

MICRO ECONOMICS.

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Micro economics

1. What do you mean by economics?

Ans:- Economics is a discipline that ~~dis~~^{deals} scarcity of resources, economic activity like production, consumption, saving and exchange.

DEMAND and Elasticity of Demand.

(1) What do you mean by demand?

→ Demand is ~~desire~~^{desire} that fulfill following condition. :-

- Availability of the product.
- Ability ~~of~~ to pay for the product.
- willingness to pay for the product.
- At a particular place & price

(2) What are the factors that affect demand of the commodity?

→ Following are the factors

- Price of the product. → price of ~~related~~^{complementary} related goods.
- Income of consumer. — population: size & composition.
- Taxation policy. — Future expectation of price.
- Seasonal changes. — Taste & fashion.

Substitute

3. What do you mean by law of demand.

→ Law of demand states there is a negative relationship b/w price of a product & its demand i.e. "keeping other things as constant" when price of a product increases its demand falls and vice-a-versa.

4. What are the different kinds of demand?

→ Demand can measurably be ^{classified} ~~characterized~~ into following three:-

- Price demand :- Demand of a commodity that get affected by change in price of product is known as price demand. There is a negative relation b/w price and demand that can be seen through following schedule ~~and~~ and for an imaginary product
→ diagram

Price of 'A' Quantity of Demand of 'A'

10

11

12

13

14

15

100

90

80

70

60

50

15

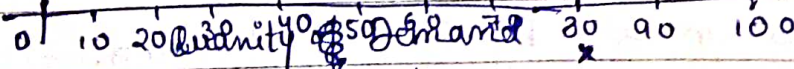
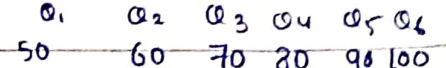
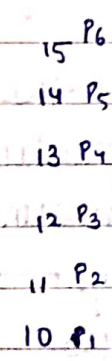
14

13

12

11

10



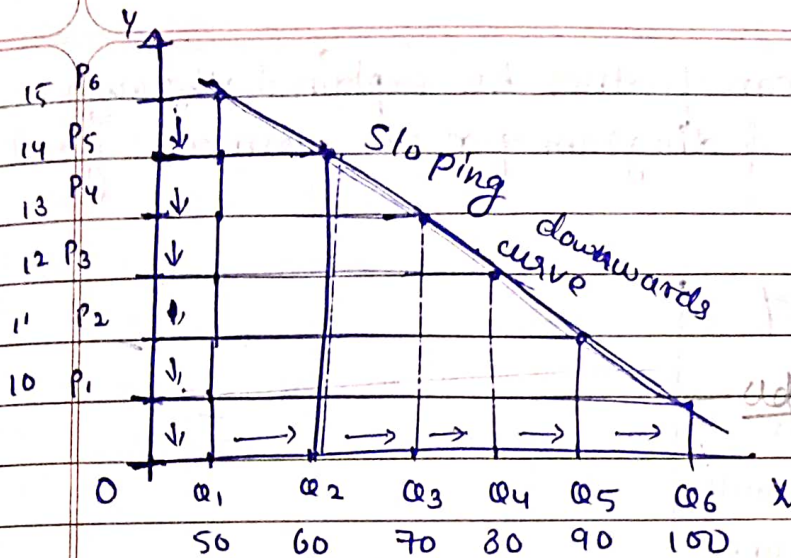
P₅

P₄

P₃

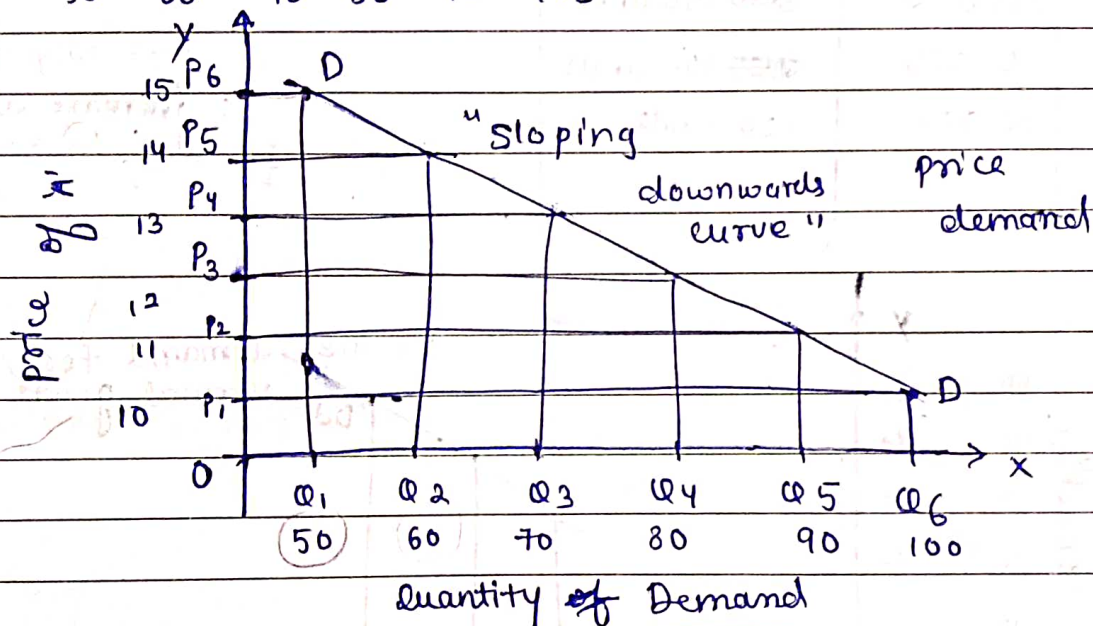
P₂

P₁



note
"always look from origin to x-axis for graph"

"graph explain ki price less demand increase"



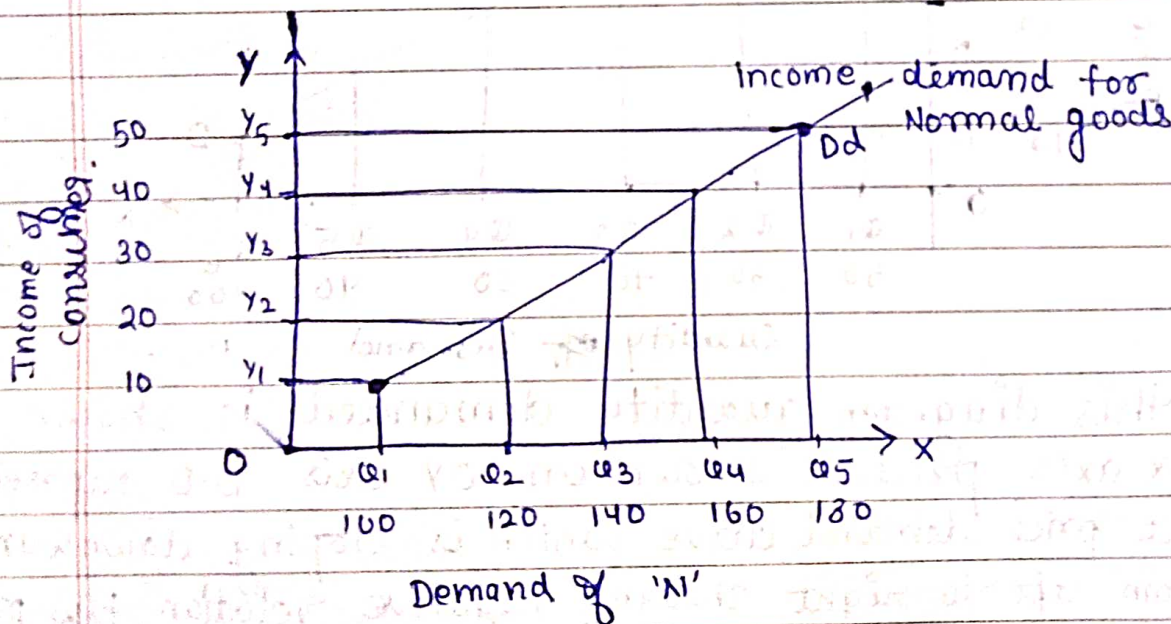
"In this diagram quantity demanded is shown on OX axis price is shown on OY axis D-D represents the price demand curve which is sloping downward from left to right showing negative relation b/w price and demand."

- (ii) Income demand : Demand of a commodity that gets affected by change in income of consumer is known as income demand. It can be explain in context of 2 kinds of goods - (i) normal goods (ii) Inferior goods
- (i) normal goods: these goods have postive relation with demand i.e when price increases there demand increase

and vice-versa it can further be explained through following schedule & diagram for a normal good

Income	Demand of 'N'
10,000	100 units
20,000	120 units
30,000	140 units
40,000	160 units
50,000	180 units

"basically if income increase demand also increase"

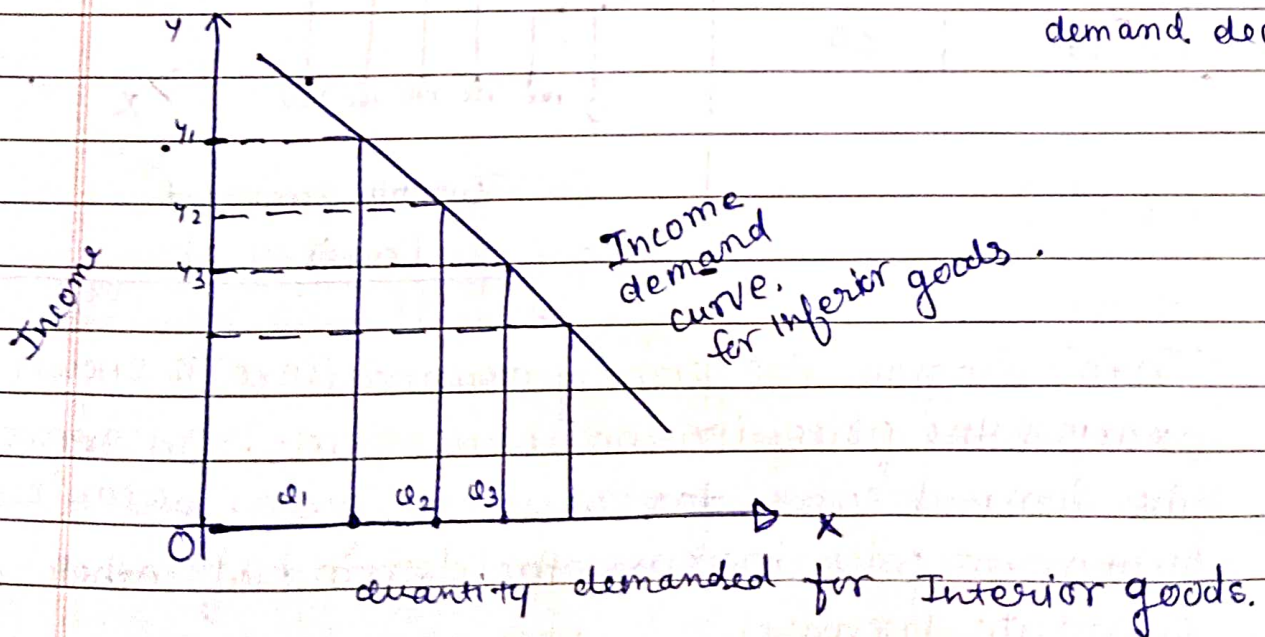


In this diagram income of consumer is shown on OY axis & demand for normal good 'N' on OX axis. Dd represents the income demand curve for normal goods as income increases demand also increases.

(ii) Inferior goods!- Those goods which are low quality and low priced are known as inferior goods. They have a negative relationship with income of consumer i.e. as the income increases their demand falls & vice-versa. This is the reason their income demand curve slopes downward from left to right as shown in following diagram.

Income of consumer.	Dd for inferior goods 'A'
10,000	100
15,000	80
20,000	60
25,000	40
30,000	20

"Income increase the demand decrease".

