



Utility Analysis



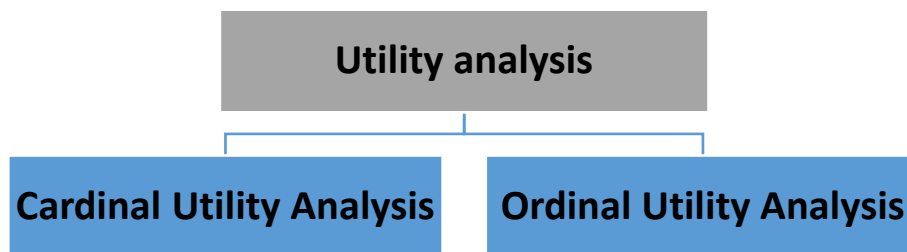
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What is Utility

Utility of a commodity is its want-satisfying capacity. The more the need of a commodity or the stronger the desire to have it, the greater is the utility derived from the commodity.

Utility is subjective



Cardinal Utility Analysis

Cardinal utility analysis assumes that level of utility can be expressed in numbers.

Assumptions

- Rationality
- Cardinal utility
- Constant marginal utility of money
- Diminishing marginal utility (discussed in further pages)

Measures of Utility

Total Utility: Total utility of a fixed quantity of a commodity (TU) is the total satisfaction derived from consuming the given amount of some commodity x.

Marginal Utility: Marginal utility (MU) is the change in total utility due to consumption of one additional unit of a commodity.

For example, suppose 4 bananas give us 28 units of total utility and 5 bananas give us 30 units of total utility. Clearly, consumption of the 5th banana has caused total utility to increase by 2 units (30 units minus 28 units). Therefore, marginal utility of the 5th banana is 2 units.

Law of Diminishing Marginal Utility

Usually, it is seen that the marginal utility diminishes with increase in consumption of the commodity. This happens because having obtained some amount of the commodity, the desire of the consumer to have still more of it becomes weaker.

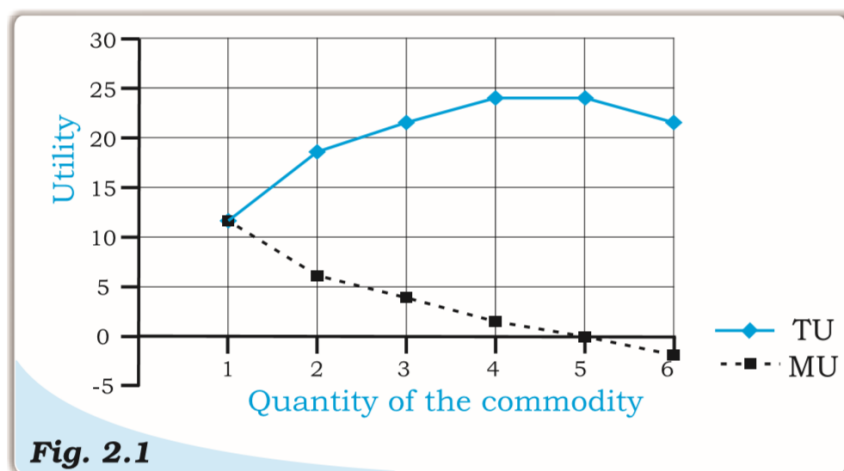
The same is also shown in the table

Units	Total utility	Marginal utility
1	12	12
2	18	6
3	22	4
4	24	2
5	24	0
6	22	-2

TU increases but at a diminishing rate and finally starts falling

MU decreases as the consumption of the commodity

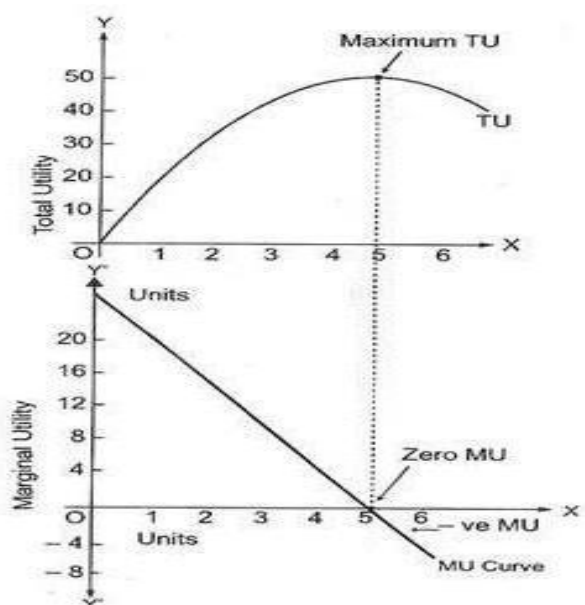
Law of Diminishing Marginal Utility states that marginal utility from consuming each additional unit of a commodity declines as its consumption increases, while keeping consumption of other commodities constant.



