

Chapter: Theory of Demand & Supply.

→ Theory of Demand & Supply.

by customer

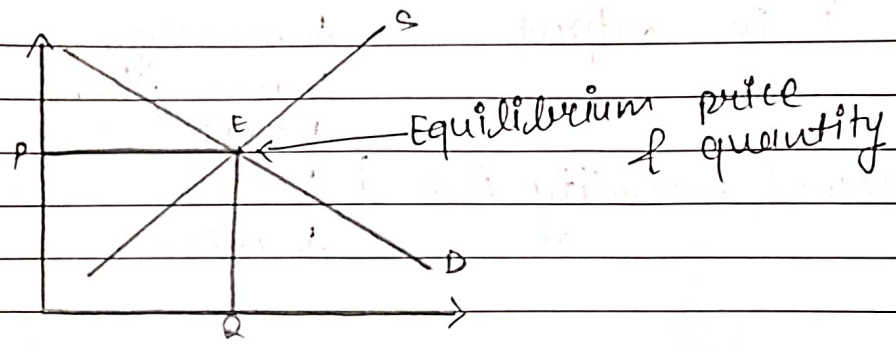
by producer

maximum satisfaction

maximum profit

with ↓ price

with ↑ price



Equilibrium price & quantity.

* Demand:

Demand = Desire for a commodity (goods & services) + Ability to pay + willingness to pay (money).

→ Person (books) X

→ Beggar (5-star hotel) X

→ person (I-phone) X

All the three conditions needs to be there for a particular demand. (compulsary).

→ In these cases, we can say that there is no demand.

→ Demand is a relative term.

price time

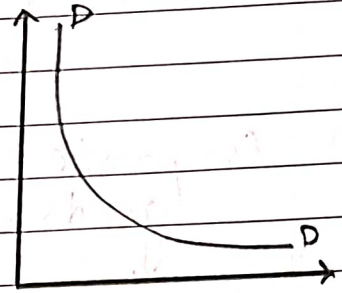
* Law of Demands (curve)

Price Qd.

↑ ↓

↓ ↑

(I)



* Types of Demands

- 1) Direct demand : Consumer goods. (by consumer)
 - 2) Derived / Indirect demand : Producer goods. (by consumer)
 - 3) Individual demand : particular consumer, particular commodity.
 - 4) Market demand : Group of consumers, particular commodity.
 - 5) Competitive demand : substitute goods → 2 commodities
 (pepsi) price of X Qd for Y (Coke)
 ↑ ↓
 ↓ ↑
 (D) (D)
- Direct relationship
↓
+ve (COO).

6) Joint Demand : Complementary goods → 2 commodities
 price of X (fuel) ↑ ↓ (I) DD for Y (vehicle) ↓ ↑ inverse relation -ve COED

7) Composite goods : Single commodity, several uses.

* Factors Influencing Demand or Determinants of Demand:

1) Price of particular good or good concerned: (PEOD)
 Price of X ↑ ↓ (I) Dd of X ↓ ↑

2) Income of consumer: (Y) YEOD

<u>Normal goods</u>	<u>Necessity goods</u>	<u>Inferior goods</u>
Y DD	Y DD	Y DD
↑ (D) ↑	↑ ↔	↑ (I) ↓
↓ ↓	↓ ↔	↓ ↑
Direct relation +ve YEOD	No change in Dd O YEOD	Inverse relation -ve YEOD

3) Price of related goods: COED

- (a) Price of substitute good.
- (b) Price of complementary good.

~~Law of Dema~~

(a) Price of substitute good:

Price of pepsi

↑
↓

(D)

+ve C_{ED}

DD for coke

↑
↓

(b) Price of complementary good:

Price of fuel

↑
↓

(I)

-ve C_{ED}

DD for vehicle

↓
↑

4) Future expectations about prices:

FEAP

↑
↓

(D)

DD

↑
↓

5) Taste / Preferences / habits / fashion / Advt. :

→ Band wagon effect

→ Demonstration effect.

6) Population :

populⁿ

↑
↓

DD

↑
↓

Age structure DD

0-14

toys, chocolates, etc.

15-59

mobile, watches, etc.

60+ above

spect, wheelchair, etc.

Gender ratio

DD

Male

male products

female

female products.

7) Distribution of Income :

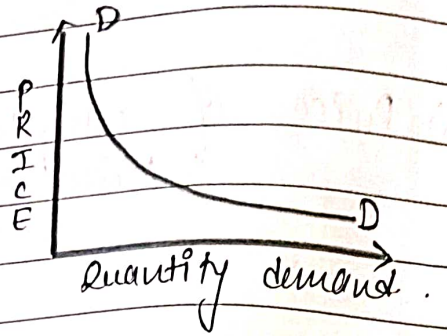
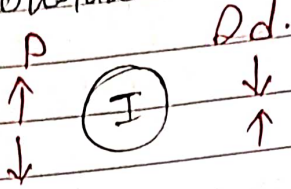
↑
↓
equal
unequal

DD

↑
↓

* Law of Demand:

→ Other factors than price of particular good remaining constant.



→ Inverse relationship
downward sloping
of DD curve.

* Features of Demand curve:

1 → It is downward sloping curve from left to right.

2 → Demand curve is negatively sloped.

3 → Demand curve is convex to the origin.

→ There is a functional relationship b/w price & quantity demanded.

→ Price varies inversely with Qd.

→ The law of demand is qualitative concept because we study only the directions, no measurement.

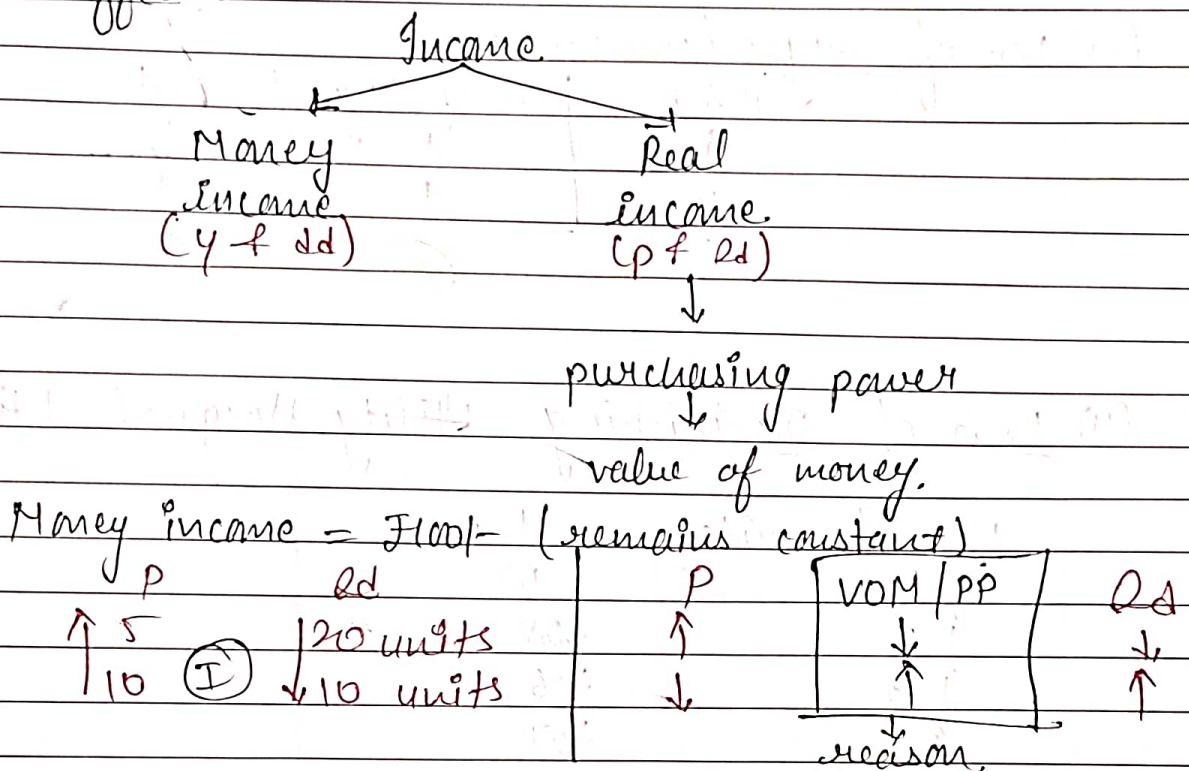
* Why does demand curve slope downward?

Because of Inverse relationship b/w P & Q_d .

So,

Why is there inverse relationship b/w P & Q_d ?