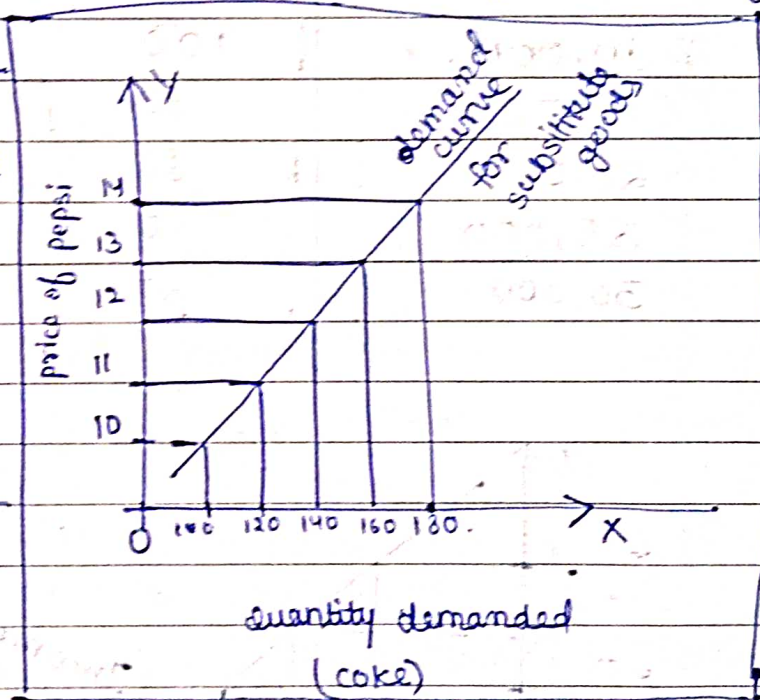


In this diagram demand for inferior good 'A' is shown on OX axis & income of consumer on OY axis. We can see as the income increases demand for these goods fall & vice-versa.

⇒ Cross demand : Demand of commodity that get affected by change in price of related goods. is known as cross demand. It can be explained in context of 2 kinds of goods. (i) substitute goods. (ii) complementary goods.

→ (i) substitute goods : goods which can be used in place of each other is known as substitute goods. when price of one increase demand for other increase. for eg : pepsi & coke they have positive relationship as explained through following Schedule & diagram

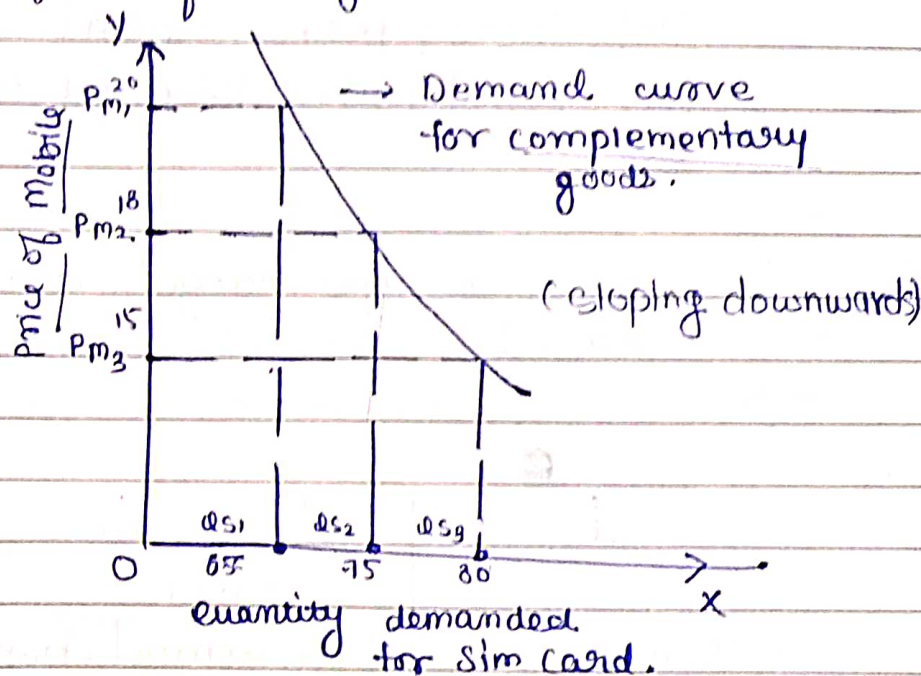
Price of Pepsi	Dd for coke
10	100
11	120
12	140
13	160
14	180



In this diagram the quantity demand (coke) is shown on x-axis & the price is shown on y-axis. Dd represents the demand curve for substitute goods. we can see that as the price increase the demand of other substitute increases.

- (ii) complementary goods : Those goods which cannot be used without each other are known as complementary goods. They have a negative relationship i.e. when price of one increases demand of other falls.
- for eg : phone & sim card. when price of phone increase demand for sim falls. ~~the~~ $\therefore$ their demand curve is sloping downward from left to right. / vice-versa.

Price of Mobile	Dd for Sim card.
10,000.	1,00,000
12,000	90,000
15,000	80,000
18,000	75,000
20,000	65,000



"This diagram shows that when the price of complementary goods increase ^{other eg:} eg mobile the demand for sim will decrease. ~~and~~ it have negative relation with each other."

"On this graph ^{quantity} the demand for quantity of sim card is shown on ox axis & price is shown on oy axis. we can see that as price of mobile increases the demand for sim decrease ^{or falls} ~~or vice versa~~. D-d represents the demand curve for complementary good, which is sloping downwards, showing negative relation b/w price & demand."

Q: What are the assumptions behind law of demand.

⇒ While explaining law of demand ~~we~~ use a phrase "keeping other things as constant" that means other than price all other factors that can affect demand are assumed to be constant and these are the assumptions:

- (i) price of related goods is constant.
- (ii) income of consumer is constant.
- (iii) taste & ~~preference~~ ^{preferences} is assumed to be constant.
- (iv) population is assumed to be constant.

Q: Differentiate b/w change in demand & change in quantity demanded.

⇒

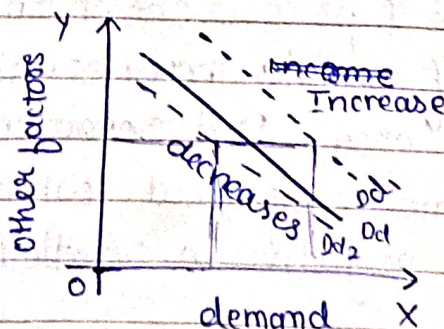
Basis

- Meaning

Change in demand

- when demand changes due to any factor affecting demand other than price it is change in demand.

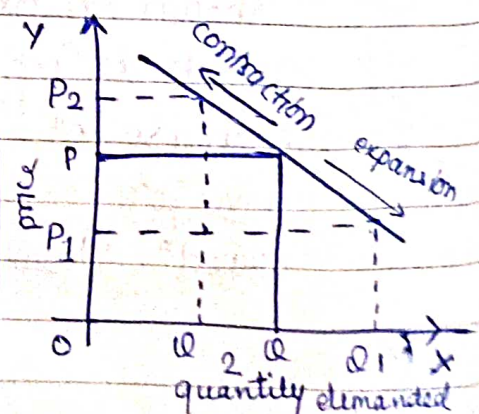
It is denoted by increase & decrease



change in quantity demanded (price)

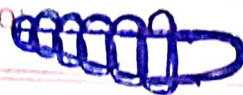
- when demand changes due to change in price keeping factors as constant it is change in quantity demanded.

It is denoted by expansion & contraction



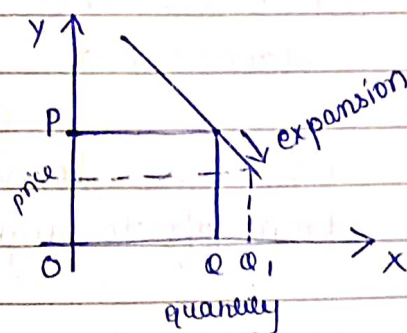
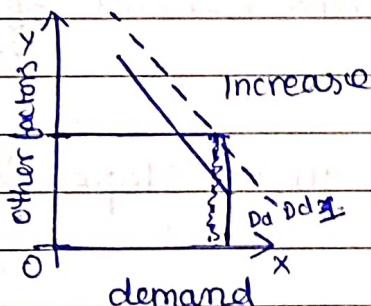
- change called as

- movement or shift in demand curve



Q: Differentiate b/w expansion of demand & increase in demand.

Basis	Increase	Expansion.
- Meaning.	Any positive change in demand due to favourable ^{change} in factors affecting demand	Favourable change in demand due to fall in price is known as expansion.
- Alternatively called as	It is also known as change in demand	It is also known as change in quantity demanded.
- Shift or change in movement in demand curve	There is a rightward shift in the demand curve.	There is rightward movement along demand.



Q: Differentiate b/w contraction & decrease in demand.

Basis	Decrease.	Contraction.
- Meaning	Any negative change in demand due to unfavourable changes in factors affecting demand	Favourable change in demand due to increase in price is known as contraction.

- Alternatively called as.

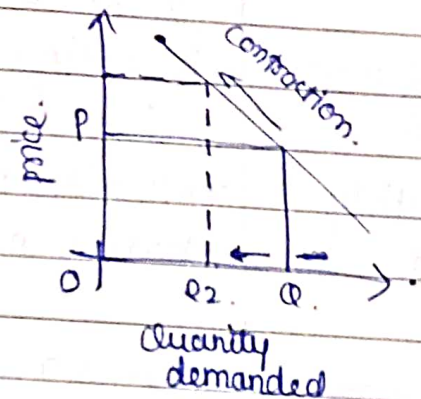
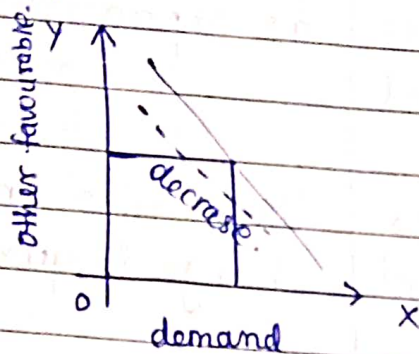
It is also known as change in demand.

It is also known as change in quantity demanded

- Shift oblig / movement in demand curve.

There is a leftward shift in demand curve.

There is leftward movement along demand.



1.Q:

What are the reasons behind of law of demand?

OR.

Price $\downarrow$? Dd $\uparrow$

Why does demand curve slope downward from left to right.

Ans:-

Law of demand states the negative relations b/w price & demand the reason behind the same are as follows:-

- (1) Substitution effect $\rightarrow$ substitution means using one commodity in place of other when it become relatively cheaper. When price of a commodity fall its demand increases because of a fact that the product has become relatively cheaper than its substitution as compare to its substitute. foreg: when price of pepsi falls its demand increases not only because its price has

fallen but due to a fact that the a substitute Coke is available and its price has not changed.

(ii) Number of consumers :- when price of a product falls many new consumers who were not in a position to buy it earlier are now in position to buy the same. So, number of consumer increase & the demand increases.

eg: price of Nano.

(iii) Income effect :- refers to the effect on demand of a commodity due to change in real income of a consumer. i.e. purchasing power. when price of a commodity falls the purchasing power i.e. real income of consumer increases. As a result the demand for commodity increases.

price ↓ purchasing power ↑
"Real income"

eg: Cg. $\frac{20}{15} \downarrow \frac{5}{7} \uparrow$ - increase

(iv) Number of uses of commodity : At times a commodity has different uses to which it can be put to, incase of these kind of goods when price of commodity rises consumer decrease or restrict its no. of users due to which its demand falls & vice-versa.

eg: electricity. Price ↑ No. of users ↓, pay ↓

(v) Law of diminishing marginal utility: This law states that when a consumer keep on consuming more & more units of a commodity the utility which he derives from the next consumption keeps on diminishing i.e. why he is willing to pay lesser for next unit of commodity or in other words he will buy more units only when it is available at cheaper price.

eg: Tummy
rat.