Marginal utility diminishes with increase in consumption of the commodity from 12 to 6, 6 to 4 and so on. (this follows from the law of diminishing marginal utility)

MU becomes zero at a level when TU remains constant. In the example, TU does not change at 5th unit of consumption and therefore $MU_5 = 0$. Thereafter, TU starts falling and MU becomes negative.

Relationship Between TU and MU



1. When TU is rising, MU falls.
2. When TU is maximum, MU is zero.
3. When TU starts to fall, MU becomes negative.

IMPORTANT POINT TO REMEMBER

Consumer is in equilibrium when marginal utility of x is equal to its market price.

Weakness of Cardinal Approach

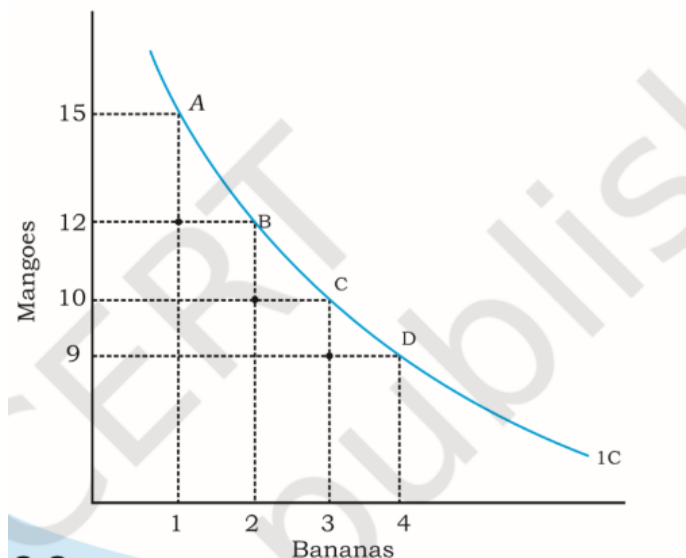
- The assumption of cardinal utility is extremely doubtful. The satisfaction derived from various commodities cannot be measured objectively.
- The assumption of constant utility of money is also unrealistic. As income increases the marginal utility of money changes.

Ordinal Utility Analysis

The consumer does not measure utility in numbers, though he/she often ranks various consumption bundles.

(Assumption - Any combination of the amount of the two goods will be called a consumption bundle or, in short, a bundle.)

The bundles available to the consumer can be plotted as points in a two dimensional diagram.



The points representing bundles which give the consumer equal utility can generally be joined to obtain a curve like the one in figure above. The consumer is said to be indifferent on the different bundles because each point of the bundles give the consumer equal utility. Such a curve joining all points representing bundles among which the consumer is indifferent is called an indifference curve.

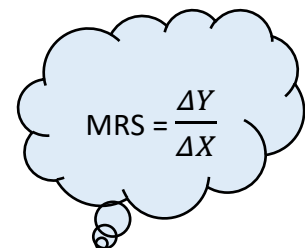
Indifference curve is the locus of all points among which the consumer is indifferent.

It is clear that when a consumer gets one more banana, he has to forego some mangoes, so that her total utility level remains the same and she remains on the same indifference curve. Therefore, **indifference curve slopes downward**. The amount of mangoes that the consumer has to forego, in order to get an additional banana, her total utility level being the same, is called marginal rate of substitution (MRS).

Law of Diminishing Marginal Rate of Substitution

Combination	Quantity of bananas (Qx)	Quantity of mangoes (Qy)	MRS
A	1	15	-
B	2	12	3:1
C	3	10	2:1
D	4	9	1:1

As the number of bananas with the consumer increases, the MU derived from each additional banana falls. Similarly, with the fall in quantity of mangoes, the marginal utility derived from mangoes increases. So, with increase in the number of bananas, the consumer will feel the inclination to sacrifice small and smaller amounts of mangoes. This tendency for the MRS to fall with increase in quantity of bananas is known as **Law of Diminishing Marginal Rate of Substitution**.



