fixed cost like Rent etc.

(9). Fixed cost (TFC) :-

- which does not change with output qty.
- when unit = 0, $TFC \neq 0$ (Rent)

(10). Variable cost (TVC) :-

- which changes along with output qty.
- when unit = 0, $TVC = 0$ (Raw materials)

(11). Semi-variable cost :-

- combination of fixed & variable cost.

e.g. Salesman's salary, Post-paid

mobile bill.

(12). Total cost (TC) = $TFC + TVC$

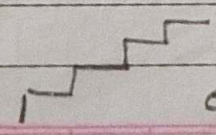
(13). Marginal Cost = Additional expenses incurred

for one additional unit.

(14). Prime cost = Factory exp.

= Direct material + Direct labour + Direct exp.

(15). Step-case cost = which behaves like step-case AKA Step-ladder cost



e.g. પગારનો વધારો દર ૬ મહિને થેમડે
1. જાન, ૩. જુલાઈ દર ૬ મહિને વધારવો

(16). Private cost = cost borne by parties
In terms of
Example

(17). External cost = cost borne by parties
external
e.g. pollution etc.

(18). Social cost = Private cost + External cost

(19). Explicit cost = Money payment for hiring/
purchasing inputs.
- AKA Accounting cost.

(20). Implicit cost =
- Not a money payment
- Sacrificed income due to use of owned
input into self owned business.
- AKA Opportunity cost.

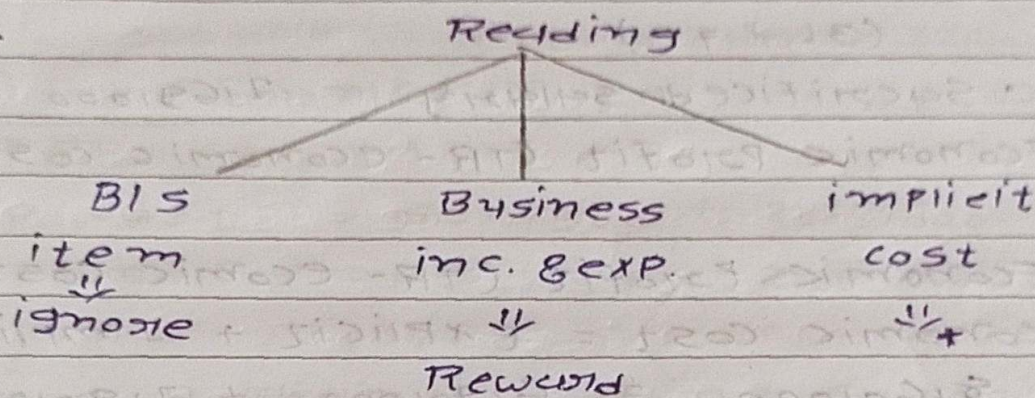
(21). Economic cost = Explicit cost + Implicit cost

* Practical cost on economic cost & economic profit.

Q-7 Steps:-

i) format

ii).



Q-7 Mr. A started a business with an investment of ₹ 10,00,000 out of which ₹ 7,00,000 he borrowed from bank at 7% P.A. & remaining amount he arranged from his own saving [7% P.A.][†]. Total expenses of business is ₹ 6,00,000 & total revenue is ₹ 14,00,000 he was earlier working in another firm for salary of ₹ 1,69,000 P.A.[†].

Calculate economic cost & Economic Profit

Sol Total Revenue - 14,00,000

(-) Explicit Cost

• int. on Bank loan 70,000
(7L x 10%)

• Business expenses 6,00,000 (6,70,000)

Accounting Profit (TR - Acc. Cost) 7,30,000

(-) Implicit Cost

• Sacrificed interest 21,000
(3L x 7%)

• Sacrificed salary 2,19,000 (2,19,000)

Economic Profit (TR - Economic Cost) 5,10,000

Economic Profit (TR - Economic Cost) 5,10,000

Economic Cost = Explicit + Implicit

$$8,60,000 = 6,70,000 + 2,19,000$$

Q-2 Mr. B a driver getting salary of ₹ 2,18,000

P.4 left the job to start his own business

& He borrowed ₹ 9,00,000 from bank at

12%. P.4 & invested his own 4,00,000 (61. P.4)

he charges ₹ 2,785 from each passenger

& spends ₹ 1,750 each passenger on

fuel, depn maint etc. Total No. of Pass.

engers are 230. Calculate economic cost

& economic profit.