Q: what are the exceptions of law of demand?

⇒ ~~Explain~~ Following are the exceptions of law of demand:

- (i) High priced & ~~pret~~ prestigious : There are certain goods which are demanded to be used as status symbol for eg: luxury cars, diamonds etc. They are demanded for sake of prestige so the demand is affected by change in price in fact higher the price higher is demand for such goods.
eg → I-Phone
- (ii) Fear of shortage : If consumer expect a shortage of goods in near goods future they will start buying more & more of that goods even if the prices are rising for eg. = during corona period people started buying more & more of oxygen cylinder more & more even at higher price.
- (iii) Ignorance : At times consumer buy costly products ignoring there price ~~can~~ currently prevailing in the market, they are not aware about increase or decrease in ^{there} ~~their~~ prices.
- (iv) Necessity goods : Goods which are necessary for life are demanded ~~irre~~ irrespective of change in there price. for eg : salt, sugar, water are demanded even at higher prices.

- (v) Impossibility to postpone demand: At times demand of certain goods which cannot be postp. are demanded even at higher price. for eg: demand for medicines, medical equipment.

25 July 2022

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Ch - Introduction to micro economics

① What do you mean by economics?

→ Economics is a science that deals with the way that a society chooses to use its limited resources having alternative uses to produce goods & services to satisfy unlimited wants. In other words economics is all about making choices in the presence of scarcity. It studies human behaviour as a relationship b/w resources & end results.

Imp // ② What do you mean by economic problem?

→ Economic problem is a problem of choice involving limited resources, unlimited wants & resources having alternative uses. So, reasons for economic problem are:

- (i) Scarcity of resources: The resource in economy are limited like land, oil, water etc. ∴, economy cannot produce all what it wants
- (ii) Alternative Uses: Resources are not only scarce by they have alternative uses to which they can be put to foreg: a land can be used for various purposes like agriculture, school, hospital, mall etc. The problem is to chose the use to which it can put to.
- (iii) Unlimited wants: Human wants are unlimited & they can never to fully satisfied as soon as one want is satisfied the another one emerges.



and out of unlimited
~~in~~ all wants cannot be fully satisfied.

imp/ (3) what are the central problems of an economy.

→ Central problems are the question that arise due to scarcity of resources these problem ~~is~~ ~~included~~ include

- (i) what to produce?
- (ii) How to produce?
- (iii) ~~From~~ ^{For} whom to produce?

(i) What to produce? which product
in which quant...

→ This problem is related to selection of goods & services to be produced and quantity to be produce of each commodity as we know every economy has limited resources so it cannot produce all goods & services that means if it decide to produce more of one commodity it will be able to produce less of another
for eg ⇒ on a piece of land if rice & wheat both can be produce we have to decide wnt quantity of each to be produced.

(-ii-) How to produce? labour intensive
capital intensive "technology" technique

→ This problem is related to selection of technique to be used for production as there are two techniques labour intensive & capital intensive one uses more of labour & another uses more of technology so economy has to decide which technique to be used for production

for rich
for poor

-(iii)- For whom to produce?

→ This problem refers to selection of class of people for whom goods are to be produced i.e. whether should we produce more for rich or for poor, we should produce more consumer goods or producer goods. Since economy cannot produce for all section of society it has to make a choice.

④ What do you mean by micro & macro economics?

~~Differentiate~~ ^{Differentiate} b/w the two.
Differentiate.

→

"single"

* Microeconomics: The term micro has been derived from a greek word mikros which means small and microeconomics is that part of economic theory that studies the behaviour of individual units of an economy like individual output, demand, supply etc.

"whole world"

* Macroeconomics: The term macro has been derived from a greek word makros which means large so macroeconomics is that part of economic theory which studies the behaviour of aggregates of an economy like national income, national output, employment level etc.

Basis Microeconomics

1) meaning: It is that part of economic theory that studies the behaviour of individual unit.

2) Tools: Demand & supply.

3) basic object: Main objective is to determine the price.

4) Aggregation: It involves limited degree of aggregation.
(on total)

5) other name: It is also known as price theory.

6) eg.: Individual income, demand, supply

Macroeconomics

It is that part of economic theory that studies the behaviour of aggregates of economy.

Aggregate demand & aggregate supply.

Main objective is to determine level of income & employment.

It involves high degree of aggregation.

It is also known as income & employment theory.

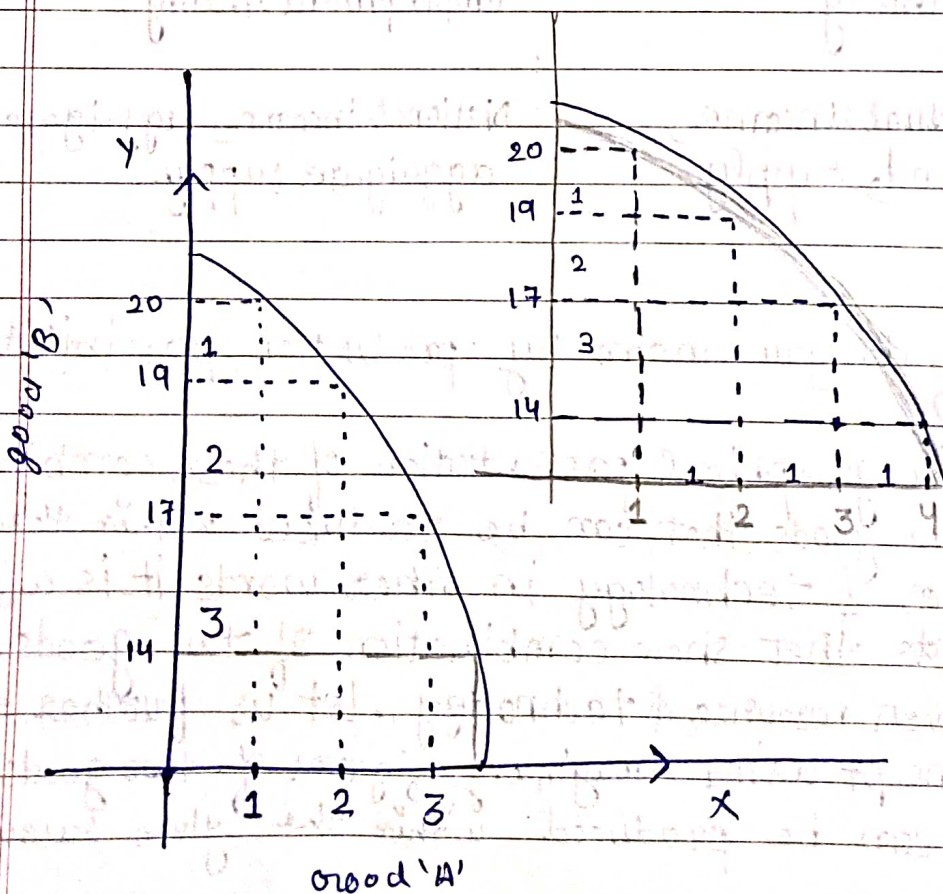
National income, aggregate demand, aggregate supply.

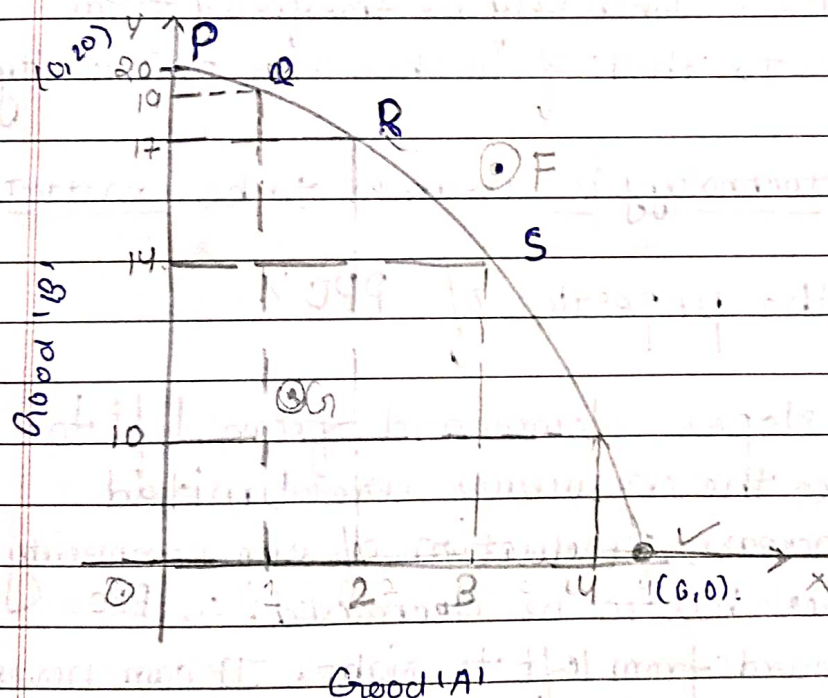
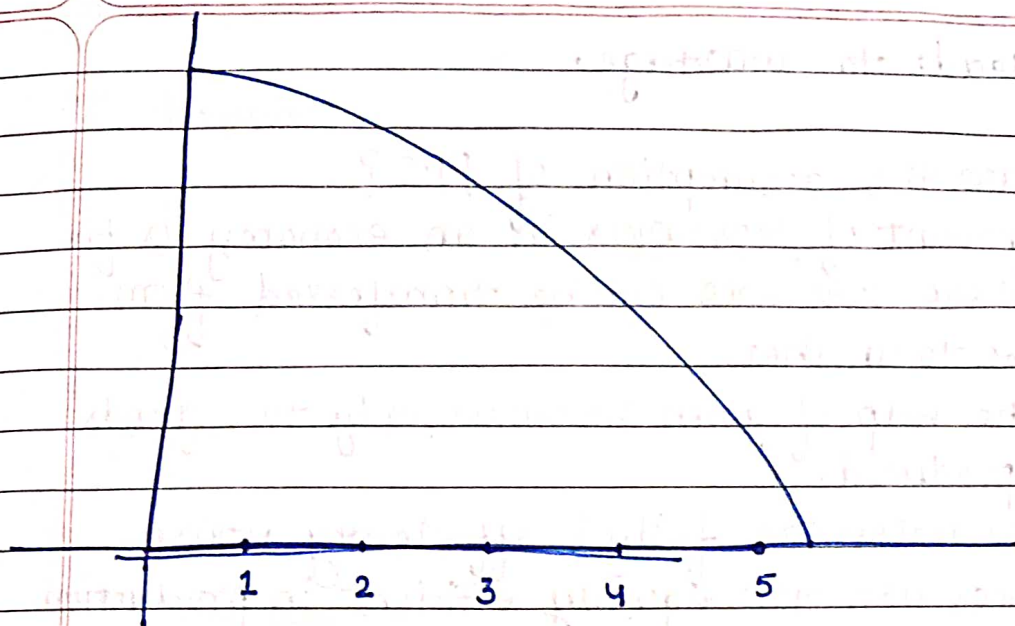
⑤ What do you mean by production possibility curve?

→ It is a graphical presentation of those combinations of two goods that can be produced within the given resources & technology in other words it is a locus of points that show combination of two goods ^{that can produce} within the given resource & technology. Let us further explain the concept using imaginary figures of two goods A & B that can be produced within the given resources.

~~Good~~

Combinations	Good A	Good B
P	0	20
Q	1	19
R	2	17
S	3	14
T	4	10
U	5	5
V	6	0





In this diagram quantity of good 'A' shown on OX axis & that on good 'B' on OY -axis. When we plot combination $PQRSTUV$ & join them we get a concave shaped production possibility curve slopping downward from left to right. A point to be noted is that any combination on PPC can be produced within the given resource but any point like F shows a combination that cannot be produced within given resources & a point like G can be produced within the resource.

but leads to wastage.

Q: What are the assumptions of PPC?

