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CLASS – 12

ECONOMICS

Introductory Microeconomics

CH-4 : The Theory of the Firm under Perfect Competition

Part – 4

Exercise (Q. 1 - 13)

Vaishnavi Agrawal

EXERCISE



1 What are the characteristics of a perfectly competitive market?



EXERCISE



1 What are the characteristics of a perfectly competitive market?

Ans : It is a market where :

- Products are homogeneous.
- The product of one firm cannot be differentiated from the product of any other firm.
- Perfect knowledge of the price to consumers.
- Free entry and exit of the firms in the market.

EXERCISE



- Market consists of large number of buyers and sellers.
- It is a price taker market and not price maker.



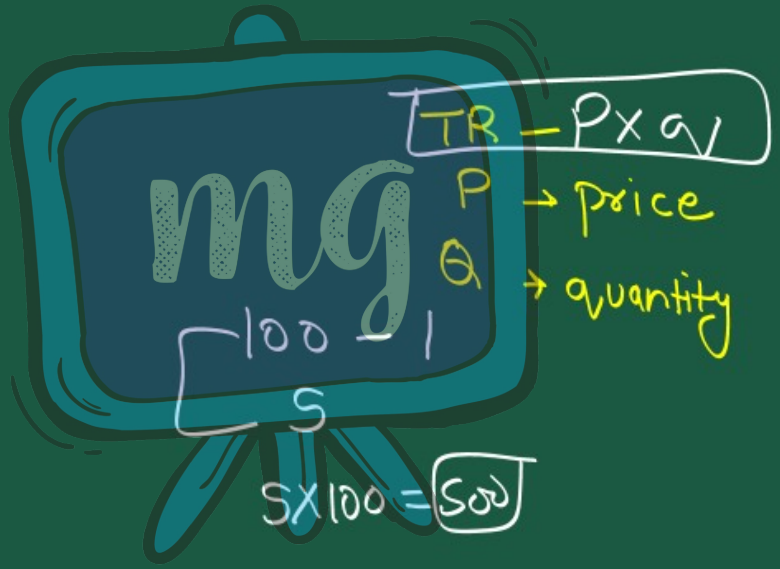
2 How are the total revenue of a firm, market price, and the quantity sold by the firm related to each other?





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2 How are the total revenue of a firm, market price, and the quantity sold by the firm related to each other?

Ans :

☛ Revenue is the total earning a firm/ producer receives from selling goods or services to the customers.



Example

☛ If a producer is selling a jacket.

- ✧ Price = Rs. 500;
- ✧ Quantity of jackets sold = 5
- ✧ Then, his revenue = Price × Quantity

= 500 × 5

= 2500

P = 500

Q = 5

TR = P × Q

3 What is the 'Price Line'?





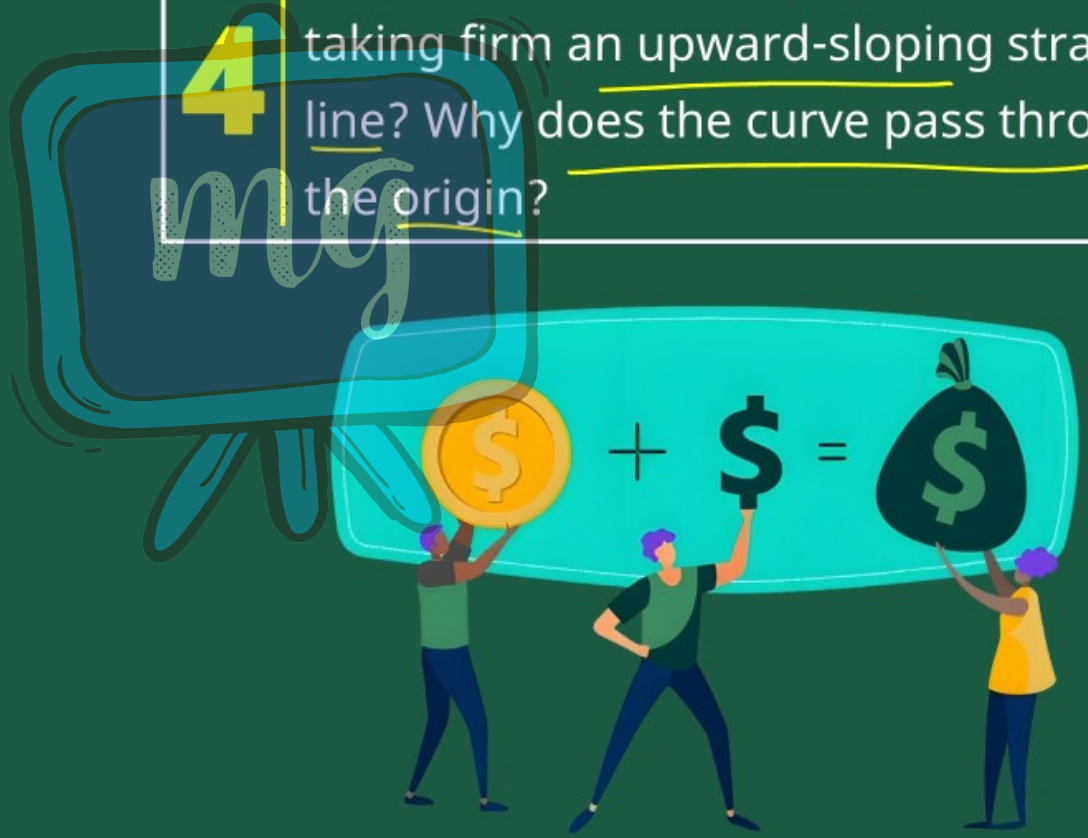
3 What is the 'Price Line'?