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

Features of Indifference Curve

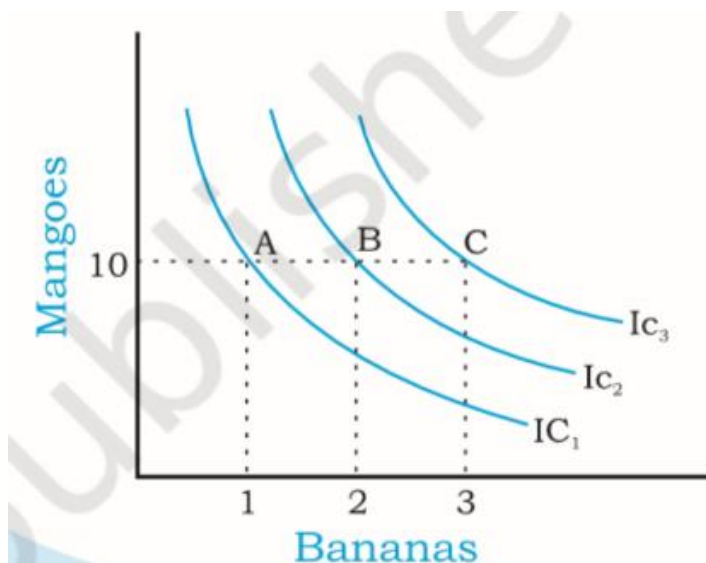
Indifference curve slopes downwards from left to right

Higher indifference curve gives greater level of utility

Two indifference curves never intersect each other

Indifference curve slopes downwards from left to right: An indifference curve slopes downwards from left to right, which means that in order to have more of bananas, the consumer has to forego some mangoes. If the consumer does not forego some mangoes with an increase in number of bananas, it will mean consumer having more of bananas with same number of mangoes, taking her to a higher indifference curve. Thus, as long as the consumer is on the same indifference curve, an increase in bananas must be compensated by a fall in quantity of mangoes.

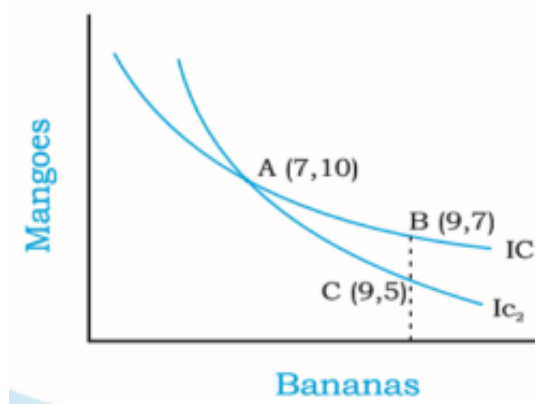
Higher indifference curve gives greater level of utility: As long as marginal utility of a commodity is positive, an individual will always prefer more of that commodity, as more of the commodity will increase the level of satisfaction.



Combinations A, B and C consist of same quantity of mangoes but different quantities of bananas. Since combination B has more bananas than A, B will provide the individual a higher

level of satisfaction than A. Therefore, B will lie on a higher indifference curve than A, depicting higher satisfaction. Likewise, C has more bananas than B (quantity of mangoes is the same in both B and C). Therefore, C will provide higher level of satisfaction than B, and also lie on a higher indifference curve than B.

Two indifference curves never intersect each other: Two indifference curves intersecting each other will lead to conflicting results. To explain this, let us allow two indifference curves to intersect each other as shown in the figure below.



As points A and B lie on the same indifference curve IC_1 , utilities derived from combination A and combination B will give the same level of satisfaction. Similarly, as points A and C lie on the same indifference curve IC_2 , utility derived from combination A and from combination C will give the same level of satisfaction.

From this, it follows that utility from point B and from point C will also be the same. But this is clearly an absurd result, as on point B, the consumer gets a greater number of mangoes with the same quantity of bananas. So consumer is better off at point B than at point C. Thus, it is clear that intersecting indifference curves will lead to conflicting results. Thus, two indifference curves cannot intersect each other.