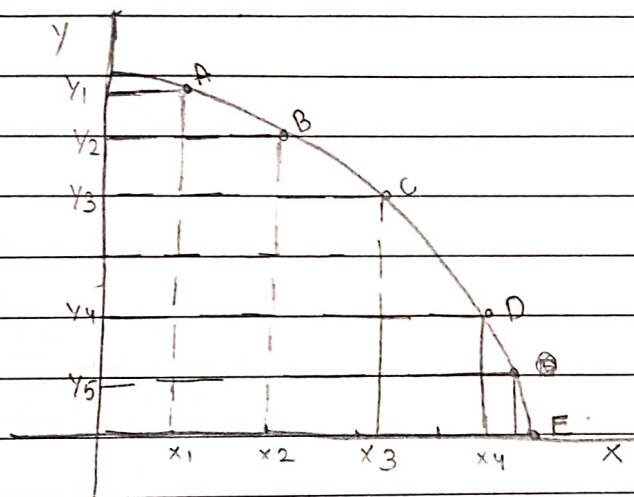
- (i) The amount of resources in an economy is fix but these resources can be transferred from one use to another.
- (ii) With the help of given resources only two goods can be produced.
- (iii) The resources are fully & efficiently utilise.
- (iv) Resources are not equally efficient in production of all products. $\therefore$, when they are transferred from production of one to that of another the productivity decrease.
- (v) The level of technology is assumed to be constant.

Q: What are the properties of PPC?

- (i) It always slopes downward from left to right. $\therefore$ Since the resources are limited when we increase production of one commodity that of another has to be decreased. $\therefore$, PPC slopes downward from left to right. It can never be sloping upward because for that production of both has to increase which is not possible.

- (ii) It is concave to the point of origin. $\therefore$ A PPC is concave to origin because of law of increasing marginal opportunity cost i.e. when ^{we} increase production of one commodity by one unit the sacrifice of other ^{is} keep on increasing. It is explained through following schedule & diagram.

Combinations	Good X	Good Y
1 A	0	20
2 B	1	18
3 C	2	14
4 D	3	8
5 E	4	0



"PPC ↓ from left to right"

"because increase MOC"
ie why it is concave.

In this diagram Good X is on ox axis & Good Y on oy plotting the combination of good X & Y we get concave S-shape PPC sloping downward from left to right. one thing we can observe that Good X is increasing constanting with one unit each time $\therefore$ the difference of x^1 & x^2 & x^2 & x^3 are same whereas the difference of y^2 & y^3 is more than y^1 & y^2 & y^3 & y^4 is

$$y_2 y_3 > y_1 y_2 \quad \& \quad y_3 y_4 > y_2 y_3.$$

Due to this the PPC is a concave shaped curve

1 Aug. 22
Monday

chapter = 1

Statistics

"Introduction to Statistics"

Q What do you mean by economics & what are different economical activities.

⇒ Economics is a science that studies the behaviour of human as a relationship b/w end results & scarce resources that have alternative uses.

OR

Economics is a study of how people & society choose to employ scarce resources that could be used to produce various commodities and distribute them for consumption for present & future.

Economic activities : An economic activity means that activity which is related to use of scarce resources & satisfaction of human wants. These activities are generally performed to earn money for livelihood. The ^{kinds} ~~eg~~ are:

(i) production ⇒ It is concerned with increasing utility of goods & services. for eg ⇒ producing furniture from wood

(ii) Consumption ⇒ It is concerned with use of goods & services for direct satisfaction of human wants. like using furniture, consuming milk etc.

(iii) Investment ⇒ It is concerned with production of capital goods for increasing production ~~same~~ capacity. for eg : production of plant & machinery for ~~more~~ factory

utility

"buying & selling"
 ↓
 "land, labour, capital, entrepreneur"
 ↓
 "rent, wages, interest, profit"

(iv) Exchange: It is concerned with purchase & sale of commodity includes mainly fixation of price of commodity.

(v) Distribution: It is concerned with determination of price of factor of production since the income has to be distributed in terms of rents, interest, wages etc.

Q

what are non-economic activities.

⇒ Those activities which have no ^{economic} aspect & are not concerned with money or wealth are known as non-economic activities.

• Some ex-eg ⇒ ~~Social activities (cultural activities, technical gathering to re-gather)~~

- Some eg :- social activities (cultural activities, picnic

- Religious activities (going to temple, ~~for~~ attending prayer)
- Political activities & activities performed by political parties including various campaigns for social wellfare.
- Charitable activities (blood donation camps, free medical camps etc).
- Parental activities (love, affection, providing food educ.

Q

Explain economics is a science.

- To understand economics as a science first we need to classify science into natural science & social science.
- Natural Science includes physics, chemistry & bio where cause & effect relationship is determined

through experiments.

- Economics here can be understood as social science because it is a systematic study of economic activities of ~~the~~ human being.
- Following are the points given in favour of economics as a science:

(i) Systematic study

⇒ It is a study of human behaviour where unlimited wants are satisfied through limited resource. The study of economics is systematically divided into production, consumption, exchange etc.

(ii) Scientific law

⇒ As the laws of science are universally applicable, law of economics are also applicable in same way. for eg:- Law of demand or law of supply.

(iii) Cause and effect relationship

⇒ As like any science economics also establish cause & effect relationship b/w different variables like in law of demand relation b/w price & demand is established.

(iv)

~~Ver~~ verification of Law: Like any other science economic laws can also be verified through investigation. for eg: one can easily check the response of demand on change in price of product.

Conclusion:- On the basis of above arguments we can say that economics is a science not exactly natural but social science that studies economic problems.

Explain economic as a normative ~~scientific~~ science & positive science.

⇒ Positive Science : A positive science is the one which makes real description of an activity. It only answers what is or what was. It does not suggest about the facts. In positive economics we study human decisions as facts which can be verified with actual data.

- eg: India is the second largest populated country in the world, prices have been rising in India, minimal wage law increase unemployment in country.

⇒ Economics as Normative Science :

A normative science is the one that explain ought to be or what ought to have happened in other word ~~now~~ normative science deals with how the economic problems should be solved. This economics makes an assessment of an activity & offers suggestions for them.

- For eg ⇒ Free education should be given to the poor, rich people should be taxed more, India should spend more money on defence.

Q

Explain economics as an art.

Ans:

Art is the practical application of knowledge for achieving some definite aim. Art helps in solution of practical problems it involves theoretical knowledge of any particular discipline & particular application of the same. Economics also include theoretical framework as a discipline & application of the same practically to solve various problems. As we all know that there is oil shortage in India this information is given by economics as positive science, govt using various techniques to remove the shortage of oil This is economics as normative science. Now, govt follows the path of oil planning as far as consumption is concerned this is economics as an art where govt wants to achieve some specific objective.

Q:

Who is the father of economics?

⇒

Adam Smith is regarded as father of economics.

Q:

Name the book written by Adam Smith.

⇒

An enquiry into the nature & causes of wealth of nations published in 1776.Q

Statistics

Q: What do you mean by statistics?

Ans ⇒ Statistics can be of two types: - (i) Plural & Singular Sense
 Statistics is the aggregate of facts
 * Plural Sense: - affected by multiple cause it is numerically expressed and estimated according to ^{reasonable} these facts are systematically collected for a pre-determined purpose.

: Main-Points about Statistics: -

- It is aggregate of facts.
- Affected by multiple causes.
- It is numerically expressed
- Estimated according to reasonable standard of accuracy
- Collected in a systematic manner.
- Collected for a pre-determined purpose.

* Singular Sense:

Statistics is a science of collection, presentation, analysis & interpretation of data. Let us understand these points: ~~let~~

- Collection of data: Getting data from various sources primary & secondary is known as collection of data here data should be collected with utmost care so that we get reliable data.
- Organisation: The data so collected need to be organised by investigator through editing, classifying data.
- Presentation of data: The collected & organised data should be presented in some systematic manner to make analysis easier. The methods include ^{graphs} ~~average~~, ^{diagrams} ~~dispersion~~ etc.

Interp

- Analyses of data: The presented data needs to be analysed through various method like averages, dispersion, correlation etc.

- Interpretation of data: It means drawing conclusion on the basis of ~~anno~~ analysed data so that certain decision can be taken.

* Ch $\Rightarrow$ 2Page No: chapter $\Rightarrow$ 2Consumer Equilibrium.

① What do mean by utility?

Utility is the power of any product that can satisfy human wants. It ~~can~~ can be measured in terms of utils. In other words the amount of satisfaction a product gives on consumption is known as utility.

② What do you mean by ~~mao~~ marginal utility?

It is ~~the~~ addition to the total utility by consuming one more unit of commodity is known as marginal utility. foreg $\Rightarrow$ A consumer consuming apples getting 100 utils from 10 apples he consumes 11 & total utility increases to 115. The 15 utils is known as marginal utility. So ~~the~~

$$MU = \frac{\Delta TU}{\Delta N} \quad \text{or} \quad MU = TU_N - TU_{N-1}$$

ΔN
Change.

$TU \Rightarrow$ Total utility $N \Rightarrow$ No. of units consumed
 $MU =$ Marginal utility.

③ What is Total Utility?

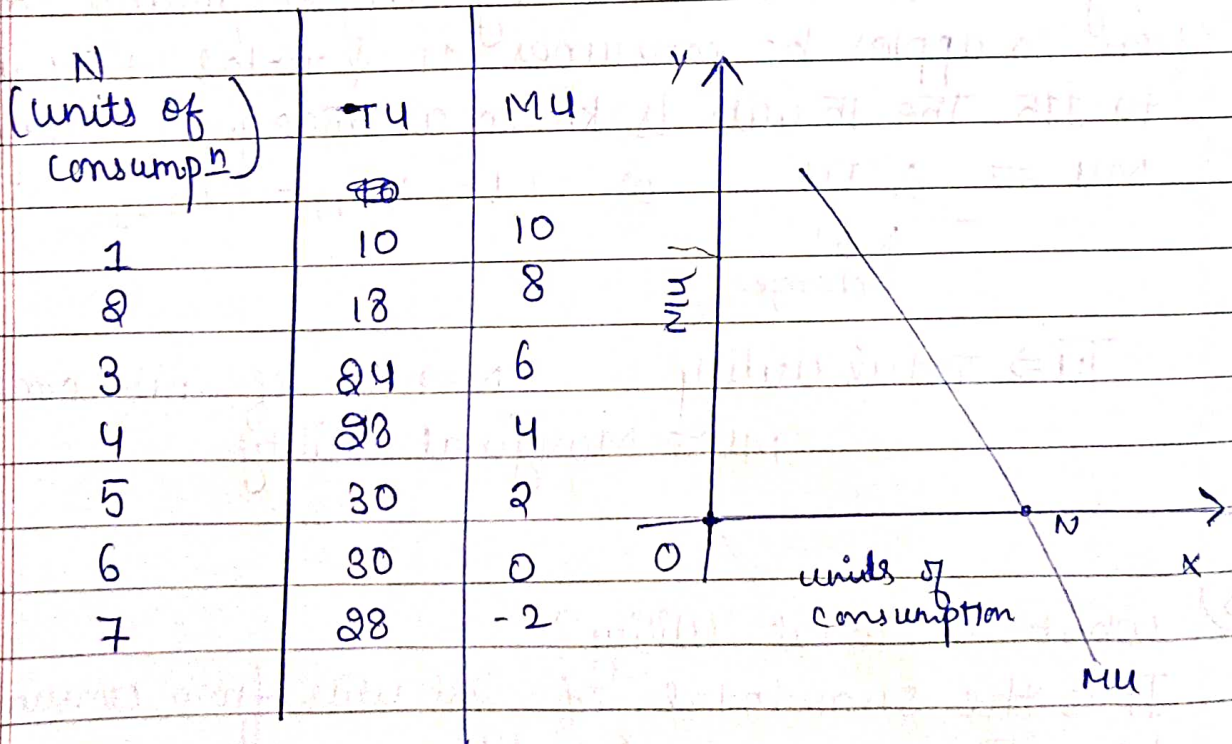
It is the sum total of all utils from consumption of ~~the~~ certain number of ~~utils~~ units by a consumer. It can be calculated by adding all the marginal ~~utils~~ utility.

foreg: A consumer consumes one ice-cream & gets 10 utils he consumes another & gets 8 utils. The Total utility from both ice-cream is 18 ~~utils~~ ~~utils~~ utils.