(1) Income effect:



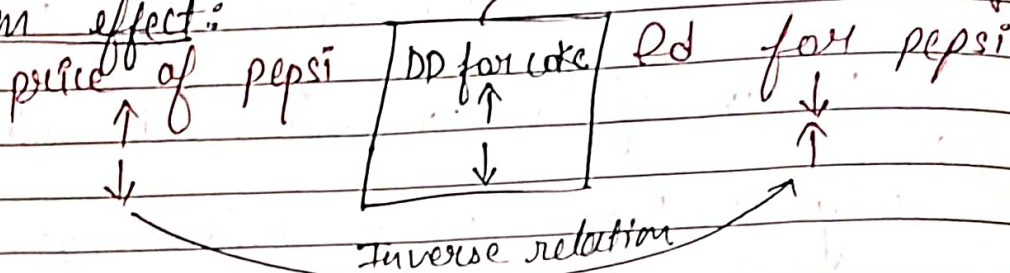
→ Money income is the relationship b/w income & demand (y & Q_d)

→ Real income is the relationship b/w price & quantity demanded. (P & Q_d)

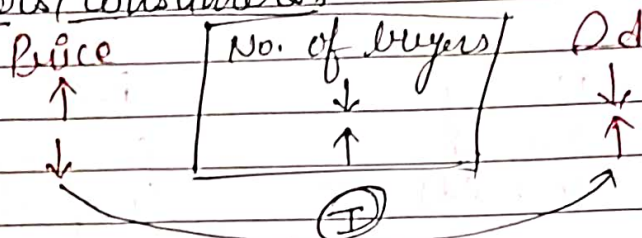
→ There is an inverse relationship b/w price & value of money or real income.

→ When price ↑ value of money ↓, & when price ↓, value of money ↑.

(2) Substitution effect:

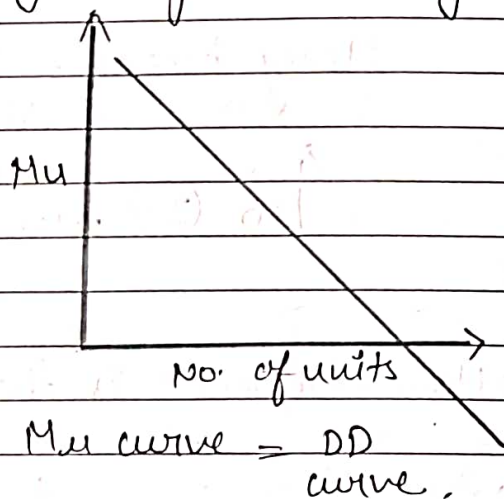


(3) No. of buyers/consumers:

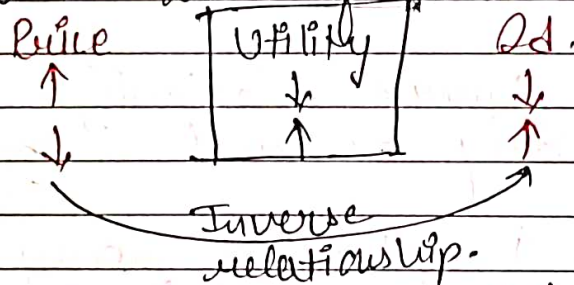


(4) Law of Diminishing Marginal Utility:

No. of units	Mu
1	10
↑ 2	↓ 8
↑ 3	↓ 6
↑ 4	↓ 4
↑ 5	↓ 2
↑ 6	↓ 0
↑ 7	↓ -2



→ utility is the basis of demand. (satisfaction)



{ For example, ice-cream - we will consume more }
 { ice-cream when price ↓ while will avoid when price ↑ }

* Exceptions to Law of Demand:

→ Exceptions are those which do not follow the law.

- 1) Conspicuous / luxury / prestige goods / veblen effect / snob appeal:
Eg: BMW, villa,
- 2) Giffen goods:
Eg: bread & meat
 consumer will prefer meat even if ↓ in bread's P.
- 3) Conspicuous necessities good:
 → Means which was luxury earlier but now necessity.
Eg: AC, Mobile phone, Television, Car, etc.
- 4) Future expectation about prices:
Eg: Gold, Diamond.
- 5) Speculative effect:
 → ↑ in future prices of shares.
- 6) Demand for necessities:
Eg: Salt, Milk, Medicines, etc.
- 7) Ignorance goods:
Eg: When consumers are unaware about ↑ price or ↓ price. So, there will no effect on P.
 (Buckin rabbits)
- 8) Impulsive purchase / Irrational behaviour:
 → Expensive & unuseful purchase.
Eg: Iphone by middle class.

movements:

→ price of particular good or price of good concerned.

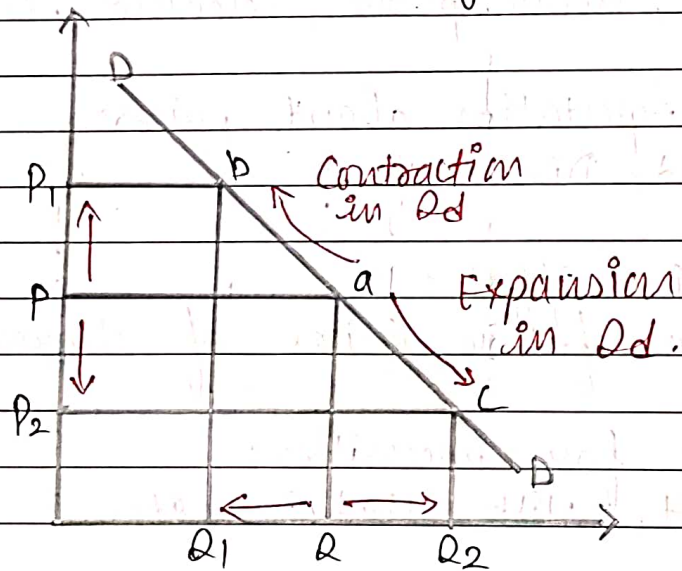
Variation in Quantity demand
Change in Quantity demand:

Contraction
in Q_d

Expansion
in Q_d

Price ↑
(rises)
 Q_d ↓
(falls)

Price ↓
(falls)
 Q_d ↑
(rises)



→ movement along the same demand curve.

→ One curve, three points.

→ Law of Demand.

→ Price varies

→ Other factors remain constant.

Shift:

→ Other factors than price of particular good.

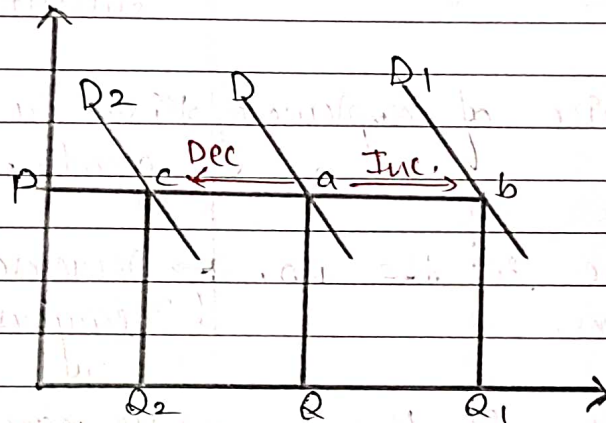
Change in ~~quantity~~ Demand
Change in Demand.

Increase
in DD

Price Q_d
↔ ↑
(same) (rises)
(more)

Decrease in
DD

Price Q_d
↔ ↓
(same) (less)



→ Shift of Demand Curve.

→ Three points of three different curves.

→ Price remains constant.

→ Other factors changes.

* Distinguish:

points of differ-	Changes in determinants other than price that cause <u>increase</u> in demand (rightward shift)	Changes in determinants other than price that cause <u>decrease</u> in demand. (leftward shift)
Normal goods.	→ rise in income in case of normal goods.	→ Fall in income in case of normal goods.
Inferior goods	→ fall in income in case of inferior goods.	→ Rise in income in case of inferior goods.
Substitute goods	→ Rise in price of substitute goods.	→ fall in price of substitute goods.
Complementary goods	→ fall in price of complementary goods.	→ rise in price of complementary goods.
No. of buyers.	→ An increase in the no. of buyers.	→ Decrease in no. of the buyers.
Future expectation about price.	→ An increase in the future expectation about price.	→ Decrease in the future expectation about price.
Taste & preferences	→ A change in taste in favour of a commodity	→ A change in taste in against of a commodity.
Govt. policies	→ Govt. policies encouraging consumption of the goods.	→ Govt. policies discouraging the consumption of goods.

* Elasticity of Demand: (Measurement)

→ Degree of responsiveness or sensitiveness of a commodity due to change in price.

* Formula:

$$\frac{\% \Delta Q_d}{\% \Delta P} \quad \text{or} \quad \frac{\Delta Q}{Q} \div \frac{\Delta P}{P} \quad \text{or} \quad \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

Price $\xrightarrow{\text{less response}}$ Q_d . } In elastic.
% ΔQ_d < % ΔP
% ΔP > % ΔQ_d

Price $\xrightarrow{\text{more response}}$ Q_d . } Elastic
% ΔP < % ΔQ_d
% ΔQ_d > % ΔP

Law of Demand

P

↑

↓

(I)

 Q_d

↓

↑

more Δ (elastic)less Δ (inelastic)more Δ (elastic)less Δ (inelastic)

→ Only directions.

→ No measurements.

→ measurements are considered.

∴ Qualitative concept.

∴ Quantitative concept.

* Kinds of elasticity of Demand:

1) $P_{eod} = \frac{\% \Delta Q_d}{\% \Delta P}$ or $\frac{\Delta Q}{Q} \div \frac{\Delta P}{P}$ or $\frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$

where, $\Delta Q = (\text{New } Q - \text{Old } Q) \rightarrow \text{change.}$
 $\Delta P = (\text{New } P - \text{Old } P) \rightarrow \text{change.}$

→ ratio method is to be used when Δ is small.