Ans :

- A price line (budget line), represents the various combinations of two goods a consumer can afford with a given income and the prices of those goods.
- It essentially shows the affordable choices for a consumer given their income and the prices of the goods being considered.

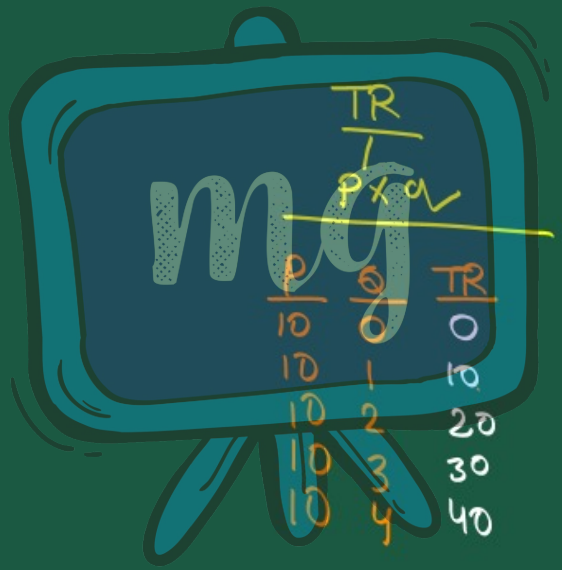


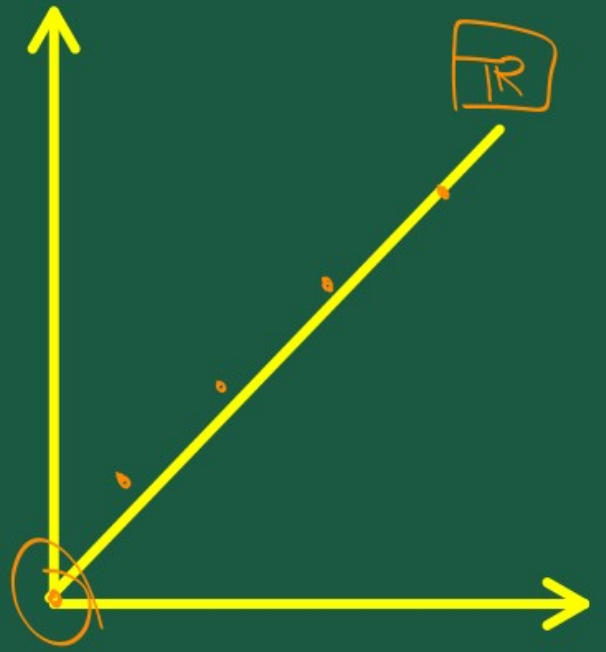
4 Why is the total revenue curve of a price-taking firm an upward-sloping straight line? Why does the curve pass through the origin?



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4 Why is the total revenue curve of a price-taking firm an upward-sloping straight line? Why does the curve pass through the origin?

Ans : Total earning by selling the goods (it produces) in the market.

Total Revenue (TR) of the firm is defined as the market price of the good (p) multiplied by the firm's output (q).