④ what is law of diminishing marginal utility? (DMU).

Ans $\Rightarrow$ This law states that when a consumer keeps on consuming more and more units of a commodity the utility which he derives from next consumption keeps on diminishing.

- for eg: A consumer consumes first ice cream & get 10 utils as satisfaction & at the time of second ice cream his want is satisfied to some extent so he gets lesser satisfaction say 8 utils. this goes on & marginal utility ~~yes~~ reaches even at negative level. This explain through following schedule & diagram.



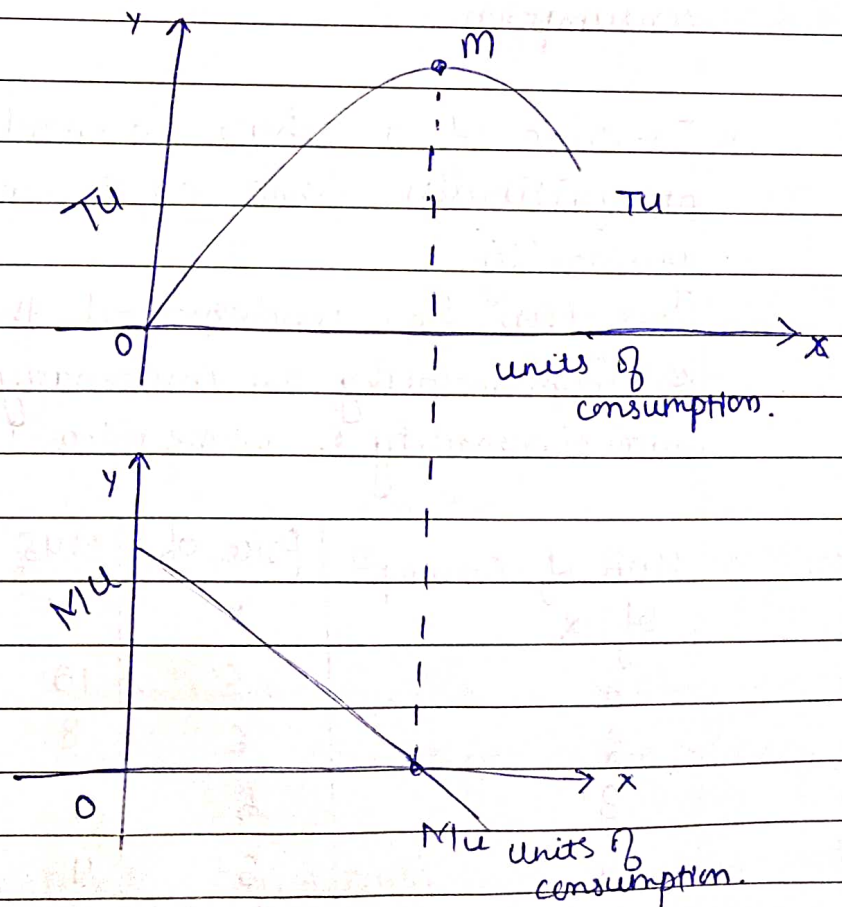
Q Explain the relationship b/w total utility & marginal utility.

i) TU ^{Total utility}: It is the sum total of all utility generated from consumption of all possible units of commodity. In other words it is the total satisfaction from consumption of certain no. of units.

MU ^{Marginal utility}: It is addition to total utility due to change in units of consumption by one unit. Their relationship can be understood through following schedule & diagram:

ii)

N	Tu	MU
1	10	10
2	18	8
3	24	6
4	28	4
5	30	2
6	30	0
7	28	-2



iii)

In this diagram Tu & Mu represent total utility & marginal utility curves. Initially Tu increases & Mu falls but remain positive (i) when Tu reaches at its maximum as shown by point M in the diagram

- (iii) MU become 0 & it intersects point T on OX axis when TU starts falling beyond point M. MU become negative as we can see on 7th unit of consumption TU falls to 28 & MU becomes -2.
- (iv) MU can be derived from TU as $MU = \frac{\Delta TU}{\Delta N}$

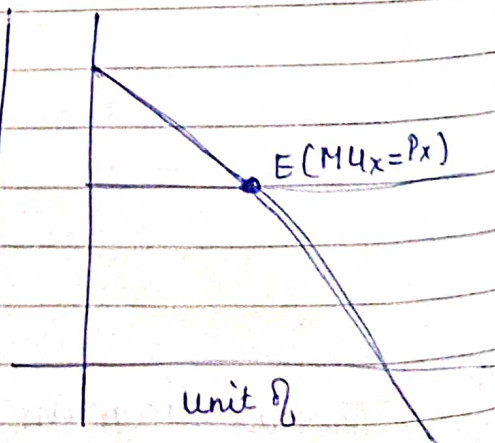
Q Explains consumer equilibrium using utility analysis for a single commodity.

Ans:- • Equilibrium means a state of balance of position of no state change. A consumer is said to be at equilibrium level when he gets maximum satisfaction within his limited income & has no intention to change his or her consumption

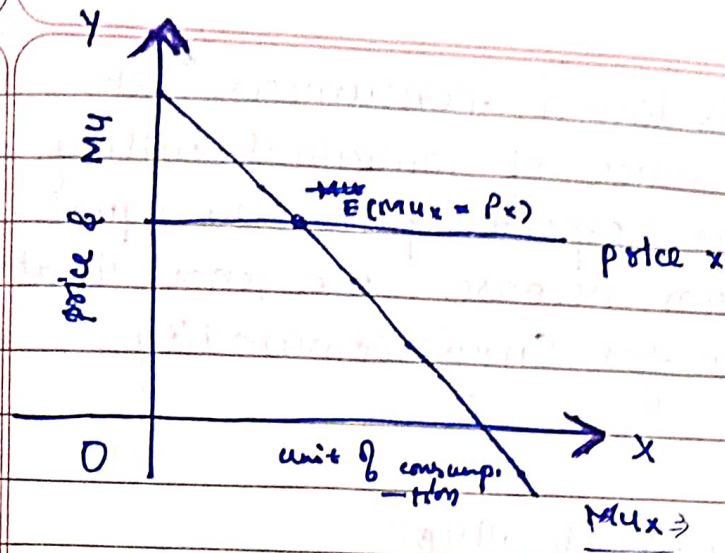
- If case of a single commodity a consumer reaches at equilibrium when MU is equal to price paid for that commodity.

This can be understood through following schedule or diagram taking an imaginary illustration or eg of commodity X whose price is fixed at ₹6 per unit.

Unit of Consump ⁿ of X	Price of 'X'	MU of 'X'
1	6	10
2	6	8
3	6	6
4	6	4
5	6	2
6	6	0



Ans. =



In this diagram price line is represented by straight line parallel to x axis since the price is constant for good x . MU_x represents the marginal utility curve it is sloping downward from left to right because of operation of law of diminishing marginal utility. E is the point of equilibrium where $MU_x = P_x$ i.e. consumer is getting satisfaction equal to price paid for product.

In the above approach utility of money is not considered, since that can also affect the consumer equilibrium state as utility of money is different for different people the condition of consumer equilibrium changes to

$$\left(\frac{MU_x}{P_x} = MU_M \right) \rightarrow \text{single commodity.}$$

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = MU_M$$

Q Explain consumer equilibrium using utility analyses in case of multiple commodity.

Ans. $\Rightarrow$ In real life a consumer consumes multiple commodities in such a situation law of equi marginal utility helps in determination of consumer's equilibrium for multiple commodity to simplify we are taking a case of two commodities only a & b

According to this law a consumer gets maximum satisfaction when ratios of marginal utility of two commodities & their respective prices are equal. And MU falls as consumption increases. We know that equilibrium condition for single commodity

$$\frac{MU_A}{P_A} = MU_M \text{ \& } \frac{MU_B}{P_B}$$

both of them we get condition of two commodities i.e. $\frac{MU_A}{P_A} = \frac{MU_B}{P_B} \Rightarrow MU_M$

- The second condition for consumer equilibrium is that MU falls with further increase in consumption

Q - This equilibrium condition can further be explained with the help of following schedule of two commodities A & B.

Units	MU _A	MU _B
1	20	15
2	16	12
3	14	10
4	10	7
5	8	5

$$\frac{MU_A}{P_A} = \frac{10}{1}$$

$$MU_B = \frac{10}{1}$$

- As per this schedule consumer is said to be at equilibrium when consumes 4 units of A & 3 units of B assuming that the price of A & B is ₹ 1 per unit each.

Q: What will happen if $\frac{MUA}{P_A}$ is not equal to $\frac{MUB}{P_B}$.

⇒ In this condition there are two possibilities.

Case I (i-) $\frac{MUA}{P_A} > \frac{MUB}{P_B}$
↳ greater than

In this case consumer is getting more marginal utility per rupee in case of good A as compared to good B. Here he will buy more of A & less of B & this will continue till he reaches at the equilibrium state i.e. $\frac{MUA}{P_A} = \frac{MUB}{P_B}$.

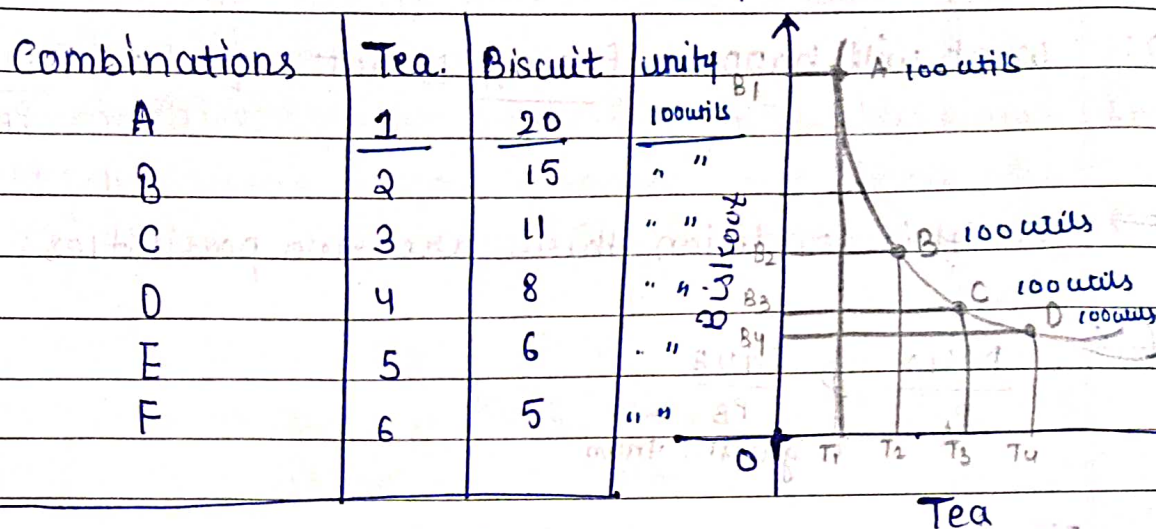
Case II (ii-) $\frac{MUA}{P_A} < \frac{MUB}{P_B}$

In this case consumer is getting more marginal utility per rupee in case of good B as compared to good A. ∴ he will buy more of B & less of A & will continue this till he reaches at the equilibrium state

$$\text{i.e. } \frac{MUA}{P_A} = \frac{MUB}{P_B}$$

Q: Explain the term indifference curve.

Ans. ⇒ An indifference curve is locus points that show combination of two goods in such a way that all combination give similar level of satisfaction to the consumer. To explain it further let us take any example of two goods tea & biscuit & understand the concept through following diagram.