2) $Y_{eod} = \frac{\% \Delta Q_d}{\% \Delta Y}$ or $\frac{\Delta Q}{Q} \div \frac{\Delta Y}{Y}$ or $\frac{\Delta Q}{Q} \times \frac{Y}{\Delta Y}$

Y ↑ ↓	DD ↑ ↓	Y ↑ ↓	DD ↔ ↔	Y ↑ ↓	DD ↕ ↑
⊕				⊖	
Direct relation +ve Y_{eod} (Normal goods)		No change 0 Y_{eod} (Necessity goods)		Inverse relation -ve Y_{eod} (Superior goods)	

→ $\frac{\% \Delta Q_d}{\% \Delta Y} = \frac{10\%}{10\%} = 1$ ($\epsilon = 1$)
(x commodity)

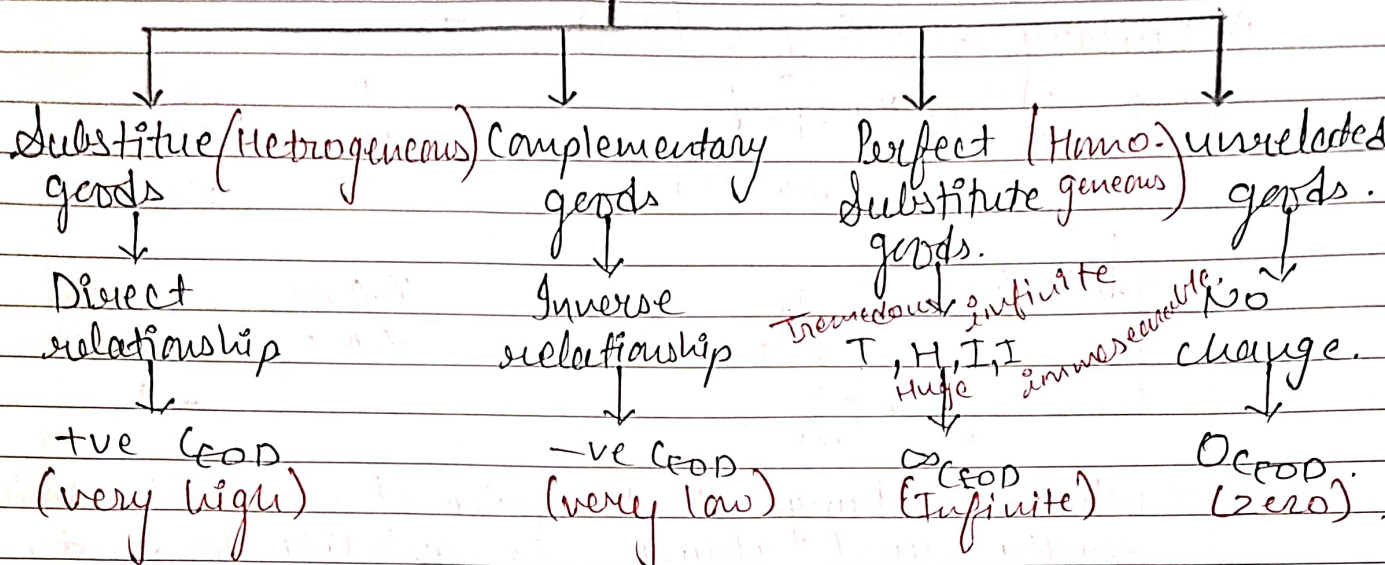
→ $\frac{\% \Delta Q_d}{\% \Delta Y} = \frac{20\%}{10\%} = 2$ ($\epsilon > 1$)
(Luxuries)

→ $\frac{\% \Delta Q_d}{\% \Delta Y} = \frac{5\%}{10\%} = 0.5$ ($\epsilon < 1$) ($\epsilon > 0$)
(Necessities)

3) Gross elasticity of Demand: C_{eod} .

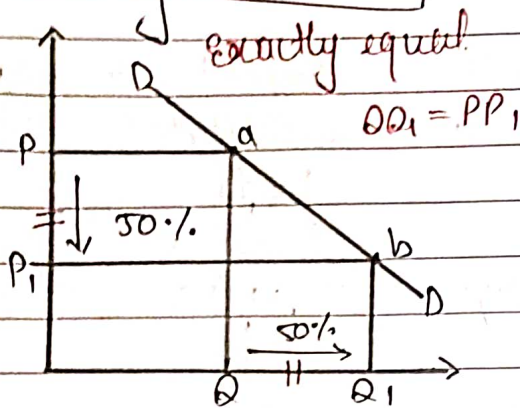
$C_{eod} = \frac{\% \Delta Q_d A}{\% \Delta P_B}$ or $\frac{\% \Delta R_A}{\% Q_A} \div \frac{\Delta P_B}{P_B}$ or $\frac{\Delta R_A}{Q_A} \times \frac{P_B}{\Delta P_B}$

Cross elasticity of demand.



4) Advertisement elasticity of demand: AEDD.

$$AEDD = \frac{\% \Delta \text{ in } Q_d}{\% \Delta \text{ in advertisement expenditure}}$$

* Types of elasticity:1) Unitary elastic dd: ($E=1$)

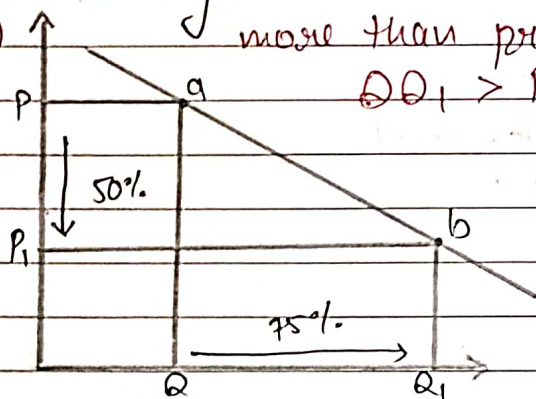
P	Qd
10	100
5	150

$$\frac{\% \Delta Qd}{\% \Delta P} = \frac{50\%}{50\%} = 1$$

→ When a change in ~~two~~ price of commodity being also exactly equal change in quantity demand, then it is called unitary elastic DD.

2) Relatively elastic DD:

(E > 1) more than proportionate



P	Qd
10	100
5	175

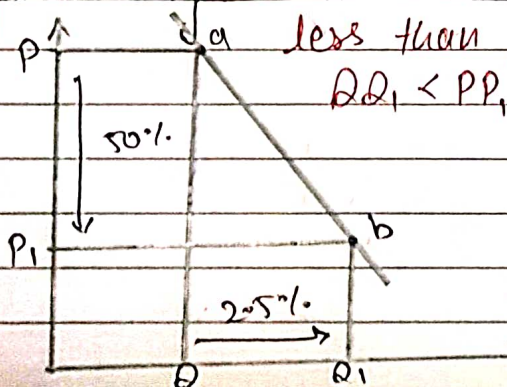
$$\frac{\% \Delta Qd}{\% \Delta P} = \frac{75\%}{50\%}$$

$$= \frac{3}{2} = 1.5$$

→ More than proportionate, relatively elastic DD.

3) Relatively inelastic DD:

(E < 1) less than proportionate



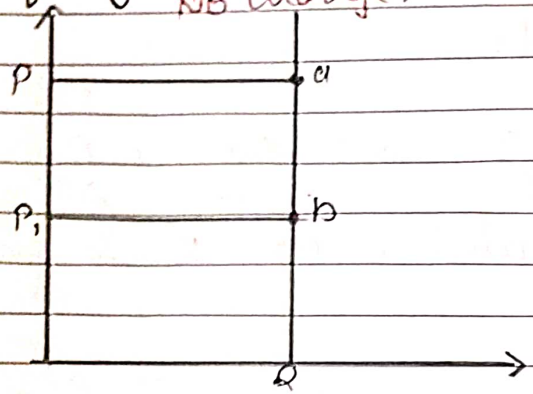
P	Qd
10	100
5	125

$$\frac{\% \Delta Qd}{\% \Delta P} = \frac{25\%}{50\%}$$

$$= \frac{1}{2} = 0.5$$

→ less than proportionate, relatively inelastic.

4) Perfectly Inelastic DD:
no change.

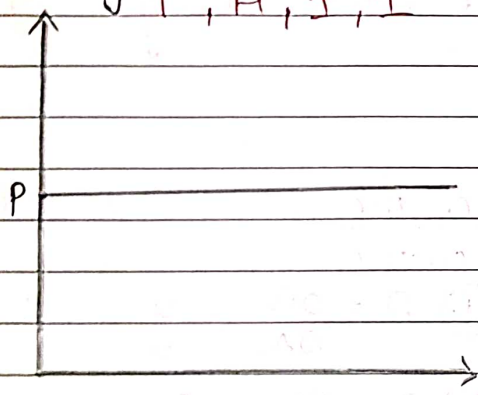


P	Qd
10	100
5	100

$$\frac{\% \Delta Q_d}{\% \Delta P} = \frac{0}{50} = 0$$

→ No change, perfectly inelastic.