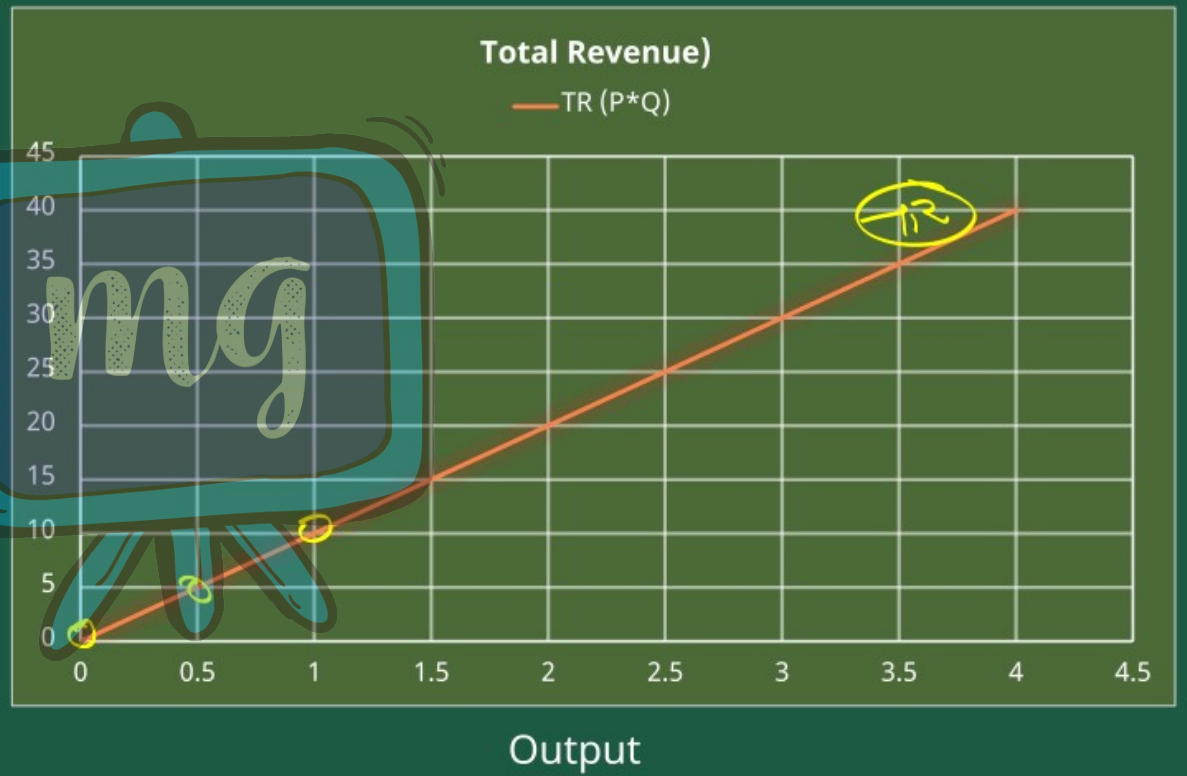
$$TR = p \times q$$

EXERCISE



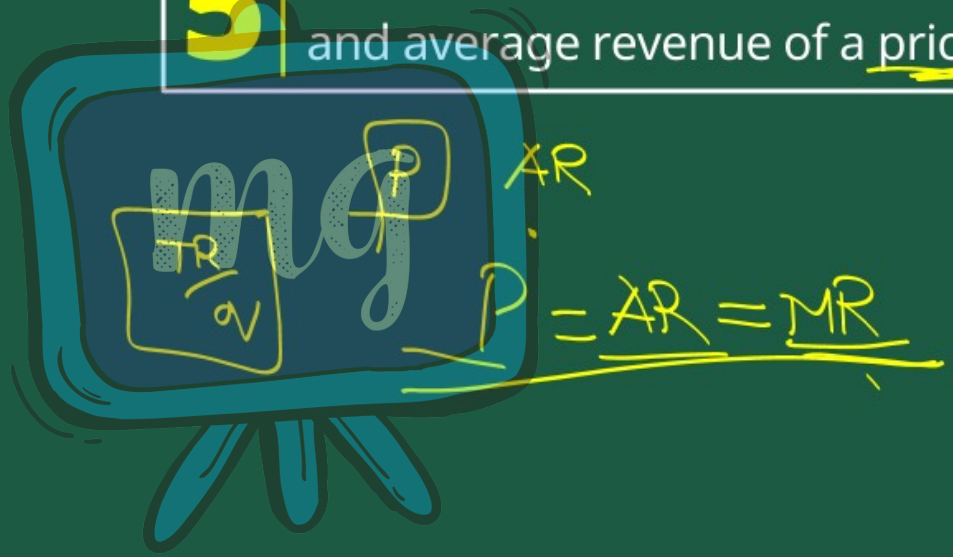
Quantity (Box Sold)	Price	TR (p × q)
0	10	0
1	10	10
2	10	20
3	10	30
4	10	40