In this diagram quantity of Tea is shown on ox & that of biscuit on oy axis. IC represents a sloping downward indifference curve showing similar level of utility at all its point i.e 100 utils on A, B, C or D. $\therefore$ A consumer is indifferent in choosing any of these combination hence the curve is known as an indifference curve.

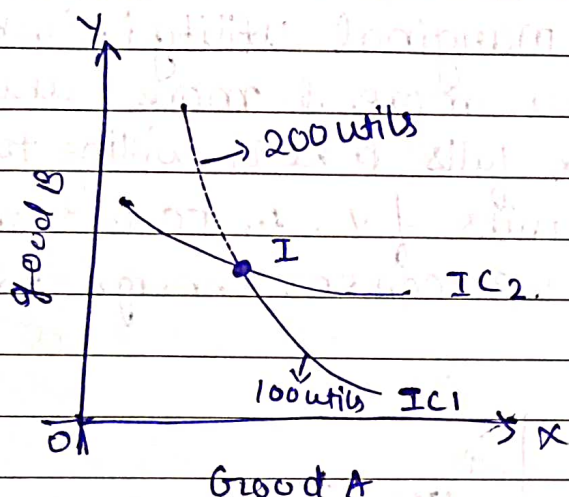
Q what are the different property of an indifference curve.

Ans $\Rightarrow$ Properties of Indifference curve :-

- They always slope downwards from left to right.
- $\rightarrow$ An indifference curve slopes downward from left to right because when consumer increases the consumption of one commodity he decreases that of another this happens to maintain the utility at same level if we think otherwise & assume that he increases consumption for both the utility will not remain same and indifference curve will

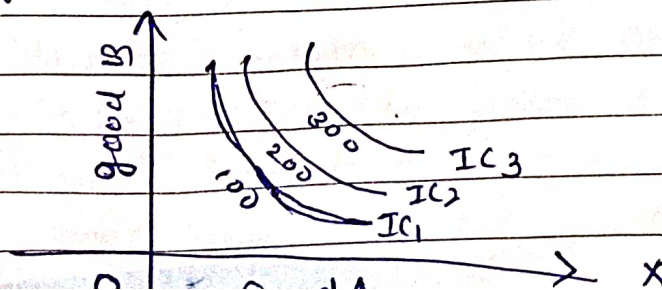
lose its meaning.

- They never intersect each other &
- An indifference curve shows similar level of utility at all its points. In case two curves intersect each other utility will be contradictory at the point of intersection as we can see in the diagram



IC one represent 100 utils & IC II represents 200 utils now point I is a contradictory point. In terms of utility and this kind of point can never exist.

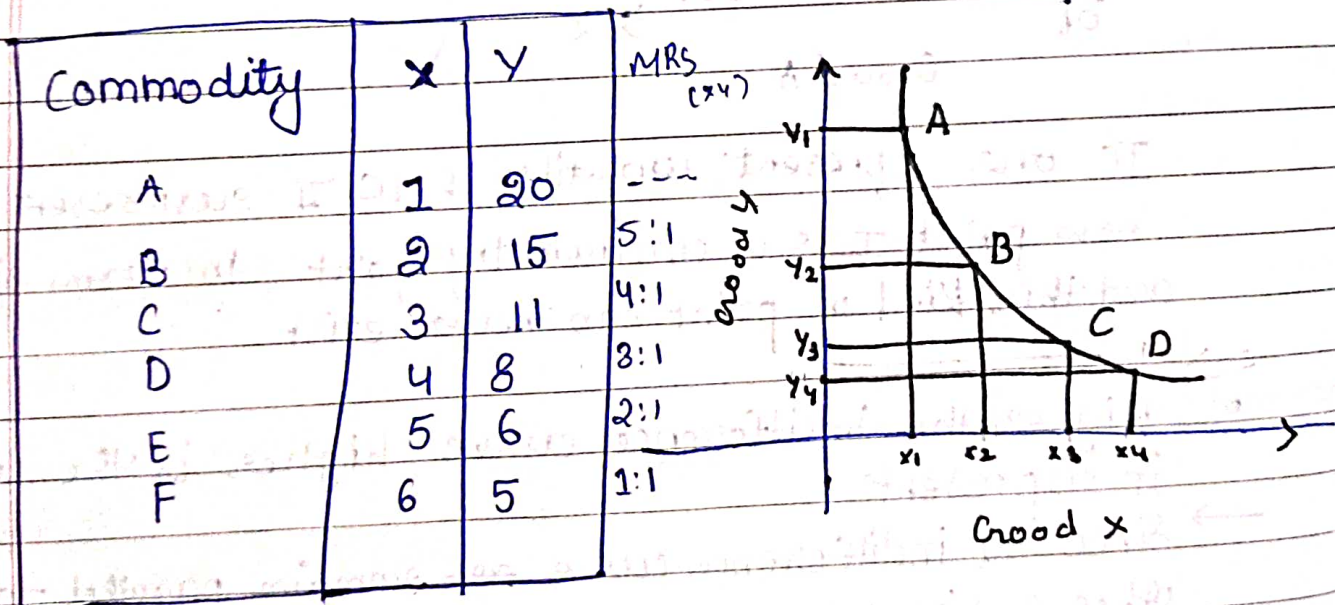
- Higher the indifference curve higher is the utility it represents.
- Since all indifference curves remain parallel to each other so higher the indifference curve higher the utility it represents. Since at high indifference curve quantity of both the goods shall comparatively be higher. As we can see in the diagram IC1, IC2, IC3 make a family of IC where higher IC represents higher utility level.



Indifference map
This family of IC that make the one curve

• They are always convex to the point of origin

→ An indifference curve is always convex to the point of origin because of application of law of diminishing marginal rate of substitution of x & y ($MRS_{(x,y)}$). This $MRS_{(x,y)}$ declines because of law of diminishing marginal utility i.e. when a consumer consumes more & more units of x the utility for x falls & he is willing to sacrifice less & less units of y . $\therefore$ IC is convex to the point of origin we can see through following schedule & diagram.



In this diagram IC represents the indifference curve i.e. convex to point of origin as we can see the operation of diminishing MRS the distance $x_1 x_2$ & $x_2 x_3$ is same whereas $y_1 y_2$ & is greater than $y_2 y_3$ & so on.

Q. what the assumptions of an indifference curve?

⇒ (i) Two commodity : It is assumed that consumer has limited amount of money whole of which is spent on two commodities only having given prices.

(ii) Non satiety : ~~but~~ we assume that our consumer has not reach the point of saturation he always prefer more of ~~two~~ ^{both the} goods and wants to move at a higher indifference curve.

(iii) Ordinal utility : under ordinal utility it is assumed that consumer can rank his prefers on the basis of satisfaction from different bundle of goods.

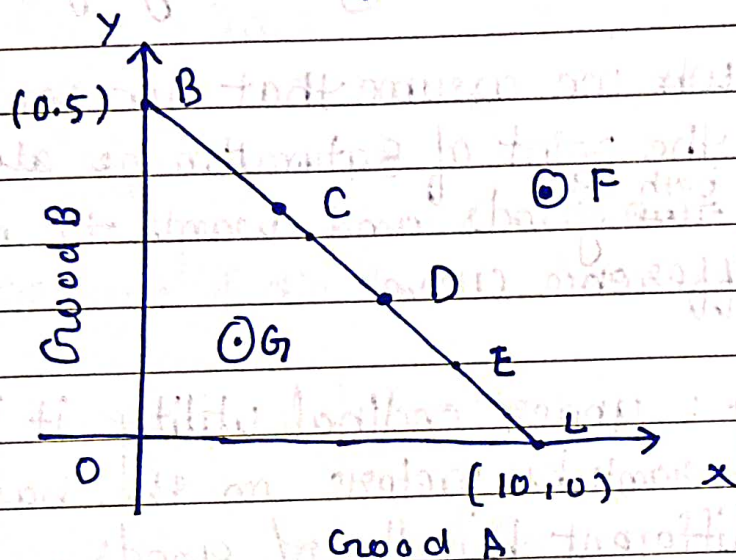
(iv) Diminishing Marginal Rate of Substitution
we assume that MRS ~~diminish~~ diminishes and due to the assumption IC is convex to the point origin.

(v) Rational consumer → The consumer is assumed to be a rational one i.e he always aims at maximising his satisfaction.

Q. what is a budget line?

A budget line is a locus of point that show combination of two goods in such a way that all the combinations can be acquired within the given budget. For instance our consumer has a total budget of ₹ 100 within which he has to ~~cons~~ consume two goods A & B. A is available

at 10 per unit & B is available at 20 per unit. Maximum of A he can buy is 10^{units} & that of B is 5 units. When we plot these two extreme on a graph & joined them with a straight line. We get a ~~box~~ budget line showing all combination of goods A & B that consumer can buy within budget of ₹ 100. As shown in ~~the~~ diag.



In this diagram combinations like BCD E L can be acquired within the given budget but the combination like F is unattainable within the budget & combination like G can be acquired in the budget but wastes the budget.

The slope of budget line is calculated by ratio of prices like in this case it will be $\frac{P_A}{P_B}$. It is also known as marginal Rate of exchange $\frac{P_B}{P_A}$ (MRE).

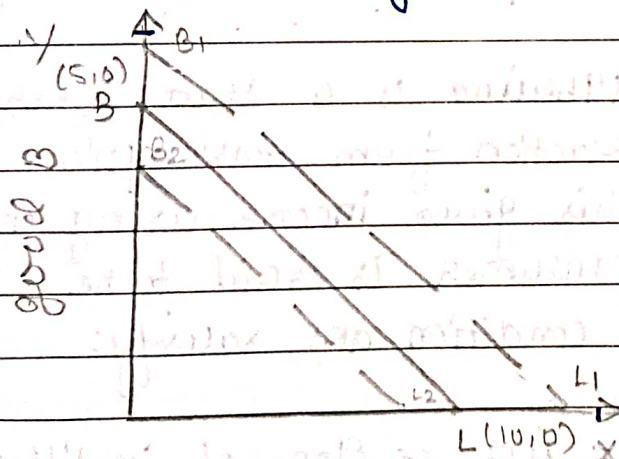


Q what are the possible cases of shift of budget line.

A Budget line can shift in case of

- (i) Change in Income of consumer.
- (ii) change in Price of good.

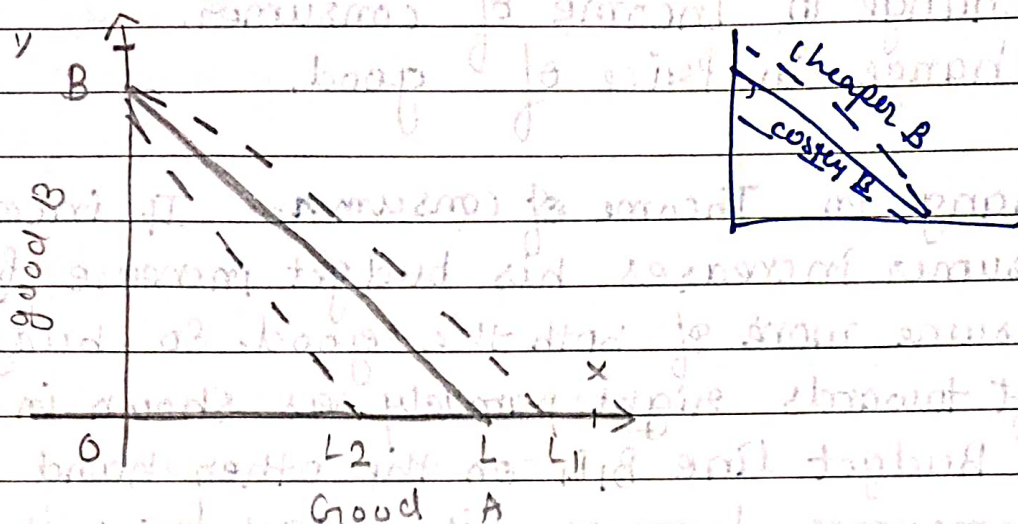
Change in Income of consumer = If income of consumer increases his budget increase & he can consume more of both the good. So, budget line shift towards right parallelly as shown in diagram. by Budget line B_1L_1 on the other hand if income of consumer decreases his budget for both the goods decrease & budget line shift to left as shown by B_2L_2 in the ~~di~~ diagram.