5) Perfectly elastic DD:
T, H, I, I

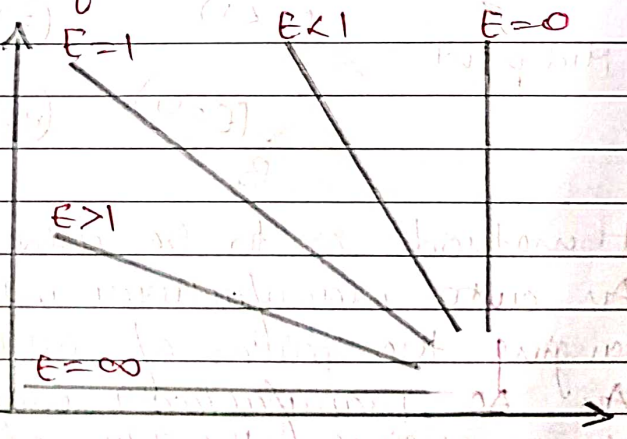


P	Qd
10	100
9.9	∞

→ Tremendous, High, Infinite & Immeasurable change, then perfectly elastic.

* Complines

→ Use right hand as 90°



* Methods:(1) Ratio / Proportionate Method:

$$\rightarrow \frac{\% \Delta Q_d}{\% \Delta P} \quad \text{or} \quad \frac{\Delta Q}{Q} \div \frac{\Delta P}{P} \quad \text{or} \quad \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

→ ratio method is to be used when Δ is small.

(2) Arc Method:

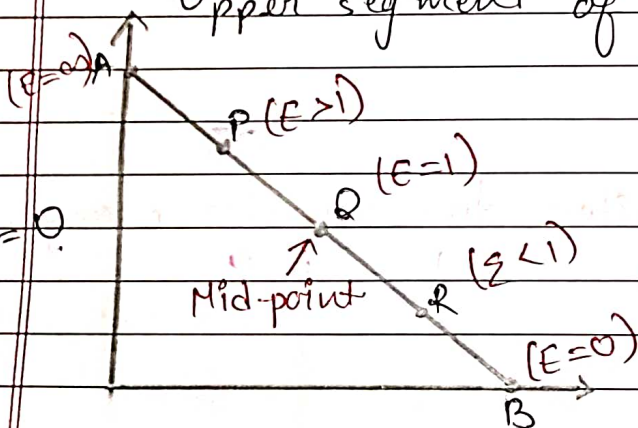
$$\rightarrow \frac{\Delta Q}{\frac{Q_1 + Q_2}{2}} \div \frac{\Delta P}{\frac{P_1 + P_2}{2}} \quad \text{or} \quad \frac{Q_1 - Q_2}{Q_1 + Q_2} \div \frac{P_1 - P_2}{P_1 + P_2}$$

$$\text{or} \quad \frac{Q_1 - Q_2}{Q_1 + Q_2} \times \frac{P_1 + P_2}{P_1 - P_2}$$

→ Arc method is to be used when change is large/substantial.

(3) Point / Geometric Method:

→ E = lower segment of DD curve
Upper segment of DD curve



$$(1) Q = \frac{QB}{QA} = \frac{2}{2} = 1$$

$$(2) P = \frac{PB}{PA} = \frac{3}{1} = 3$$

$$(3) R = \frac{RB}{RA} = \frac{1}{3} = 0.33$$

$$(4) A = \frac{AB}{0} = \frac{4}{0} = \infty$$

→ Point method is to be used when Δ is negligible.

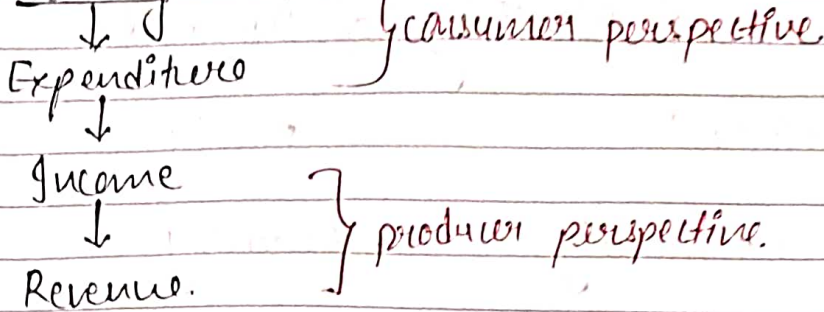
- eg:
- 1) An auto manufacturer wants to find out P_{ed} by changing the prices of automobile by ₹100.
 - 2) An AC manufacturer wants to find out P_{ed} by changing the prices of AC from ₹30,000 to ₹30,010.

When price \uparrow TO \downarrow , price \downarrow TO \uparrow indicating an inverse relationship b/w P & TO, then the demand for the commodity is elastic. (Indirect relationship indicates consumer does not favour the commodity.)

Date _____
Page _____

(4.)

Total Outlay Method:



→ No formula (observation method)

→ Answer to be found out by observing the relationships between P & total outlay (TO).

Case: 1	P	Q	TO	P	TO	
(E=1)	2	10	20	↑	↔	[No change in total outlay]
	4	5	20	↓	↔	
	1	20	20			

Case: 2	P	Q	TO	P	TO	Direct relationship.
(E < 1)	2	10	20	↑	Ⓚ	(relatively inelastic) E < 1
	4	6	24	↓	Ⓚ	
	1	16	16			

Case: 3	P	Q	TO	P	TO	Inverse relationship
(E > 1)	2	10	20	↑	Ⓛ	(relatively elastic) E > 1
	4	4	16	↓	Ⓛ	
	1	24	24			

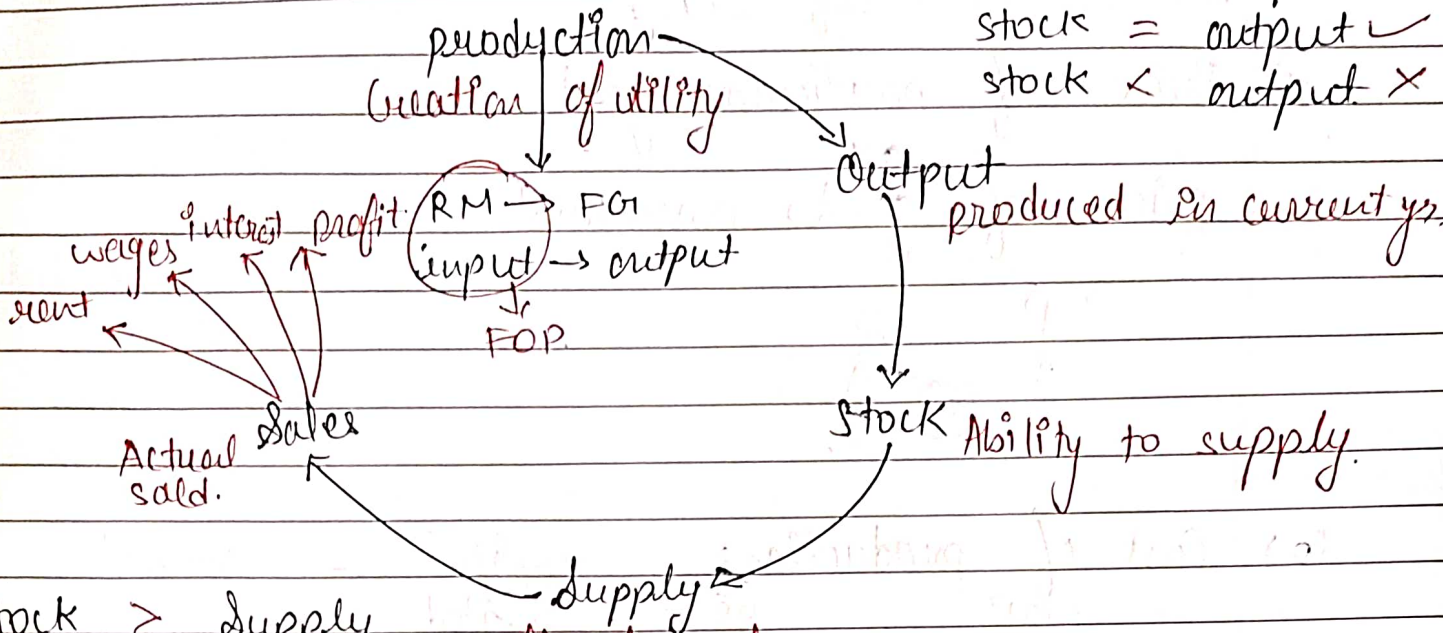
- Total outlay is dependent upon tastes of an individual.
- When price \uparrow or \downarrow & total outlay remains \leftrightarrow then the demand for commodity is unitary elastic.
- When price \uparrow and total outlay also \uparrow , price \downarrow & TO \downarrow . Indicating a direct relationship b/w P & TO, the demand for the commodity is inelastic. (Direct relationship indicates that consumer favours the commodity.)

* Determinants of Elasticity of Demand:

②	Determinants	Elastic	Inelastic
1)	Nature of commodity	Luxury	Necessities
2)	Durability	Durable	Perishable
3)	Availability of substitutes	available	Not available
4)	Complementary goods	X	✓
5)	Habitual goods	X	✓
6)	No. of uses	multiple uses	single use
7)	Income earned	low	High
8)	Proportion of Income spent or position of commodity in consumers budget.	High	Low
		Less	Shorter run
9)	Time period	Long run	Short run
10)	Price range	X	very low & very high.