Total Revenue	(2785×230)	641,550
(-) exp. cost		
• int. on Bank loan	$(9L \times 22\%)$	1,08,100
• exp	(1750×230)	4,02,500
		(5,10,600)
Accounting Profit		1,30,950
(-) implicit cost		
• Sacrificed salary		2,18,000
• int. on FL	8%	32,000 (2,50,000)
Economics Loss		81,950

$$\text{Eco Cost} = 5,10,500 + 2,12,100$$

$$= 7,22,500$$

B-3

Mr. C. A. Thirunagar getting salary of ₹ 3,40,000 P.A. started his own firm with an investment of ₹ 2,50,000 - out of which ₹ 4,00,000 he borrowed from father in law at 6%. P.A. ₹ 3,00,000 from mother in-law at 12%. P.A. ₹ 2,00,000 from wife at 24%. P.A. ₹ remaining amount from his own saving (7% P.A.)
 Total members = 320
 Membership fees = ₹ 8000 P.A.
 total exp = 5,00,000
 Calculate economic cost & economic Profit

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TR 320×8000 25,60,000

(-) EXP. Cost

Int. on FIL $4L \times 6\%$ 24,000

MIL $3L \times 12\%$ 36,000

Wife $2L \times 24\%$ 48,000

EXP. 50,000 (61,000)

A.P 19,52,000

(-) Imp. Cost

Sum 54,450 3,40,000

Int $(6L \times 7\%)$ 42,000 (3,82,000)