Change / Effect of change in price

If price of any of the goods change the budget line change for instance price of good A decreases consumer can consume more of good A so the

budget will shift towards right on ox axis on the other hand if price of good A increase the consumer would be ~~able to~~ able to ~~available~~ buy less of good A and budget line will shift towards left on ox axis as shown by BL_2 in the diagram.



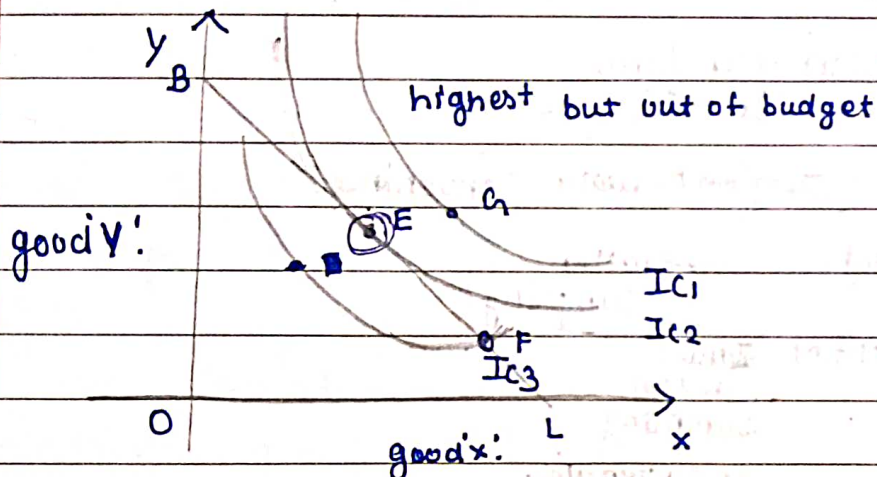
Q. Explain consumers equilibrium using indifference curve analysis

→ A consumer equilibrium is a state where consumer get maximum satisfaction from consumption of goods which ~~is~~ within his given income. using indifference curve analysis consumer is said to be at equilibrium when following condition are satisfy:

1. Slope of budget line = Slope of indifference curve
i.e. $\left[\frac{P_x}{P_y} = MRS_{xy} \right]$. If $\left[MRS_{xy} > \frac{P_x}{P_y} \right]$ it means that to obtain one more unit of x consumer is willing to sacrifice more of y as compare to what is required in market as a result MRS falls & continue to fall till it becomes equal to $\frac{P_x}{P_y}$ on the other hand if MRS_{xy} is less $\frac{P_x}{P_y}$. It means $\frac{P_x}{P_y}$ that to obtain

one more unit of x consumer is willing to sacrifice less of y as compare to what is require in market.
"Marginal Rate Substitution"

(ii) MRS continue fall: This condition means that MRS should be falling at the point of equilibrium i.e IC should be convex to the point of origin. This equilibrium is shown through falling diagram



In this diagram BL represent the Budget line & an indifference map is shown through IC_1 , IC_2 , IC_3 where IC_1 shows the highest level of satisfaction where consumer wants to have a combination but it is beyond his budget. On the other hand a combination like F on IC_3 is within his budget but give lesser amount of satisfaction. So, our consumer gets the maximum possible satisfaction at point E where IC_2 is tangent to budget line BL & both the conditions are also satisfied. So, E is the consumers equilibrium using Indifference Curve analyses.

"Statistics"

Page No. chapter. → 3
collection of data.

26 Aug. 2022

Friday

Chapter ⇒ 3.

Collection of Data.

- Statistical Survey

- Sampling

Census.

- Random Sampling.

- Non-random sampling

- Judgement - Quota - Convenience.

~~Unrestricted~~

- Restricted

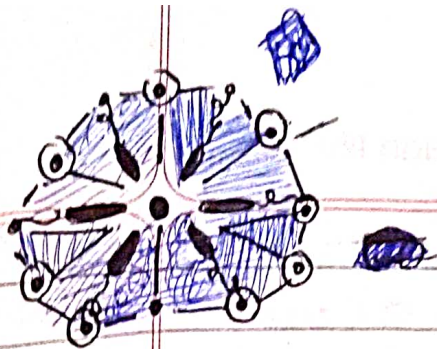
→ Cluster sampling

- Table of Random No

- Lottery

- Stratified

- Quasi random sampling or systematic.



Q: what do you mean by classification of data?

Ans

⇒ It is the process of grouping & arranging the data according to their identity, features & similarities
foreg: students in school can be classified on the basis of age, gender or on the basis of class. where 1 particular group generally has similar type of data

Q: what are the objectives of classification of data?

Ans



- (i) To present the facts in the simple form.
- (ii) To clearly explain similarities & dissimilarities
- (iii) To facilitate comparison
- (iv) To bring out relationship ~~change~~.
- (v) To prepare a basis for tabulation.

Q: why do you mean by a statistical series & what are its different type.

Ans ⇒ A series is logical arrangement of data in a systematic order. A statistical series is prepared to present the collected & classified data in a ~~propo~~ ~~property~~ properly arranged way.

A series can be measurably classified into 2 categories:

(i) On the basis of ~~contu~~ construction.

~ Individual series ~ discrete series ~ continuous series.

(ii) On the basis of general character.

~ Time series ~ Spatial series ~ Condition series.

On the basis of construction:

- (i) Individual Series $\Rightarrow$ when data is not much similar & it is comparatively lesser it is arranged in an individual series. for eg: marks of 6 students in 6 students in a class can be written as.

Mark of Students	
Name	Marks.
A	10
B	12
C	8
D	15
E	7
F	6

$\rightarrow$ Individual

- (ii) Discrete Series. $\rightarrow$ when size of data is large & there is similarity in data we prepare discrete series. for eg: Marks of 30 students in a class is as follows.

Marks	Marks	Tally bars	no. of students/ Frequency
1, 5, 6, 7, 8, 10,	1		02
2, 10, 5, 6, 8, 12	2		02
13, 4, 5, 7, 8, 10.	4		02
10, 5, 6, 7, 13, 12.	5		04
2, 1, 7, 10, 12, 4.	6		03
	7		04
	8		03
	10		05
	12		03
	13		02

- Continuous series: When the data is huge with less similarities we can group the same in different classes to get a continuous series. for eg: prepare a continuous series from the following using 5 as C.I.

Marks of students :	Class of mark.	Tally Bars	frequency
7, 8, 9, 12, 15, 25	0-5	III	08
23, 19, 4, 2, 1, 5	5-10	II	07
10, 12, 13, 1, 3, 4	10-15		04
17, 19, 24, 21, 20, 18	15-20	I	06
3, 7, 6, 5, 4, 19	20-25		04
	25-30	I	01
			<u>30</u>

	Individual	Discrete	Continuous
Frequency	x	✓	✓
Classes	x	x	✓

Kinds of Continuous Series

Inclusive

Exclusive

- (i) Inclusive Series: It is the one in which both the limit lower & upper are included.

foreg:

Marks.	frequency
0-9	7
10-19	8
20-29	6
30-39	4
40-39	10

(11) Exclusive Series : A Series in which lower limit is included but upper limit is excluded.

for eg:

Marks	frequency
0-10	7
10-20	10
20-30	4
30-40	6
40-50	8

— Conversion of Inclusive Series into exclusive series

Step 1: Take the difference of Lower limit of a class and upper limit of ^{previous} ~~preceeding~~ class

Step 2: Divide the difference by 2.

Step 3: Deducted this amt from lower limits & add in upper limit.

Inclusive series	⇒ Exclusive series.
eg: 0-9	-0.5 to 9.5
10-19	9.5 - 19.5
20-29	19.5 - 29.5
30-39	29.5 - 39.5
40-49	39.5 - 49.5

Series with mid values.

Series with Mid values.

	f	Mid value.
0-10	7	5
10-20	3	15
20-30	5	25
30-40	4	35
40-50	2	45

$$\frac{0+10}{2} = \frac{10}{2} = 5$$

M.V.	f	deduct $\leftarrow$ added lower limit - upper limit.
15	7	10 - 20
25	2	20 - 30
35	5	30 - 40
45	4	40 - 50
55	10	50 - 60
65	11	60 - 70

$$\text{Differo. of two class} = \frac{25-15}{2} = \frac{10}{2} = 5$$

$$= \frac{10}{2} = 5$$

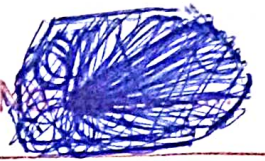
Convert the following ~~with~~ series into a normal Series with classes interval.

M.V.	frequency
2.5	6
7.5	7
12.5	8
17.5	4
22.5	5
27.5	3

$$\text{Differo. of two class} = \frac{7.5-2.5}{2} = \frac{5}{2} = 2.5$$

class Inte	freq
0 - 5	6
5 - 10	7
10 - 15	8
15 - 20	4
20 - 25	5
25 - 30	3

$$\frac{5}{2} = 2.5$$



Converting Normal Series a Less than or More than cumulative series.

~ Less than Series.

Step 1: Take upper limits of all classes.

Step 2: Add frequencies to get CF.

For eg: Convert the following series into a Less than cumulative

Marks	No. of students Frequency
0-10	7
10-20	2
20-30	9
30-40	5
40-50	4
50-60	3

less than

cf

[Lower = 0
upper = 10]

less than 10	7	(7)
less than 20	9	(7+2)
less than 30	18	(9+9)
less than 40	23	(18+5)
less than 50	27	(23+4)
less than 60	30	(27+3)



less than series

No.



Q:

0-20

20-40

40-60

60-80

80-100

f.

9

5

10

4

3

less than 20

less than 40

less than 60

less than 80

less than 100

f.

9

7

17

21

24

Ans



Converting Normal Series into More than & less than Cumulative series.

Step 1: Take lower limits of all classes

Step 2: Take the total of frequency in first class & deducted frequency one by one to get frequency of next class.

freq.	C.I	f.
	0-10	7
	10-20	2
	20-30	9
	30-40	5
	40-50	4
	50-60	3
		30.

More than 0

More than 10

More than 20

More than 30

More than 40

More than 50

30

$30 - 7 = 23$

$23 - 2 = 21$

$21 - 9 = 12$

$12 - 5 = 7$

$7 - 4 = 3$

freq.

More than 0

" " 10

" " 20

" " 30

" " 40

" " 50

30 - 7

$(30 - 7) = 23$

$(23 - 2) = 21$

$(21 - 9) = 12$

$(12 - 5) = 7$

$(7 - 4) = 3$

21
- 9
12

Q.

	f.	More than 20
0-20	2	90
20-40	5	60
40-60	10	80
60-80	4	100
80-100	3	
	24	

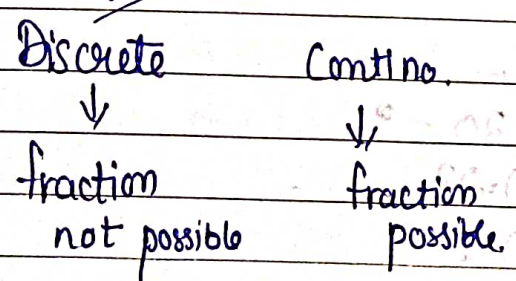
24
111
91

7
110
117
14
21
13
24

More than 0	24
" 20	24 - 2 = 22
" 40	22 - 5 = 17
" 60	17 - 10 = 7
" 80	7 - 4 = 3

Individual	D.	C
X	✓	✓
X	✓	✓

Variable.