* Supply:

- Stock > output ✓
- Stock = output ✓
- Stock < output ✗



- ✓ Stock > supply
 - ✓ Stock = supply
 - ✗ Stock < supply
- offer for sale
or
willingness to sale.

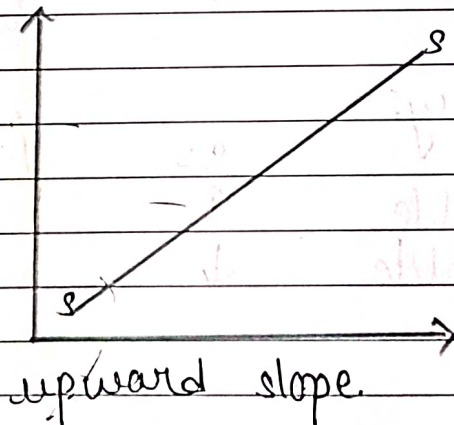
→ Supply is a relative term

Price ← → Time

* Law of Supply:

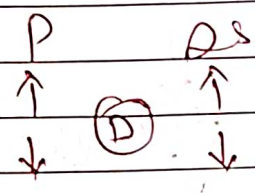
P Qs
↑ ↑
↓ ↓

(D)

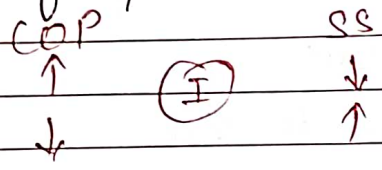


* Determinants of supply:

1) Price of particular good.
price of goods concerned.



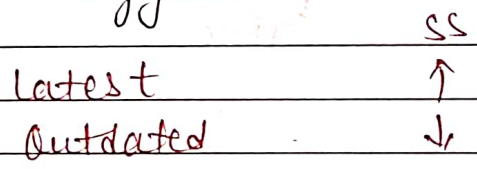
(2) Cost of production:



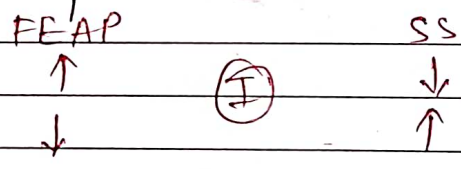
capital limited — 100000/-

COP	Qs
1	100000 units
2	50000 units.

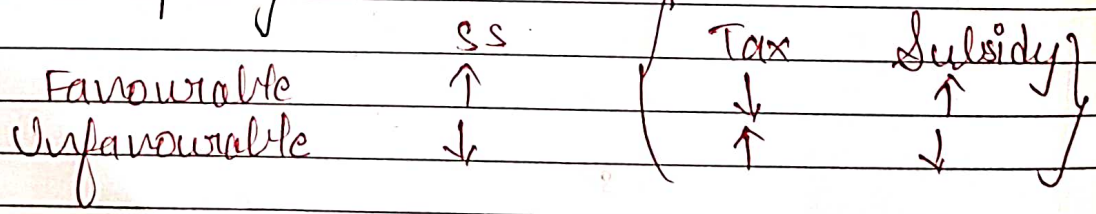
3) Technology:



4) Future Expectation about prices



5) Government policy:



6) (Climate conditions: (Agricultural goods)

	SS
Favourable	↑
Unfavourable	↓

7) Price of substitute goods:

price of wheat / cauliflower	SS of rice / cabbage.
---------------------------------	--------------------------

↑	Ⓧ	↓
↓		↑

8) No. of sellers:

	SS
↑	Ⓧ ↑
↓	Ⓧ ↓

* Movement & Shift:

Supply

Price of particular good
or
price of good concerned

Other factors than price
of particular goods.

Variation in Quantity supply
Change in Quantity supply.

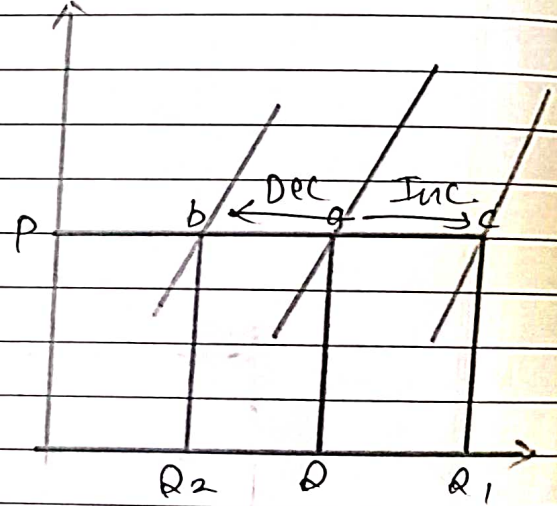
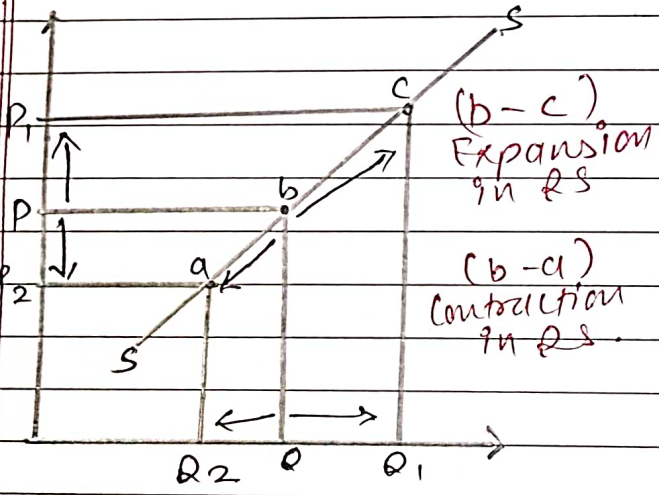
Change in Supply

Expansion in QS Contraction in QS

Increase in SS

Decrease in SS

Price	QS	Price	QS	Price	QS	Price	QS
↑	↑	↓	↓	↔	↑	↔	↓
(rises)	(rises)	(Falls)	(Falls)	(same)	(more)	(same)	(less)



→ Movement along the same supply curve.

→ Shift of Supply Curve.

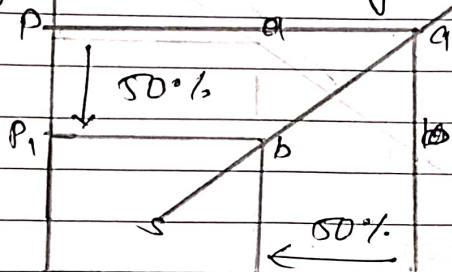
→ Law of Supply.

* Price Elasticity of Supply:

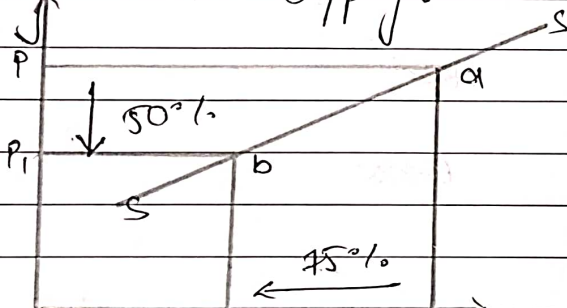
$$\rightarrow \frac{\% \Delta Q_s}{\% \Delta P} \quad \text{or} \quad \frac{\Delta Q_s}{Q_s} \div \frac{\Delta P}{P} \quad \text{or} \quad \frac{\Delta Q_s}{Q_s} \times \frac{P}{\Delta P}$$

* Types of Elasticity of Supply:

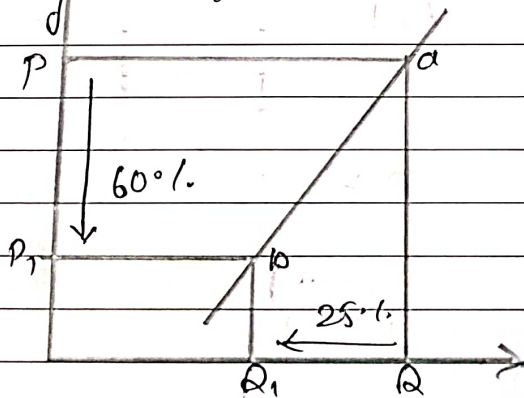
1) Unitary elastic supply: ($E_s = 1$)



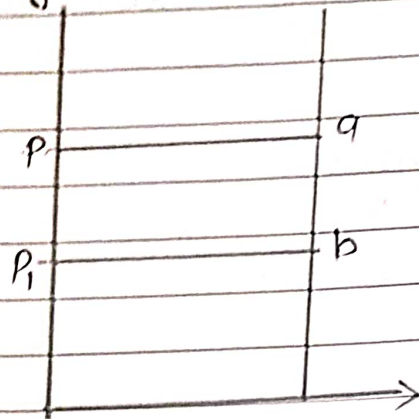
2) Relatively Elastic Supply: ($E_s > 1$)