The consumer's preferences over all the bundles can be represented by a family of indifference curves. This is called an indifference map of the consumer.

Consumer Budget

- Consumer has fixed amount of money and cannot buy any or every combinations
- Consumption bundle depends on price of two goods and income of customer

The consumer can buy any bundle (x_1, x_2) such that

$$p_1x_1 + p_2x_2 \leq M$$

where, M = Income of the consumer

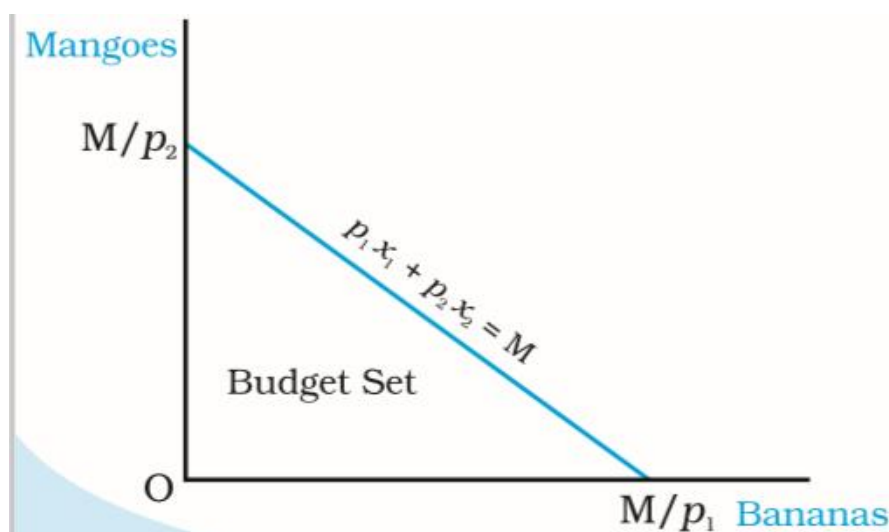
p_1 = Price of banana

x_1 = Quantity of banana

p_2 = Price of mango

x_2 = Quantity of mango

The inequality is called the **consumer's budget constraint**. The set of bundles available to the consumer is called the **budget set**. The budget set is thus the collection of all bundles that the consumer can buy with her income at the prevailing market prices.



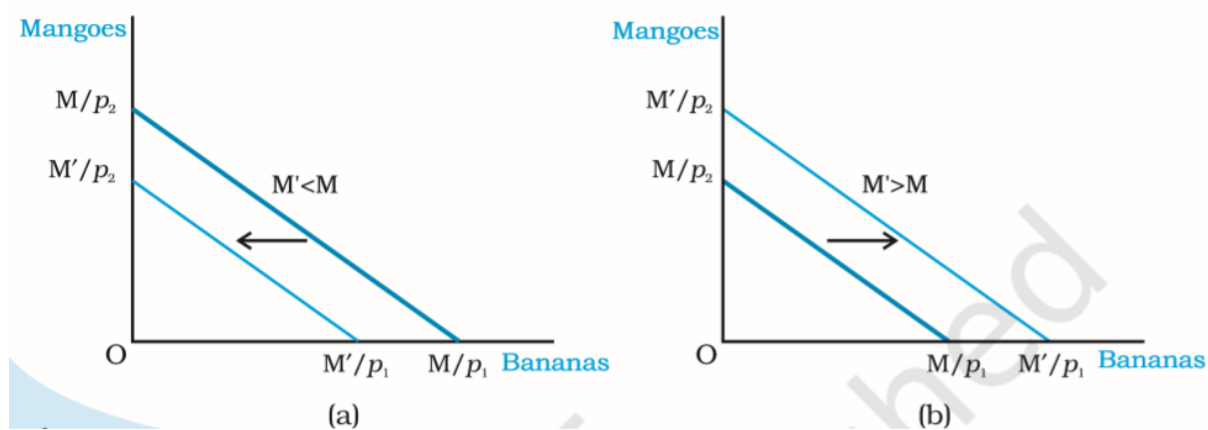
All bundles in the positive quadrant which are on or below the line are included in the budget set. The equation of the line $p_1x_1 + p_2x_2 = M$

The line consists of all bundles which cost exactly equal to M . This line is called the **budget line**.