Age	No. Student
-----	-------------

" would be weird if someone would say I have 0.5 kid but will be okay if she/she will say I have half age is 0.5 or 1/2

Q: On the st

Statistical series on the basis of general character.

(1) Time Series: A series in which data are presented with reference to some time unit like month, week, year etc. is known as time series.

foreg $\Rightarrow$ Data about wheat production in India in last 5 years

Years	wheat production (in Tonnes)
2017	1200
2018	1500
2019	1300
2020	2100
2021	1750

Statistical Series.

On the basis
of construction

On the basis
of general
character

Indiv. Dis.

Cont.

Time
Series

$\Rightarrow$ (ii) Spatial / geo : A series in which values are given according to geographical division of the universe is known as spatial or geographical series.

foreg: Data about No. of schools in different states

States	No. of schools
Delhi	250
Mumbai	224
Kolkata	175
Haryana	335
Punjab	290

(iii) Condition Series: A series in which value of some variable is given according to condition.
 foreg: Height, weight, Income etc. for instance income data of employs in a factory

Income	No. of employers
10K - 20K.	12
20K - 30K	30
30K - 40K	40
40K - 50	15

Continuous

2.

Class.

10-14

15, 16, 16, 17, 18, 18, 17, 15, 15, 16,

14-18

16, 16, 17, 15, 16, 15, 16, 16, 18, 15, 17,

18

17, 18, 10, 16, 15.

22-

30-34

34-38

38-42

Discrete.

Marks.

10

15

16

17

18

15, 15, 15, 15, 16, 16
 17, 18, 18, 18, 19, 20, 20
 20, 21, 22, 22, 22, 22, 23,
 24, 24, 24, 25, 25, 25, 25

Individual
kind

Exclusive

Discrete Series

mark	tally marks	frequency
15		4
16		3
17		1
18		4
19		1
20		3
21		1
22		4
23		1
24		3
25		5
		Total = 30

Continuous

10-15	10-15	 	4
15-20	15-20		
20-25	20-25		
25			

Continuous Series.Exclusive

Mark	frequency	Tally Mark.
12-15	4	
16-19	9	
20-23	9	
24-27	8	
Σfi = 30		

Inclusive to exclusive

Mark	frequency
11.5 - 15.5	4
15.5 - 19.5	9
19.5 - 23.5	9
23.5 - 27.5	8

Less than Series.

	cf.	
less than 0.	0	
less than 12	13	0
less than 19	22	13+9 = 22
less than 23	30	22+8 = 30
less than 27		

More than.

	cf	
more than 12	30	
more than 16	26	
more than 20	17	9+8
more than 24	8	

" Ch $\Rightarrow$

Tabular presentation of data."

Q What do you mean by tabulation & what are the different parts of a table.

Ans $\Rightarrow$ Tabulation is a process by which statistical tables are created it is a scientific process in which a classified data is presented in an orderly manner. So that it can show the essential features of data.

- A statistical table is a logical listing of related data in vertical columns & horizontal rows with sufficient explanation & qualifying words in the form of title, heading, notes etc.

- For

- Parts of the table can be explained as follows :-

(i) Table No. : A table should always be numbered for identification in future ~~for~~ it is more important when more than one table are prepared. It can be written as 1.2, 1.3 etc. where 1 represents the chapter no. & second digit represent order of table.

(ii) Title : Title can be a main title written in one or two line. A title explains nature of data, time period of data, field of data etc.

(iii) Captions & Stubs : Headings & Subheading given to columns are called captions while rows are identified as stubs. These both should be brief as much as possible.

- (iv) Body of Table: It contains the numerical information & it is most important part of a table. This should be properly arranged in columns & rows that may be alphabetically, geographically, ascending order, descending order etc.
- (v) Perifectry or Head Note: It is statement normally given below the title that explains content of table
- (vi) Foot Note: The Note place that bottom of the table is known as foot note. This is required to explain some important feature of table
- (vii) Source: In case of tabulation of secondary data. A source note should be provided indicating place of publication, ^{page} ~~age~~, edition, author

~ Stub: used for row.
~ Caption " " columns.

Structure of table:

Table Number.

Title

(Head Note)

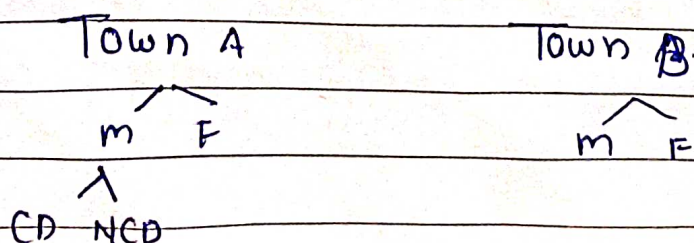
Row Heading	Caption. (column Heading)			Total.
	Sub-caption	Sub-caption	Sub-caption.	
↑ 1 ↓ Stubs	BODY of Table			
Total				

Foot note:

Source:

Q In a sample study about coffee drinking habits in two town following information was received.

Town A female were 40% total, coffee drinkers were 15% & male non-coffee drinker were 20%. Town B males are 55%. male non-coffee drinkers were 30% & female coffee drinkers were 15%. represents the above data in tabular form.



Solution =

Table No.
Coffee drinking Habits in Town A & B
(in %)

	Town A			Town B		
	Male	Female	Total	Male	Female	Total
Coffee Drinker	40.	35	75	25	15	40
Non-Coffee Drinker	20.	35	55	30	30	60
Total	60.	40.	100	55.	45	100

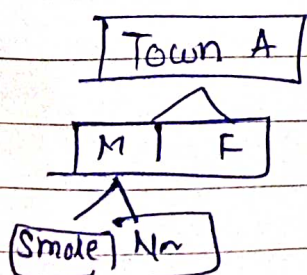
Source : Solution Academy (ask)

Q:

In a sample study of smoking habits of two towns following data were retrieved.

Town A. 52% are male 26% are smokers & 18% are male smokers

Town B. Males are 54%; smokers are 28% & male smokers are 20%.



Town B

M F

52.

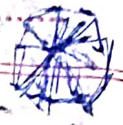


Table No.....
Smoking Habits in Town A & Town B.
(in %)

Habit	Town A			Town B		
	Male	Female	Total	Male	Female	Total
Smoker	26 18.	8.	26	20	8.	28.
Non-smoker	34	40	74	34	38.	72.
Total	52.	48.	100.	54.	46.	100

Source : Solutions Academy.

$$\begin{array}{r}
 100 \\
 - 52 \\
 \hline
 48 \\
 48 \times 18 = 864 \\
 \hline
 18 \\
 - 18 \\
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 0
 \end{array}$$

$$\begin{array}{r}
 100 \\
 - 54 \\
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 46 \\
 46 \times 8 = 368 \\
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 \end{array}$$

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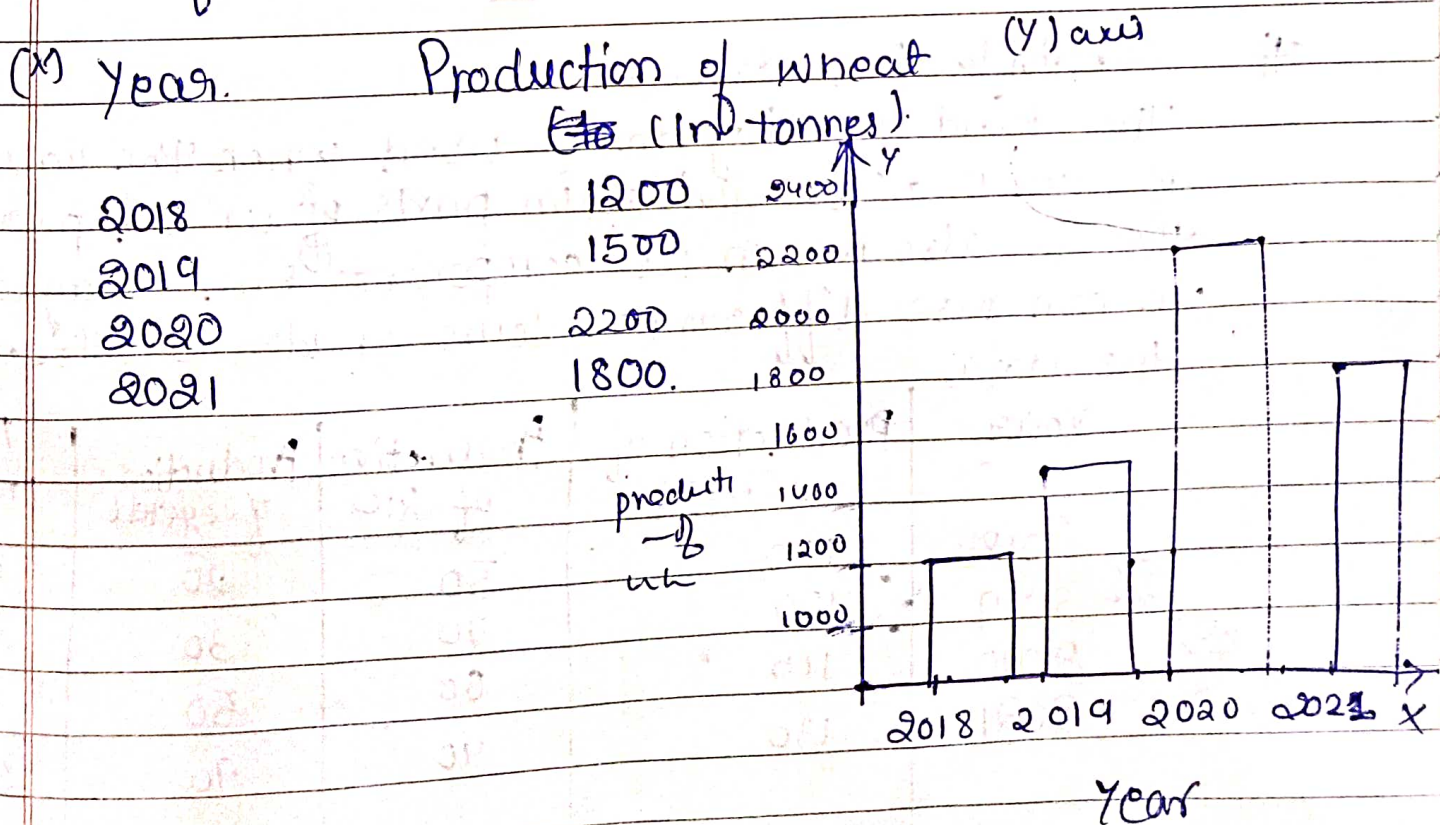
$$\begin{array}{r}
 100 \\
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 46 \times 8 = 368 \\
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 \end{array}$$



"Diagrammatic Presentation"

- Simple presentation.
- Subdivided Bar Diagram
- Multiple Bar Diagram
- Percentage bar diagram.
- Broken bar diagram.
- Deviation bar diagram.

~ It is simplest way to present one type of variable
It is used for visual presentation of one variable
that can be on a horizontal or a vertical base
• for eg: present the following data related to production of wheat in India in last four years



Tips : about diagram.

- (i) Take data related to time on ox axis and that of a variable on oy axis.
- (ii) Give one box to one year with half box as gap.
- (iii) Scale on y axis should be good enough to make data comparable considering the lowest & the highest value in data.
- (iv) The maximum units on oy axis should be 10.

$$\left[\frac{\text{"maxi - lowest"} }{\text{no. of item}} = \text{scale value} \right]$$

Subdivide Bar diagram.

This kind of diagram is used when the value of data is to be divided in parts or sub parts. This is also known as component bar diagram. We can use different colours shades to differentiate the data.

Year.	Production of wheat	Production of Rice	Production of vegetables	Total production
2018	100	50	20	170
2019	120	70	30	220
2020	110	60	50	220
2021	130	40	70	240

$$\frac{240-20}{10} = \frac{220}{10}$$