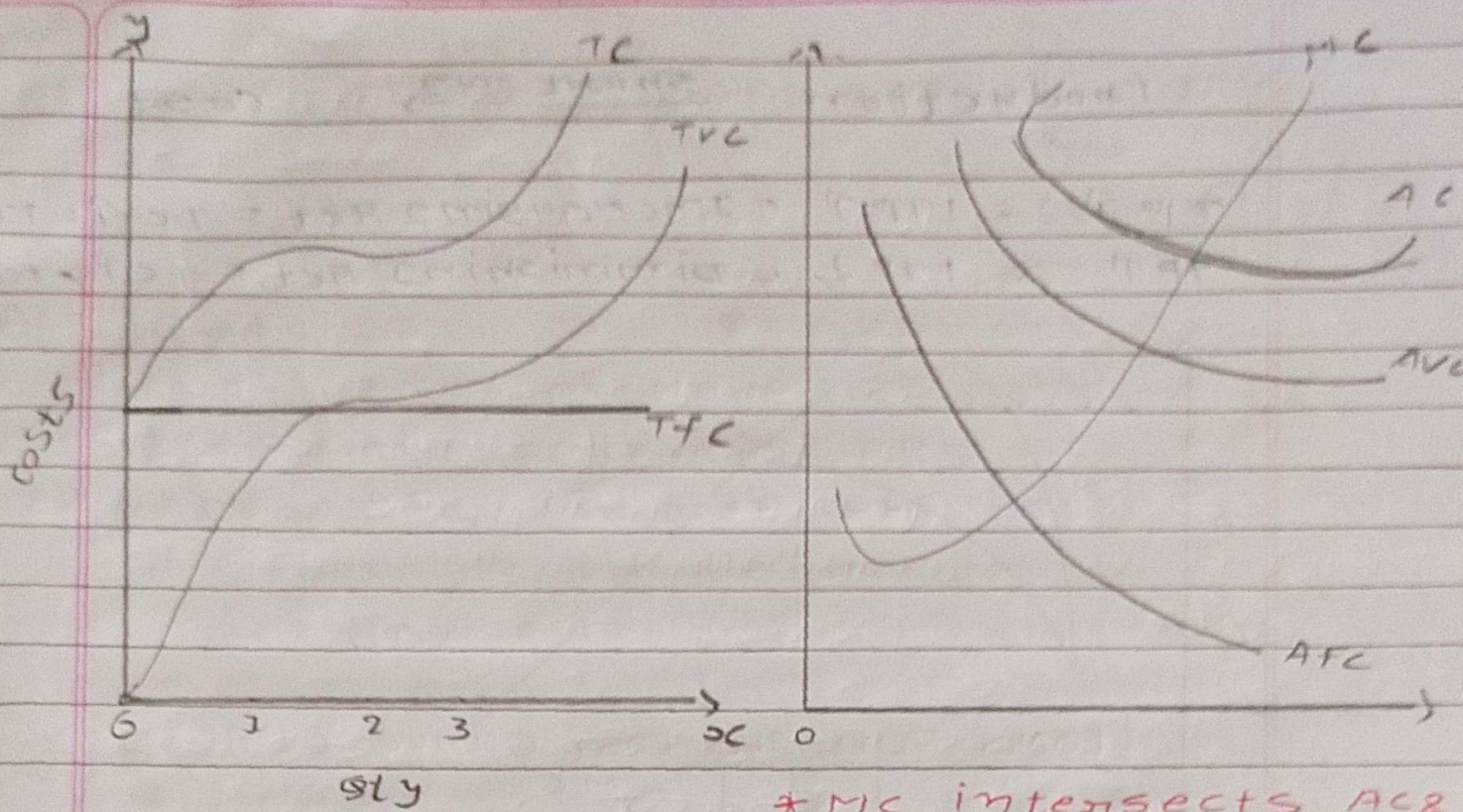
Eco Profit 75,70,000

$$\text{Eco. Cost} = 61,000 + 3,82,000$$

$$= 9,90,000$$

Behaviour of Short run costs

Units	TAFc	TVC	TC	MC	Afc	AVC	ATC	AC
0	100	0	100	-	-	-	-	-
1	100	20	120	20	100	20	120	120
2	100	30	130	10	50	15	65	65
3	100	60	160	30	33.33	20	53.33	53.33
4	100	120	220	60	25	30	55	55
5	100	210	310	90	20	42	62	62
6	100	350	450	140	16.67	58.3	75	75



* MC intersects AC & AVC at their respective minima's (min-points)