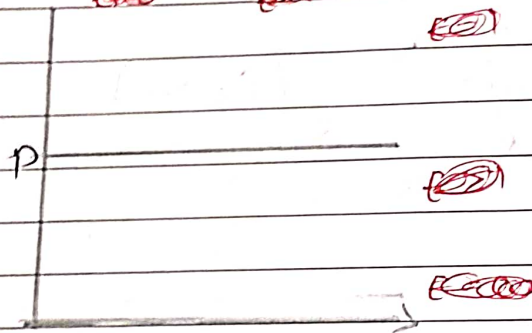
3) Relatively inelastic supply: ($E_s < 1$)



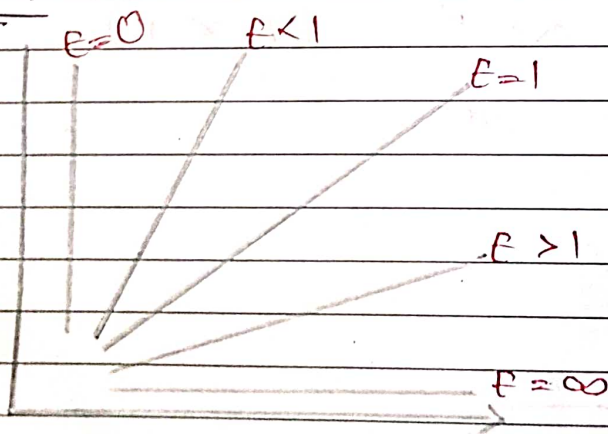
4) Perfectly Inelastic SS: $E_s = 0$



5) Perfectly elastic SS: $E_s = \infty$



* Combines



* Methods:(1) Ratio / Proportionate Method:

$$\frac{\% \Delta Q_s}{\% \Delta P} \quad \text{or} \quad \frac{\Delta Q}{Q} \div \frac{\Delta P}{P} \quad \text{or} \quad \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

(2) Arc elasticity:

$$\frac{\frac{\Delta Q}{Q_1 + Q_2}}{2} \div \frac{\frac{\Delta P}{P_1 + P_2}}{2} \quad \text{or} \quad \frac{Q_1 - Q_2}{Q_1 + Q_2} \div \frac{P_1 - P_2}{P_1 + P_2}$$

$$\frac{Q_1 - Q_2}{Q_1 + Q_2} \times \frac{P_1 + P_2}{P_1 - P_2}$$

(3) Point / geometric method:

$$Q_s = -100 + 10P$$

$$P = 15$$

$$\therefore Q_s = -100 + 10(15)$$

$$Q_s = 50$$

→ Differentiating Q with respect to P .

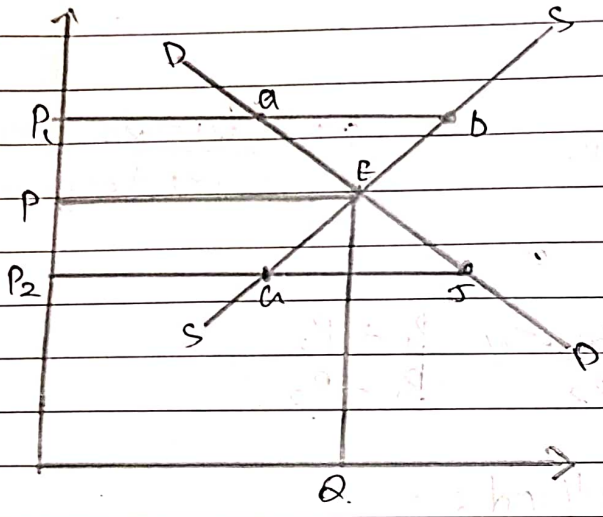
$$\frac{dQ}{dP} \times \frac{P}{Q} \Rightarrow \frac{dQ}{dP} = \frac{d(-100 + 10P)}{dP} = 10.$$

$$\therefore 10 \times \frac{15}{50}$$

$$= \underline{\underline{3}}$$

* Determination of equilibrium price & quantity:

Price	DD	SS	Comparison	s/s/e	effect on price
5	100	500	$DD < SS$	Surplus or excess supply	↓
4	200	400	$DD < SS$		
3	300	300	$DD = SS$	Equilibrium	←
2	400	200	$DD > SS$	Excess demand or scarcity	↑
1	500	100	$DD > SS$		

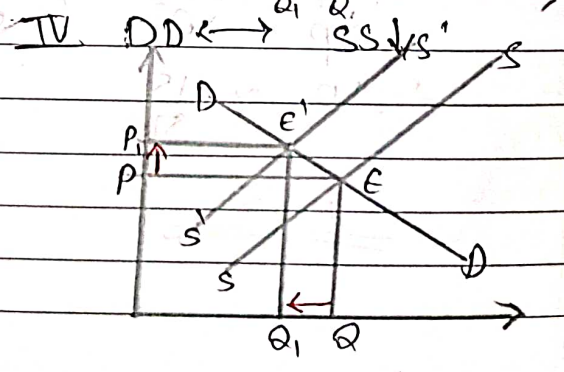
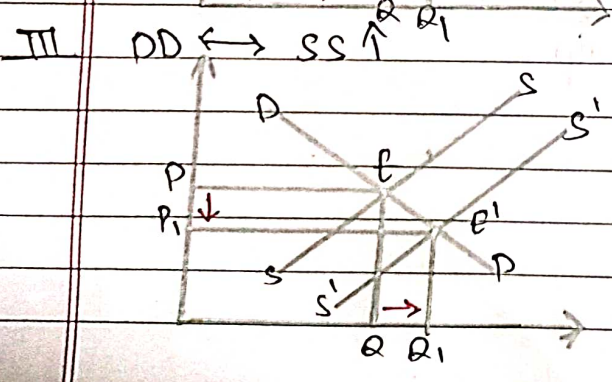
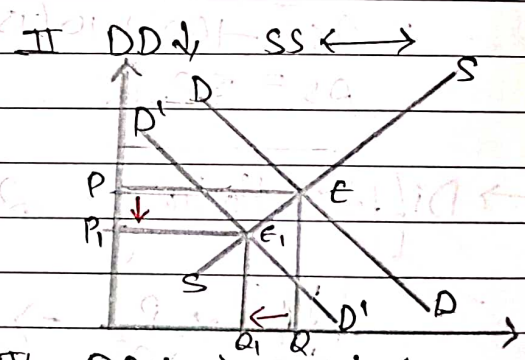
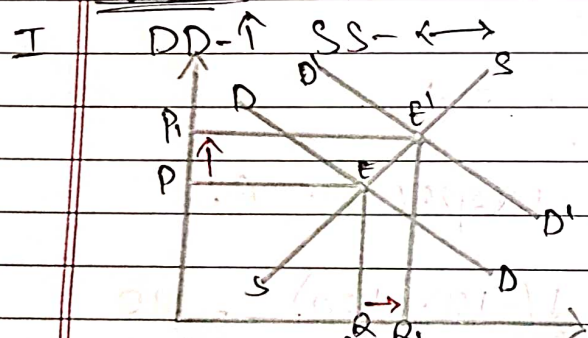


(a) $P_1 \rightarrow b > a$ ($SS > DD$)
Excess supply or surplus
 \therefore Price ↓

(b) $P \rightarrow E$ ($SS = DD$)
Equilibrium \therefore Price ←

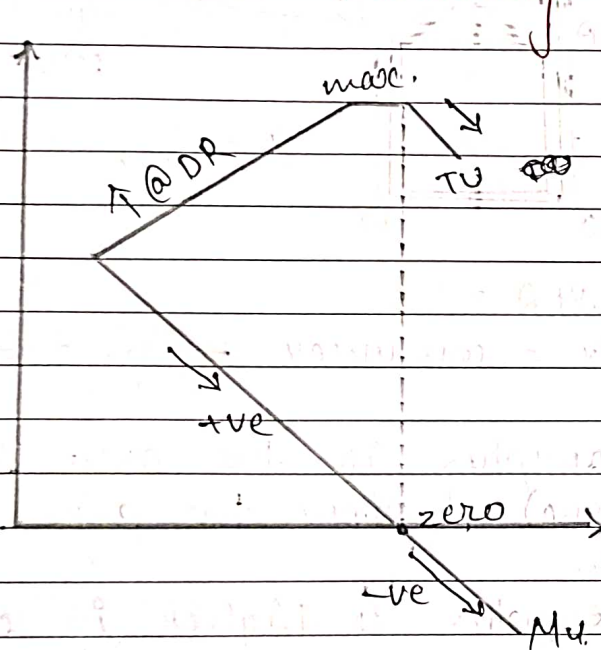
(c) $P_2 \rightarrow f > c$ ($DD > SS$)
Excess demand or scarcity
 \therefore Price ↑

* Cases:



* Concept of TU and Mu. (Utility):

utility no. of units	all whole aggregate Total utility	last, additional, extra marginal utility
1	10 ↑	10 ↓
2	15 ↑ increasing	8 ↓ decreasing
3	24 ↑ at diminishing	6 ↓ +ve. marginal
4	28 ↑ rate.	4 ↓ utility.
5	30 ↑	2 ↓
6	30 ← constant max.	0 zero
7	28 ↓ decreasing	-2 -ve.