Changes in the Budget Set

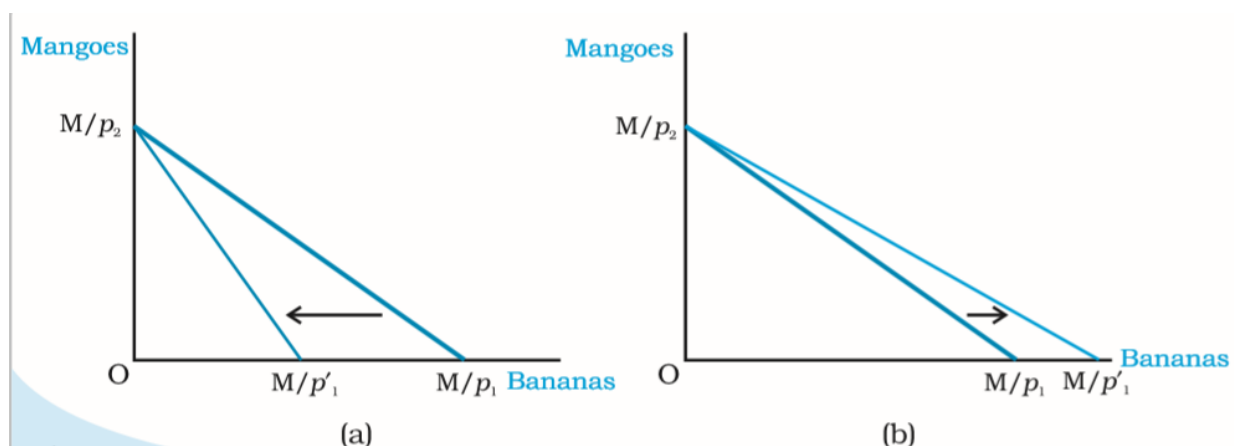
Change in the Consumer's Income

A decrease in income causes a parallel inward shift of the budget line as in panel (a). An increase in income causes a parallel outward shift of the budget line as in panel (b).



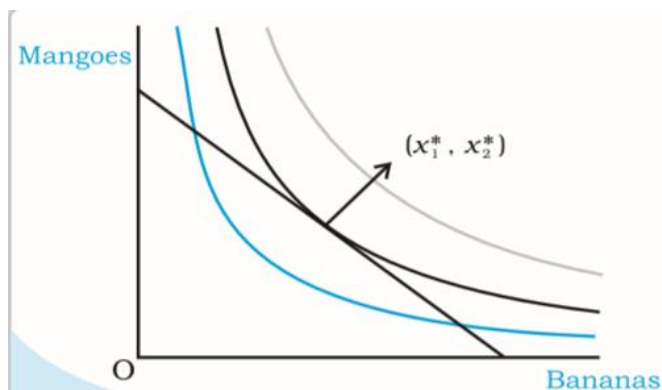
Change in the Price of Commodity Represented on X- Axis

An increase in the price of bananas makes the budget line steeper as in panel (a). A decrease in the price of bananas makes the budget line flatter as in panel (b).



Consumer's Equilibrium / Optimal Choice for the Consumer

- Consumer can choose any consumption bundle from the budget set.
- Consumer chooses her consumption bundle on the basis of her taste and preferences over the bundles in the budget set. It is generally assumed that the consumer has well defined preferences over the set of all possible bundles.
- The optimum bundle of the consumer is located at the point where the budget line is tangent to one of the indifference curves. If the budget line is tangent to an indifference curve at a point, the absolute value of the slope of the indifference curve (MRS) and that of the budget line (price ratio) are same at that point.
- In economics – consumer is rational – knows what is good or bad (consumer has preferences but also acts based on the preferences) – choose one that gives maximum satisfaction.
- Bundles on indifference curve above the optimum line are not affordable.
- Points below this indifference curve are inferior.



The above figure illustrates the consumer's optimum bundle. At (x_1^*, x_2^*) the budget line is tangent to the black coloured indifference curve. The first thing to note is that the indifference curve just touching the budget line is the highest possible indifference curve given the consumer's budget set. Bundles on the indifference curves above this, like the grey one, are not affordable. Points on the indifference curves below this, like the blue one, are certainly inferior to the points on the indifference curve, just touching the budget line. Any other point on the budget line lies on a lower indifference curve and hence, is inferior to (x_1^*, x_2^*) . Therefore, (x_1^*, x_2^*) is the consumer's optimum bundle.