As output increases

↑ TC, TVC

↓ AFC

Constant TFC

U-shaped MC, AVC, AC

when AC is ↓

• MC = ↑ & ↓

• AC > MC

• AC is above MC

when AC is minimum

• MC = AC

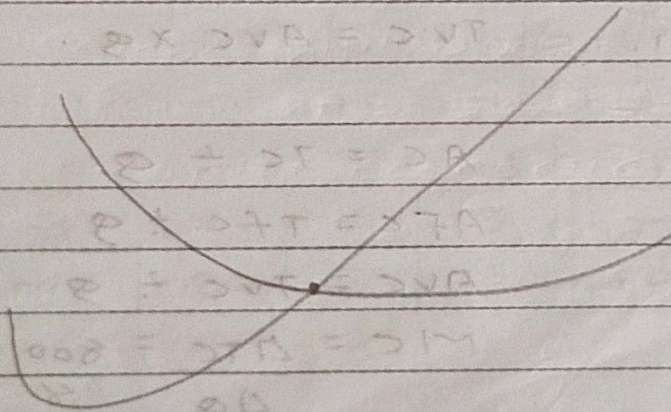
AC • Most efficient point

• when AC is ↑

MC is also ↑

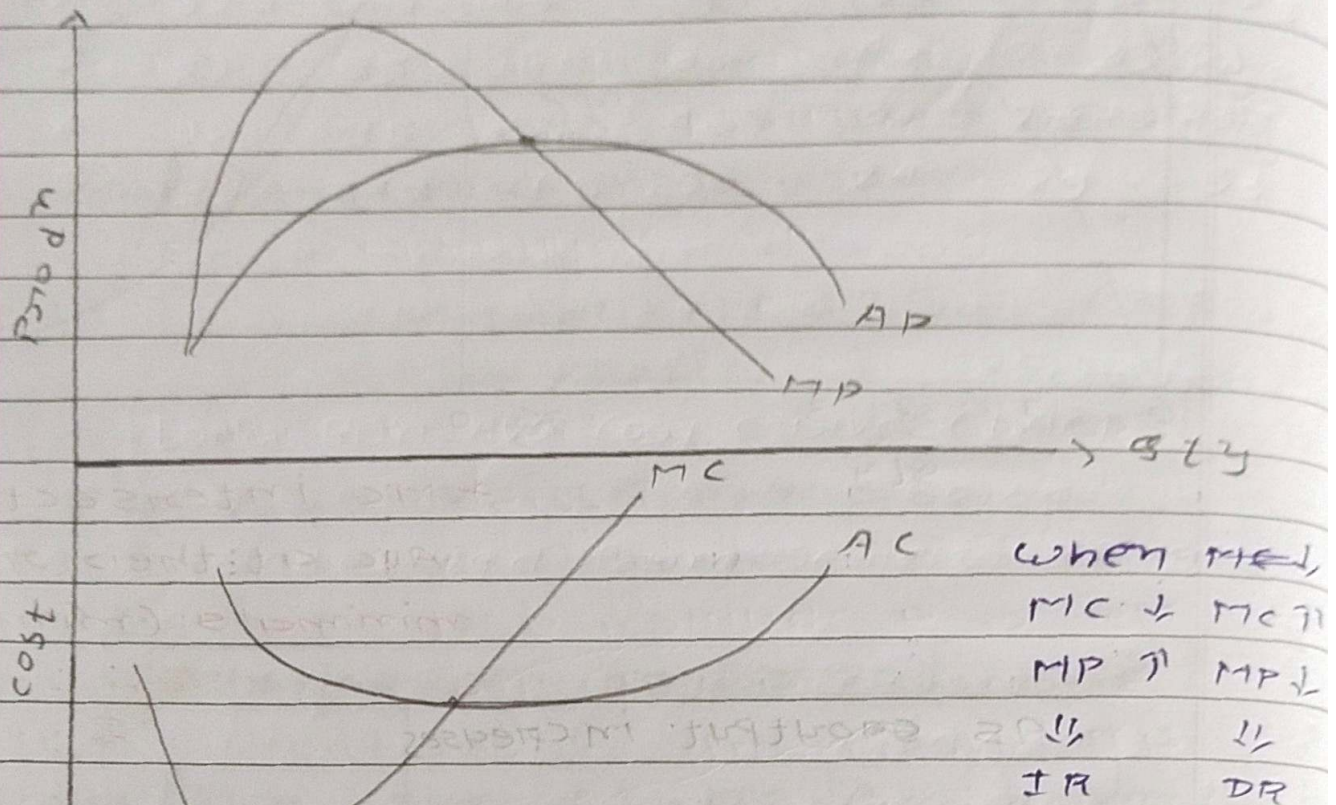
MC > AC

MC is above AC



Production Short Run Cost

$TP \uparrow = MP \uparrow = \text{Increasing Ret} = TC \uparrow = MC \downarrow$
 $TP \uparrow = MP \downarrow = \text{Diminishing Ret} = TC \uparrow = MC \uparrow$



Formulas

$$TC = TFC + TVC$$

$$TFC = TC - TVC$$

$$TVC = TC - TFC$$

$$AC = AFC + AVC$$

$$AFC = AC - AVC$$

$$AVC = AC - AFC$$

$$MC = TC_n - TC_{n-1}$$

$$TC = AC \times Q$$

$$TFC = AFC \times Q$$

$$TVC = AVC \times Q$$

$$AC = TC \div Q$$

$$AFC = TFC \div Q$$

$$AVC = TVC \div Q$$

$$MC = \frac{\Delta TC}{\Delta Q} = \frac{800}{4} = 200$$

$$= \frac{\Delta TVC}{\Delta Q}$$

	Q	TC	MIC		Q	TC	MIC
	25	1000	-		30	1000	-
	26	1300	300		38	1800	100

⇒ steps :-

- format with '0' & ts
- copy all into given.
- first slope "0" row.

Q=)

Q	0	1	2	3	4	5
TC	60	80	90	140	200	300

Q	TFC	TVC	TC	MIC	AFC	AVC	AC
0	60	-	60	-	-	-	-
1	60	20	80	20	60	20	80
2	60	30	90	10	30	15	45
3	60	80	140	50	20	26.67	46.67
4	60	140	200	60	15	35	50
5	60	240	300	100	12	48	60