Law of Diminishing Marginal Utility

$$TU = \sum MU \quad \text{or} \quad MU_n = \Delta TU$$

$$MU_n = TU_n - TU_{(n-1)}$$

$$\text{eg: } MU_6 = TU_6 - TU_{(6-1)}$$

$$= 30 - 30$$

$$= 0$$

$$MU_5 = TU_5 - TU_4$$

$$= 30 - 28$$

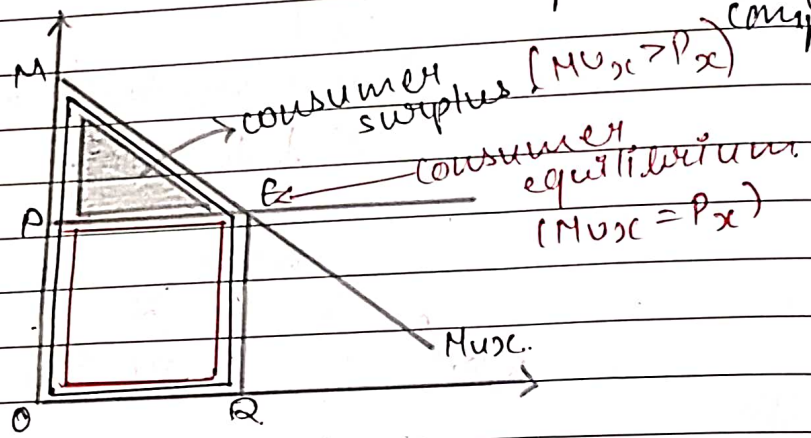
$$= 2$$

$$= 2$$

* Consumer Surplus

→ consumer surplus = price willing to pay — price actually paid.
 Extra utility = satisfaction — sacrifice.
 = max. price — market price.
 = MU_x — P_x

Assumption: Perfect competition



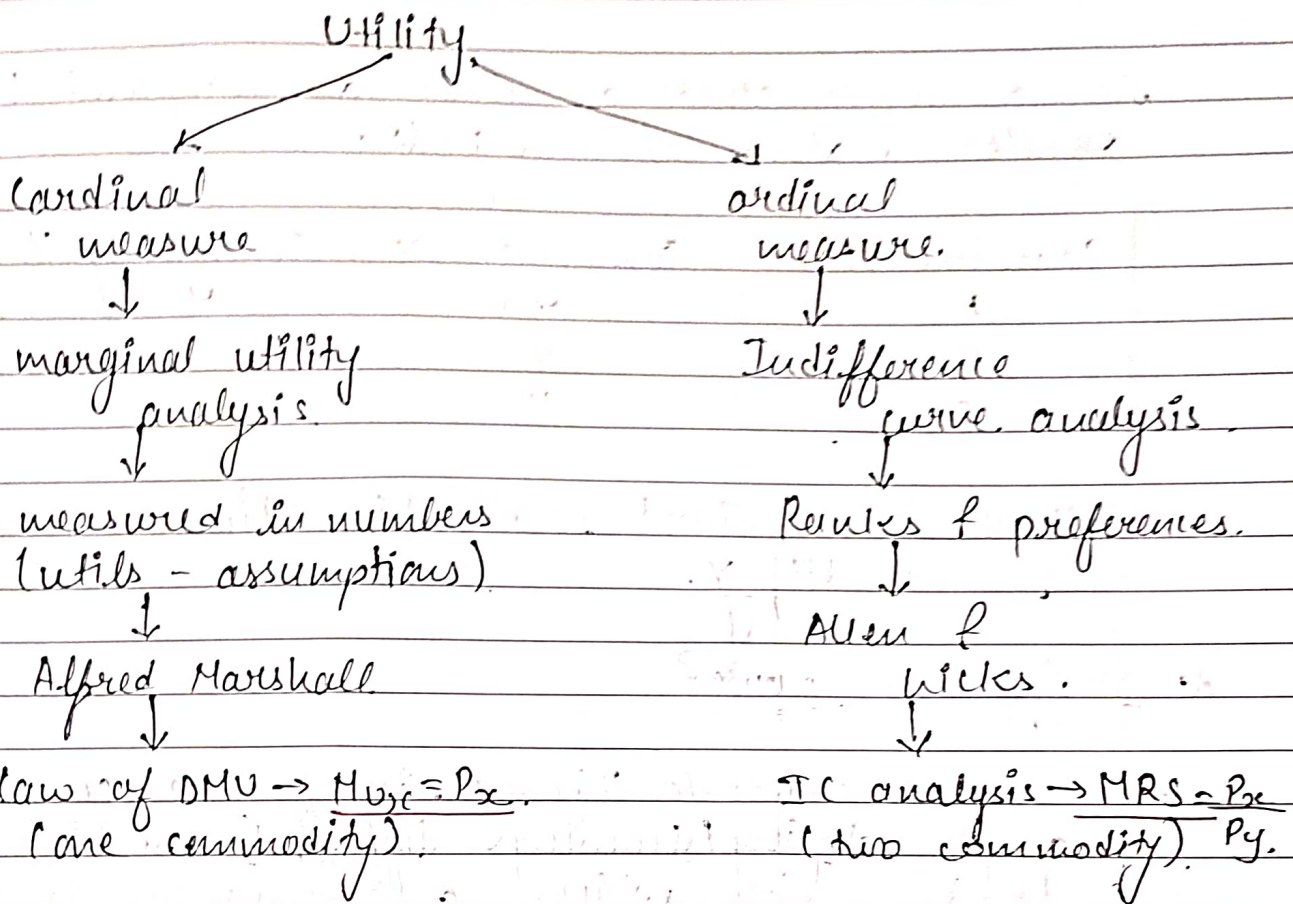
→ $OMEQ - OPEQ = PME$

→ $MU_x - P_x = \text{consumer satisfaction surplus.}$

→ Consumer surplus is the area below the MU curve (demand curve) & above the price line.

→ Consumer surplus is higher in case of necessities (infinite).

→ Consumer has low consumer surplus on the last unit of commodity consumed.



* Law of equi-marginal utility (EMU):

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \frac{MU_z}{P_z} = k$$

(two or more commodity)

* Scale of preferences:

- preference refers to set of assumption related to ordering some alternatives based on the degree of happiness, satisfaction, enjoyment.
- A consumer prefers large stock of goods as compared to a smaller stock of goods, this is because of visualise higher level of satisfaction

in a larger stock of goods as compared to a smaller stock of goods.

Combination	Commodity X	Commodity Y	Rank
A	2	4	3rd
B	3	6	2nd
C	4	8	1st

→ There is a direct relationship b/w commodity X & commodity Y.

* Indifference curve:

→ In microeconomic theory, indifference curve is graph showing different combination of goods which a consumer is indifferent.

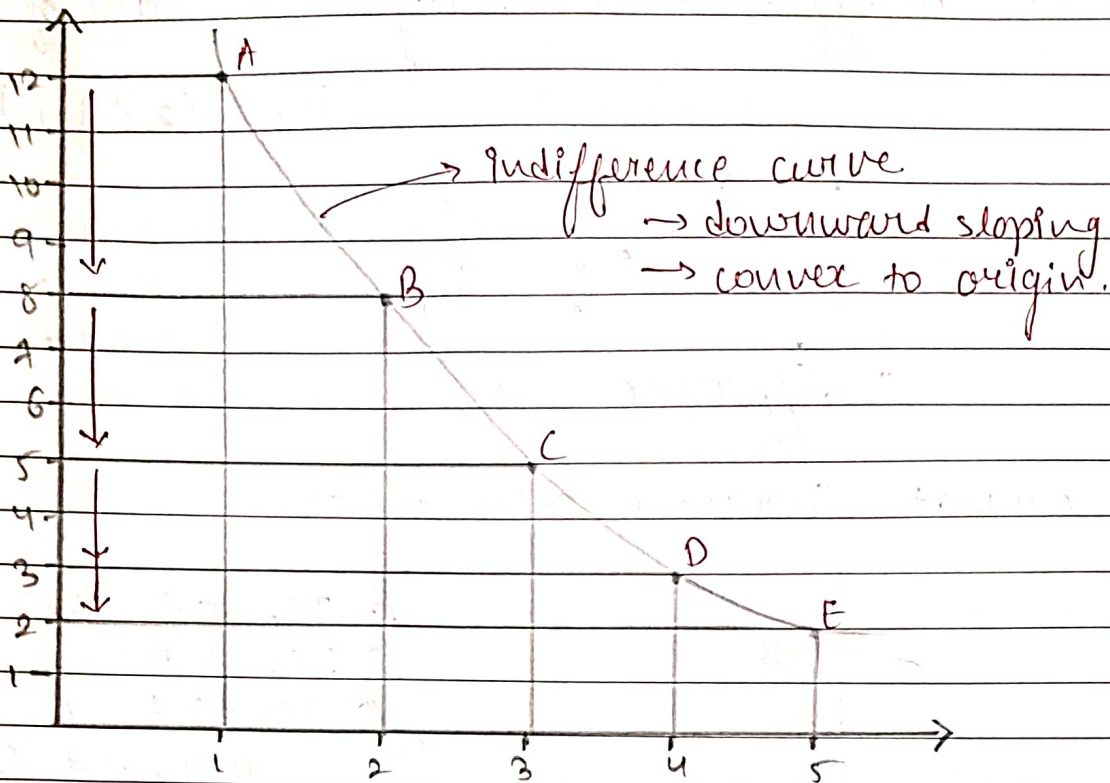
→ In simple terms, indifference curve represents all those combinations of goods which give same level of satisfaction to the consumers.