Total Revenue)
TR (P*Q)
Revenue
45
40
35
30
25
20
15
10
5
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Output



5 What is the relation between market price and average revenue of a pricetaking firm?

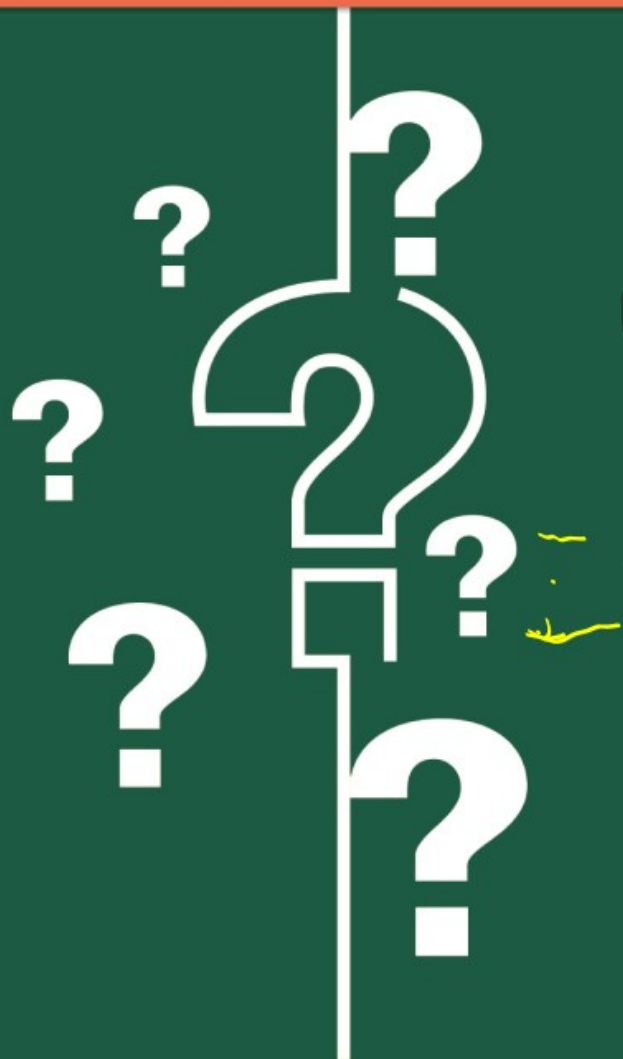


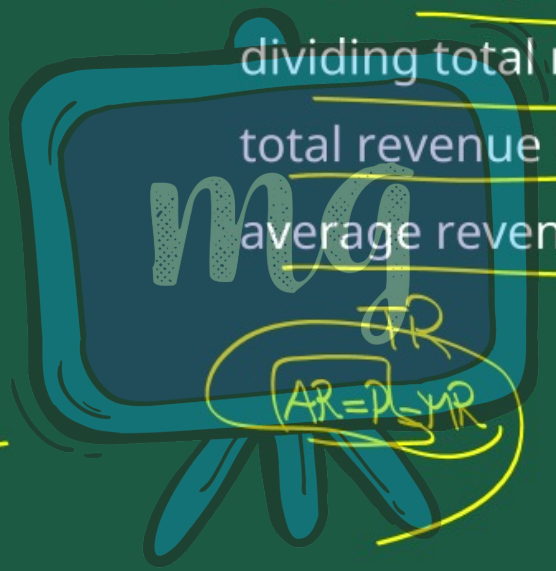


5 What is the relation between market price and average revenue of a pricetaking firm?

Ans :

- For a price-taking firm, the average revenue (AR) is equal to the market price. AR=P
- This is because a price-taking firm, also known as a firm in a perfectly competitive market, faces a horizontal demand curve, meaning it can sell any quantity of output at the prevailing market price.