MUST REMEMBER

Two conditions must be fulfilled for the consumer to be in equilibrium:

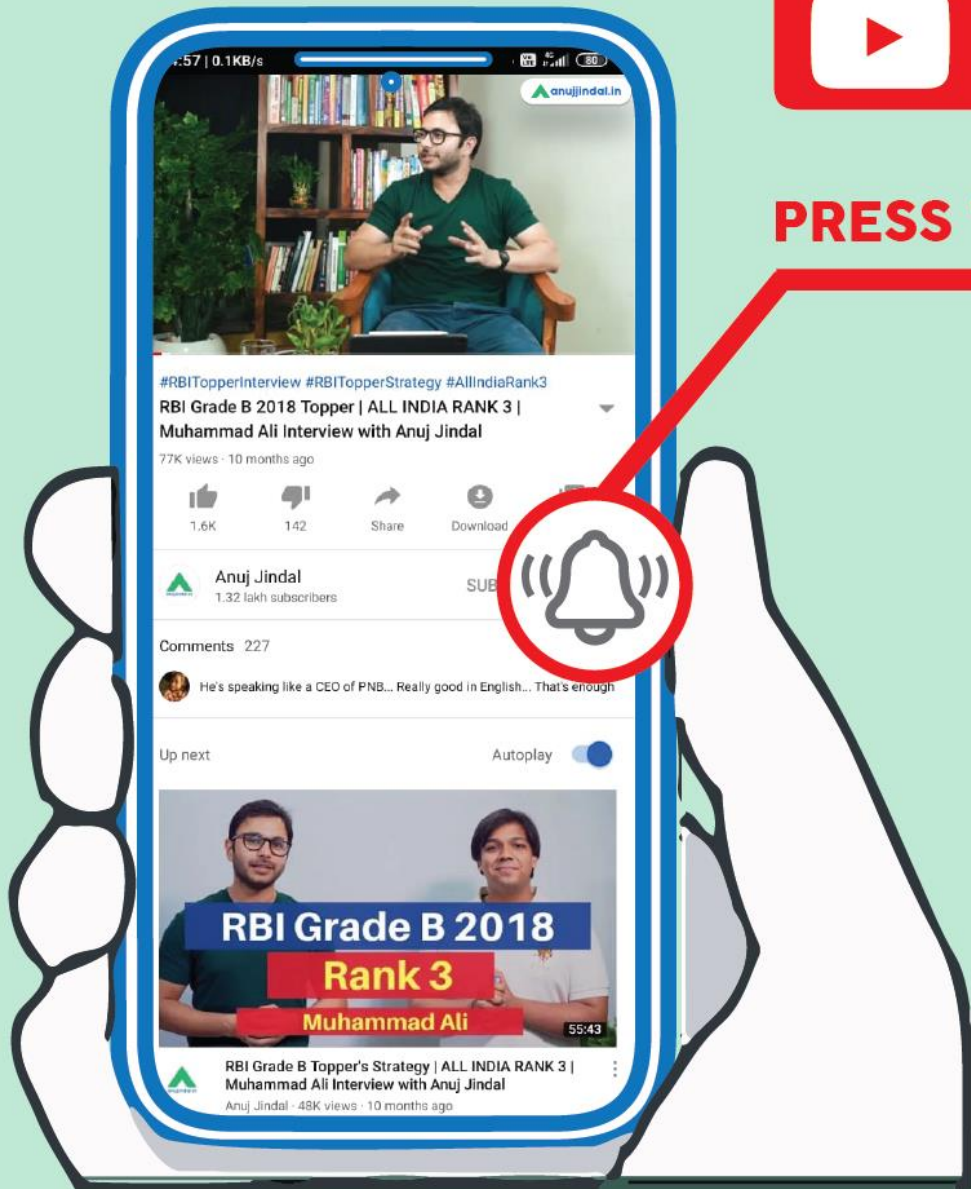
1. Marginal rate of substitution should be equal to the ratio of commodity prices ie., slope of indifference curve must be equal to slope of budget line.
2. Indifference curve must be convex to the origin.