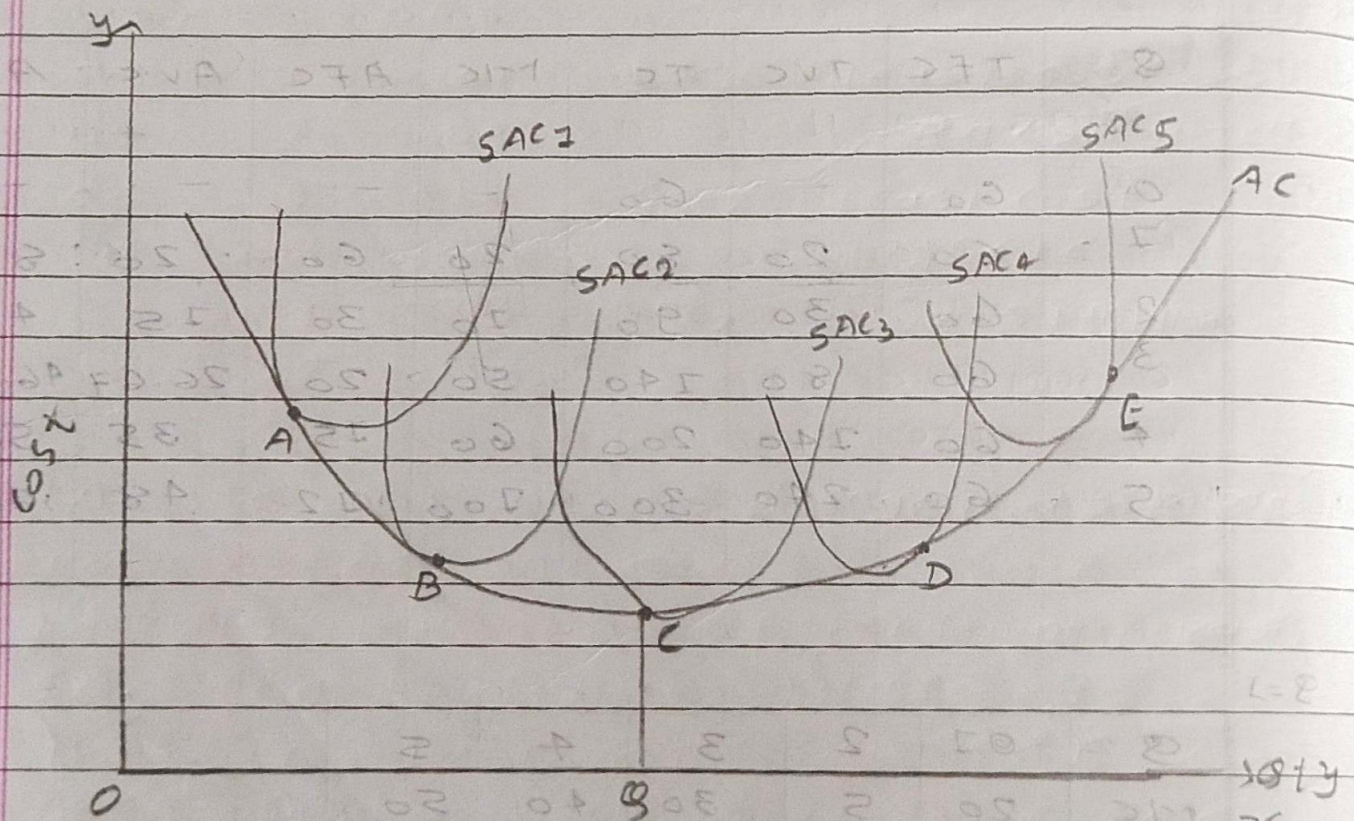
Q=)