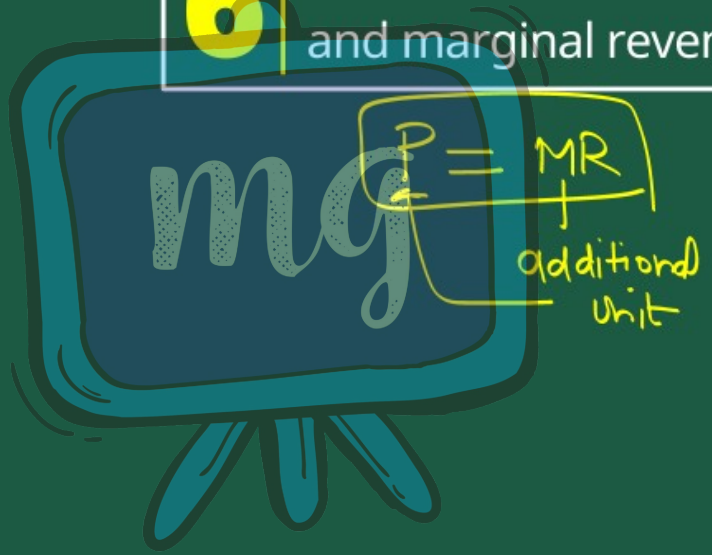




- Since average revenue is calculated by dividing total revenue by quantity sold, and total revenue is price times quantity, the average revenue per unit is simply the price.



6 What is the relation between market price and marginal revenue of a pricetaking firm?

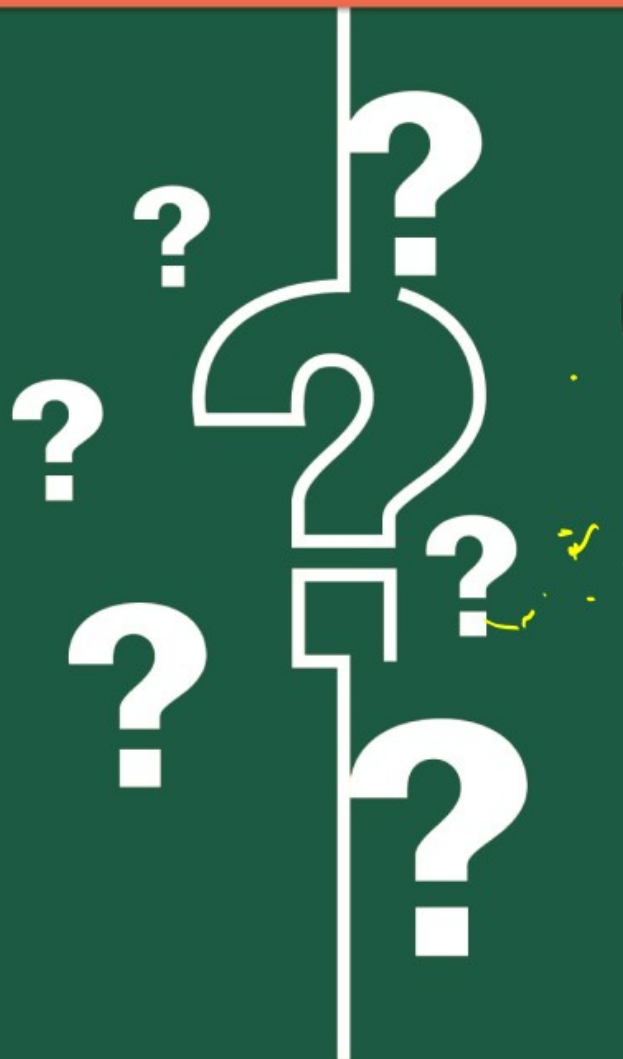




6 What is the relation between market price and marginal revenue of a pricetaking firm?

Ans :

- For a price-taking firm in a competitive market, marginal revenue (MR) is equal to the market price (P).
- This means the additional revenue from selling one more unit is exactly the same as the price that unit is sold for.



7 What conditions must hold if a profit maximising firm produces positive output in a competitive market?

1) MR = MC condition
[MC=P]

2) MC when cuts MR, it must be rising.
[MC must not be declining]



7 What conditions must hold if a profit maximising firm produces positive output in a competitive market?

Ans :

For profits to be maximum, three conditions must hold at q :

MR=MC

1. The price p, must equal MC (P = MC)
2. Marginal cost must be non-decreasing at q.



3. For the firm to continue to produce;
   - In the short run, price must be greater than the average variable cost ($p > AVC$).
   - In the long run, price must be greater than the average cost ($p > AC$).