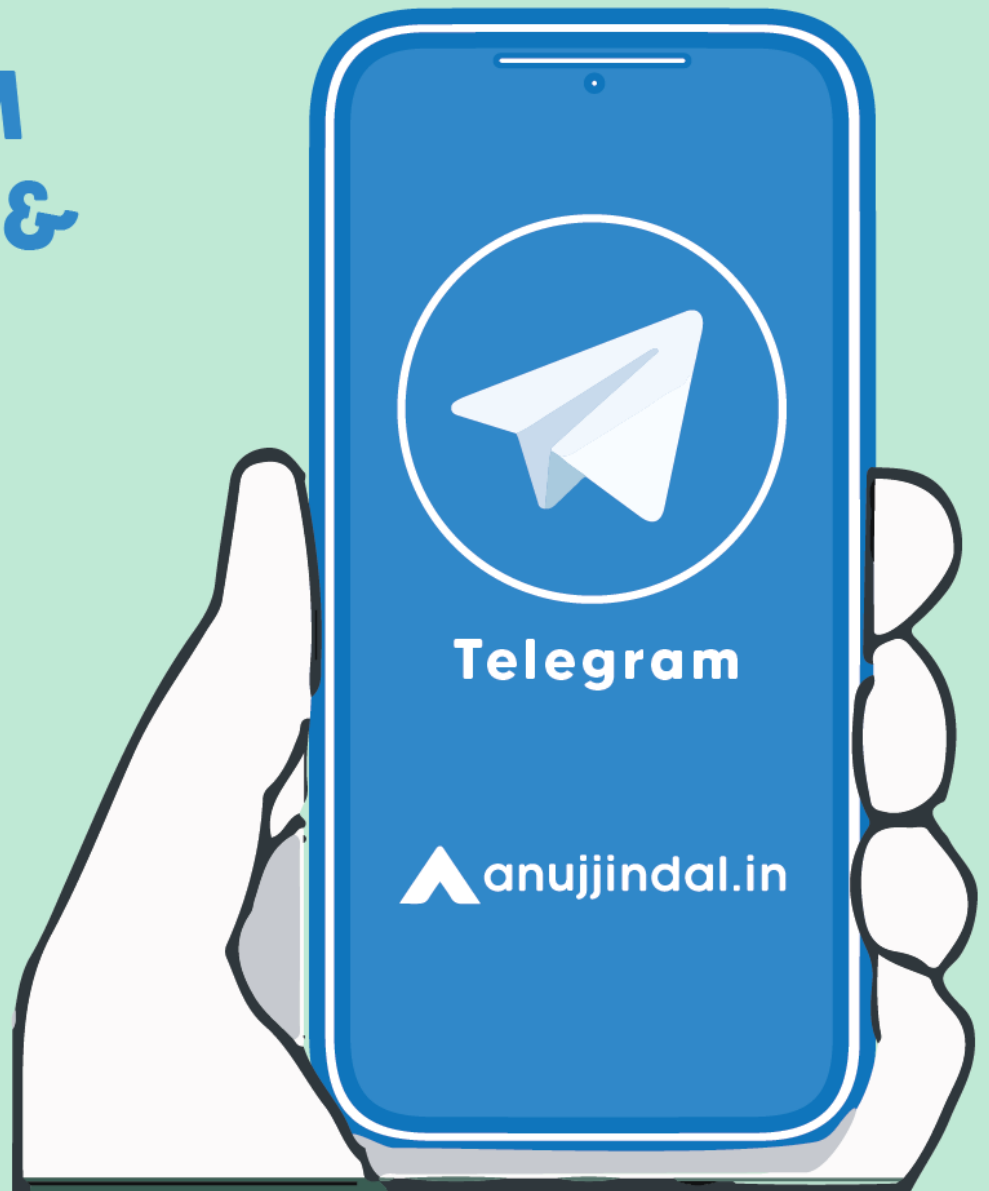
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Cleared SEBI

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Cleared SEBI

Vasant Kesari



Cleared SEBI

Swetha Bodagala



NET with 98 Percentile

Anushka Keshri



JRF with 96.92 Percentile

Vaishali Jadon



NET with 89.27 Percentile

Srishti Gupta



JRF with 72 Percentage

Abhishek Mohanty



NET with 68 Percentage

Dinesh Mohan



JRF with 64.66 Percentage

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