Q	0	1	2	3	4	5
MIC	-	20	5	30	40	50

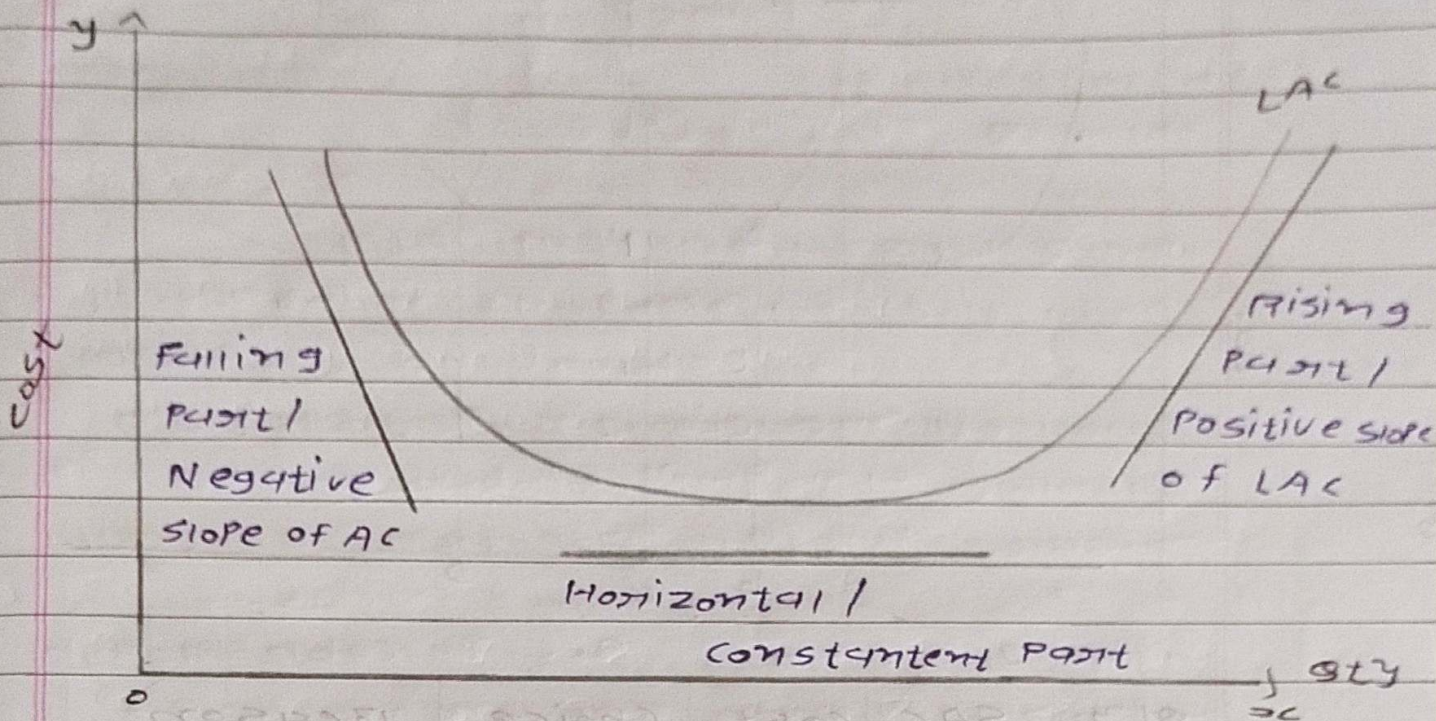
Q	TFC	TVC	TC	MC	AFC	AVC	AC
0	120	0	120	-	-	-	-
1	120	20	140	20	120	20	140
2	120	25	145	5	60	12.5	72.5
3	120	55	165	30	40	18.33	58.33
4	120	95	215	40	30	23.75	53.75
5	120	145	265	50	24	29	53

LONG RUN AVERAGE COST CURVE (LAC)