→ All the points on one indifference curve gives consumer the same level of satisfaction.

Combination	Commodity X	Commodity Y	MRS = $\frac{\Delta Y}{\Delta X}$
A	1	12	
B	2	8	$-\frac{4}{1} = 4$
C	3	5	$-\frac{3}{1} = 3$
D	4	3	$-\frac{2}{1} = 2$
E	5	2	$-\frac{1}{1} = 1$

Downward sloping (inverse relationship).

MRS = ↓
convex shaped slope



→ MRS: Marginal rate of substitution is the amount of goods that the consumer is willing to sacrifice in order to get more of another good, as long as the new combination of goods gives the same level of satisfaction.

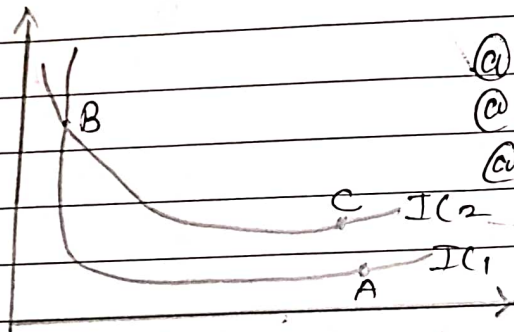
* Properties of indifference curve:

- 1) Indifference curve are downward sloping (inverse relationship).
- 2) Indifference curves are convex to the origin (since MRS is diminishing).

3) Higher indifference curve, higher the level of satisfaction
($IC_3 > IC_2 > IC_1$)



4) It cannot intersect each other.



@ $IC_1 \rightarrow A = B$

@ $IC_2 \rightarrow B = C$

@ $IC_3 \rightarrow A = C$

but, $A \neq C$.

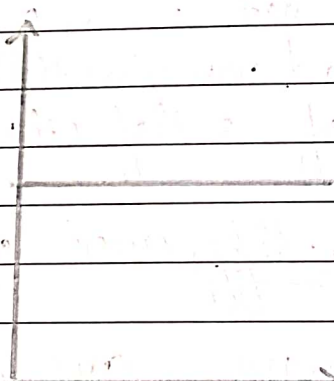
$\therefore IC_1 \neq IC_2$

5) It cannot touch axis:



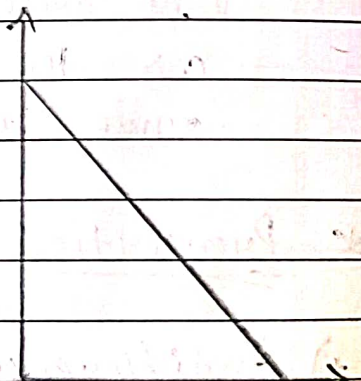
(5, 0)

x



(0, 5)

x



x

\therefore Its combination of two commodities.

Therefore, any one among them cannot be zero.

* Budget line / Buice line

- What the consumer can actually buy depends upon the money income he has & the price of the goods he would want to buy or purchase.
- Budget line shows all those combination of two goods which the consumer can buy spending his given money income at the two goods at their given prices.

Combination	X	Y	MRS = $\frac{\Delta Y}{\Delta X}$
A	0	5	—
B	2	4	$\frac{1}{2}$
C	4	3	$\frac{1}{2}$
D	6	2	$\frac{1}{2}$
E	8	1	$\frac{1}{2}$
F	10	0	$\frac{1}{2}$

$$\boxed{MRS = \frac{1}{2}}$$

→ Budget = 50 = M, $P_x = 5$, $P_y = 10$.

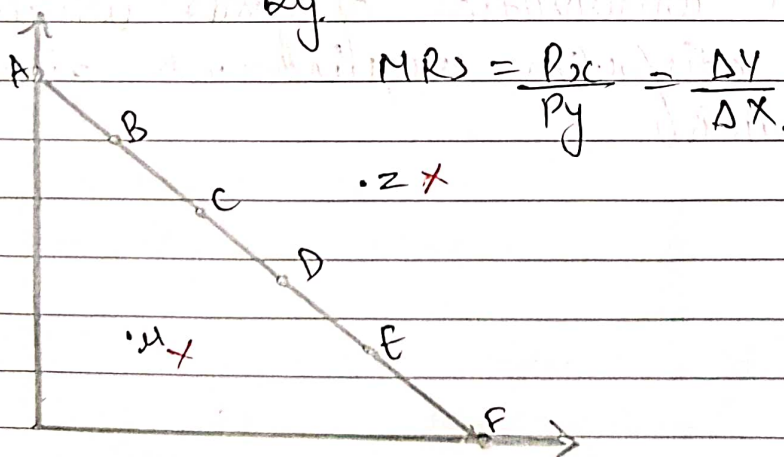
$$M = P_x \cdot Q_x + P_y \cdot Q_y$$

$$P_x = \frac{M(\text{Budget})}{Q_x}$$

$$P_y = \frac{M(\text{Budget})}{Q_y}$$

$$MRS = \frac{P_x}{P_y} \Rightarrow \frac{5}{10} = \frac{1}{2}$$

$$MRS = \frac{\Delta Y}{\Delta X} = \frac{1}{2}$$



→ Points A, B, C, D, E, F are on the budget line, this represents consumer is spending entire money income on purchase of two commodity.

→ Point 'u' is inside the budget line, represents that combination of goods which will result into underutilization of money income.
($u < \text{consumer's income}$)

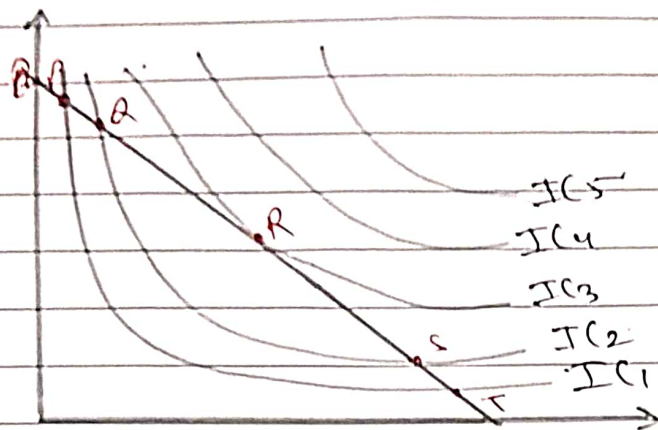
→ Point 'z' is outside the budget line & represents the combination of goods which is unattainable to the consumer's income.

* Consumer equilibrium

→ The point at which the consumer reaches optimum utility or satisfaction from the goods and services purchased, given the constraints of budget & price.

→ This is based on the assumption that consumer attempt to get maximum utility from the purchase.

→ Equilibrium is reached when the consumer purchases that combination of goods which best to meet his satisfaction requirements given his financial constraints.



@ IC_4 & IC_5 - Not

@ $IC_3 \rightarrow R$

@ $IC_2 \rightarrow Q \text{ \& } S$

@ $IC_1 \rightarrow P \text{ \& } T$

→ The consumer will choose point R on IC_3 because the other points P & T are on IC_1 , points Q & S are on IC_2 & as per the property of indifference curve higher the indifference level of satisfaction higher.

→ So, we conclude point P, Q, S, T will utilize the budget as they are on the budget line but they will give lesser satisfaction as compared to point R which is on a higher indifference curve.

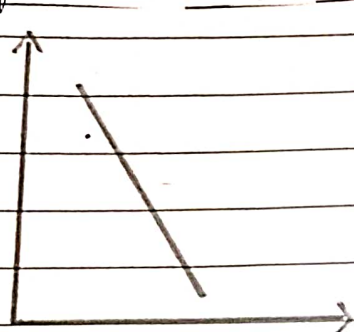
* Conditions for consumer equilibrium:

- (a) The consumer should be on the budget line.
- (b) The consumer should be on the highest indifference curve.

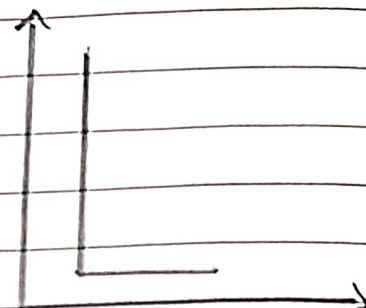
→ The consumer is at equilibrium at the point where the budget line is a tangent to an indifference curve.

→ The indifference curve is tangent to the budget line when consumer is maximizing his/her utility.

* Exceptions to the indifference curve:



Linear
MRS = \longleftrightarrow



L shaped
MRS = 0, constant.

* Comparison b/w ordinal & cardinal measurement:

→ cardinal measurement → law of equi-marginal utility:
 $EMU = \frac{MU_x}{P_x} = \frac{MU_y}{P_y}$ or $\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$ (i)

→ Ordinal measurement → marginal rate of substitution:
 $MRS = \frac{\Delta Y}{\Delta X} = \frac{P_x}{P_y} \rightarrow MRS = \frac{P_x}{P_y}$ (ii)

From eqⁿ (i) & (ii),

$$MRS = \frac{MU_x}{MU_y}$$