i). LAC is derived from series of SAC's



ii). LAC is 'U' shaped curve



Economic

Eco = Diseco

Diseconomies

IRS

CRS

DRS

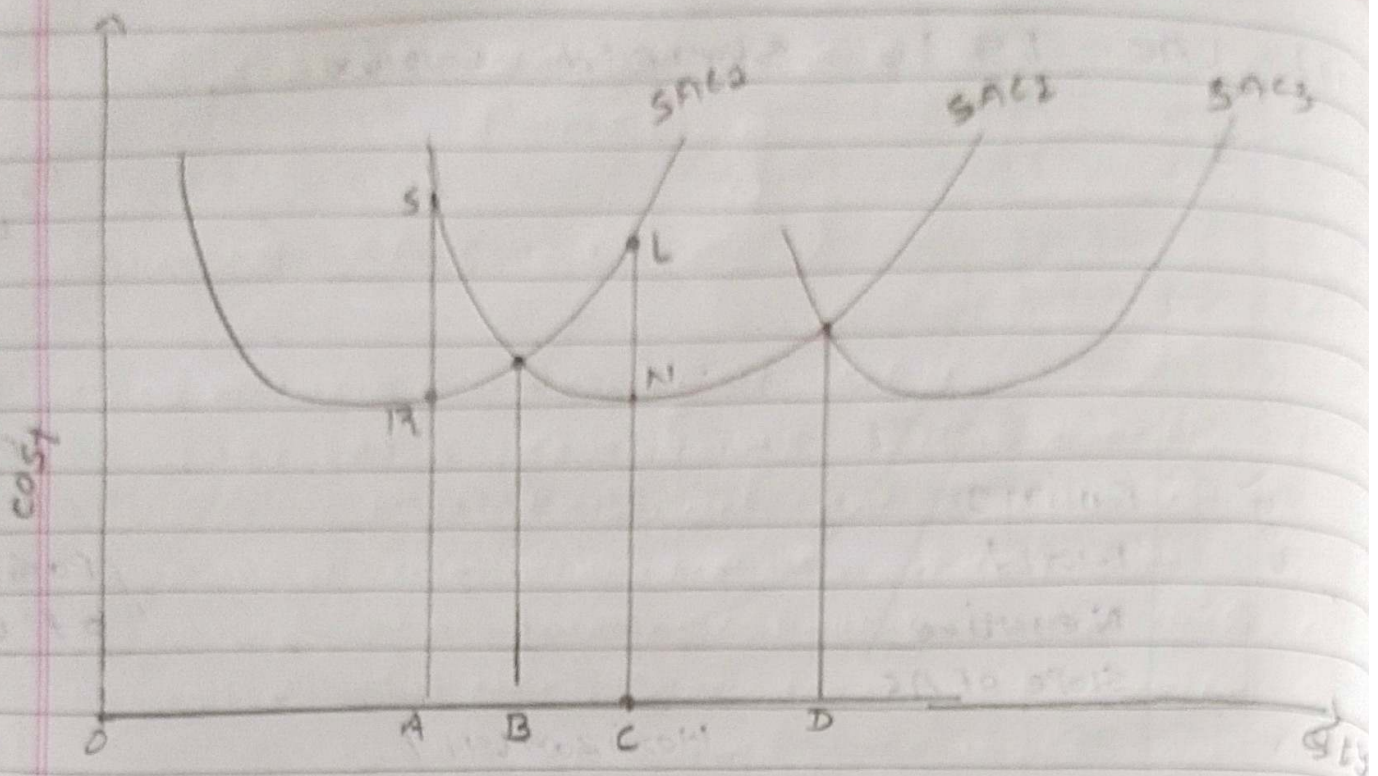
$\Delta Q > \Delta I$

$\Delta Q = \Delta I$

$\Delta Q < \Delta I$

Law of Returns to Scale

iii). LAC is an Envelope curve & Planning curve (Bcz we can find Least cost plant size for each level of output)

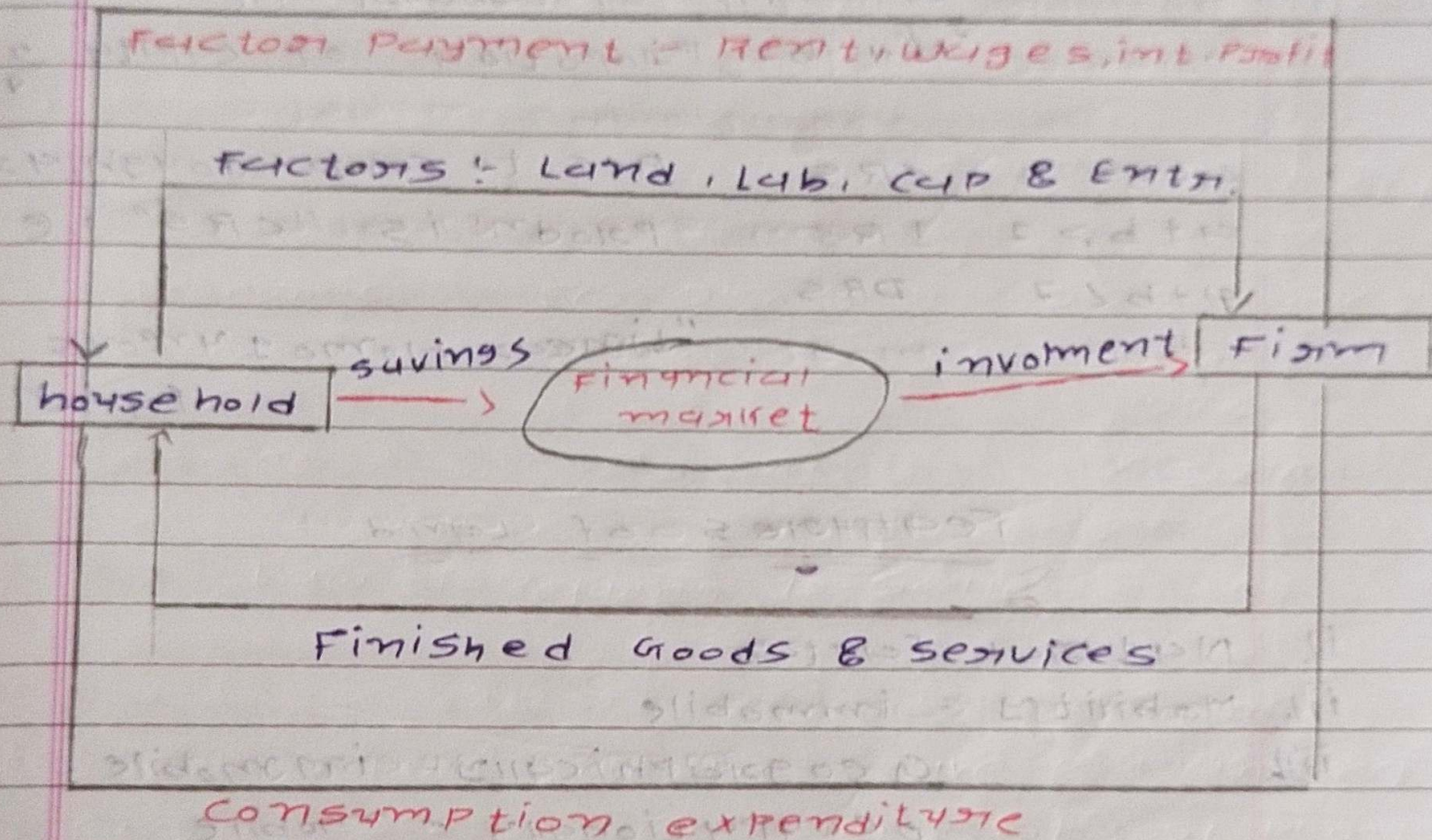


Qty	SAC	Cost	Choice	Reason
OA	1	RA	SAC ₁	Least cost
OA	2	SA		$RA < SA$
OC	1	LC	SAC ₂	Least cost
OC	2	NC		$NC < LC$
OB	1	TB	SAC ₂	More efficient
	2	TB		

- ④ LAC is not always tangent to minimum points of SAC's
- initially it is tangent to falling part of SAC (eg. Point A & B)
- then at min point (Point C)
- & finally at rising part of SAC (Point D & E)

capital formation / capital accumulation

- converting savings into investment
- 3 Stages -
 - i). Savings
 - ii). mobilisation of savings
 - iii). investment
- Affected by various factors like income, taxation, monetary policy etc.



Cobb-Douglas Production Function

$$Q = F(K^a L^b e^{c-1})$$

where Q = output

n = constant number

L = Labour

C = capital

a = Prop'n of Labour i.e. $3/4$

b = Propotion of capital $2/4$

$a+b=1$ CRS Acc. to Cobb-Douglas

$a+b>1$ IRS prodn is "CRS" i.e.

$a+b<1$ DRS

"Linear Homogeneous
function"

Features of Land

- i). Natural factor
- ii). Mobility - immobile
Geographically - immobile
Occupationally - mobile
- iii). Supply - perfectly inelastic, fixed place to place limited fertility
- iv). Heterogeneous: A Differs from place to place
- v). Passive factor: Productivity land depends upon Labour.

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vii). Permanent factor: Indestructible

Features of Labour

- i). Human factor
- ii). Bargaining power of Labour = weak
" " " " of Trade union = Strong
- iii). Labourer sells his labour only
- iv). Heterogeneous factor
- v).
Supply $\begin{cases} \text{Firms} = \text{Elastic} \\ \text{Economy / Country} = \text{inelastic} \end{cases}$
- vi). Active factor
- vii). Perishable factor = can not be stored.
- viii). mobility = Least mobile factor

Features of Capital

- ii. Human Factor
- i). manmade factor
- iii. Productive factor = it is productivity of Land & Labour
- iii). produced means of production
- iv). Durable = Not Perishable like Labour
- vi). Passive factors
- vii).
 - Supply $\left\{ \begin{array}{l} \text{Short run} = \text{inelastic} \\ \text{Long run} = \text{elastic} \end{array} \right.$
- vii). mobile = most mobile

Types of Capital

- i). money capital :- money invested in business
- ii). Real capital :-
Physical Assets
- iii). Specific capital :-
Specific assets use

iv). Floating capital:-

multiple use

v). fixed capital:-

Purchase once & use again & again

vi). working / variable capital:-

can not be used again & again

vii). Human capital:-

Human skill etc

viii). Tangible capital:-

ix). intangible capital:-

Trade marks, Patents etc.

x). Private capital:-

Personal Assets.

xi). Social capital:-

Collective ownership.