P

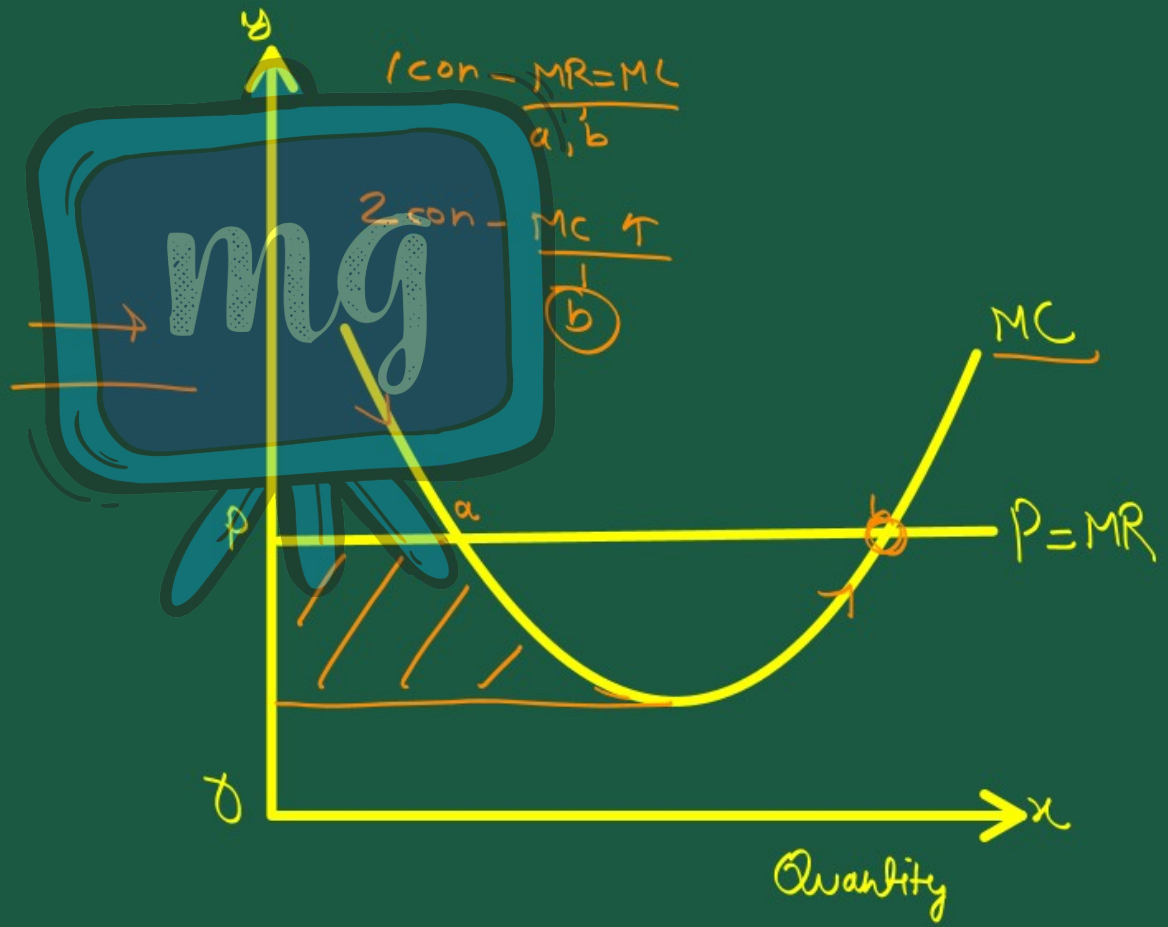


CONDITION 1 : P = MC

- Also called **MC = MR condition.**
- Change in total revenue per unit increase in output is the **marginal revenue. (MR)**
- the change in total cost per unit increase in output is the **marginal cost. (MC)**

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EXERCISE



- When marginal revenue is greater than marginal cost, profits are increasing.
- Marginal revenue is less than marginal cost, profits will fall.
- Profits are maximum where **MR = MC** for the perfectly competitive firm.
- We have established that in perfect competition market, the **MR = P.**
- So the firm's profit maximizing output becomes the level of output at which **P=MC.**



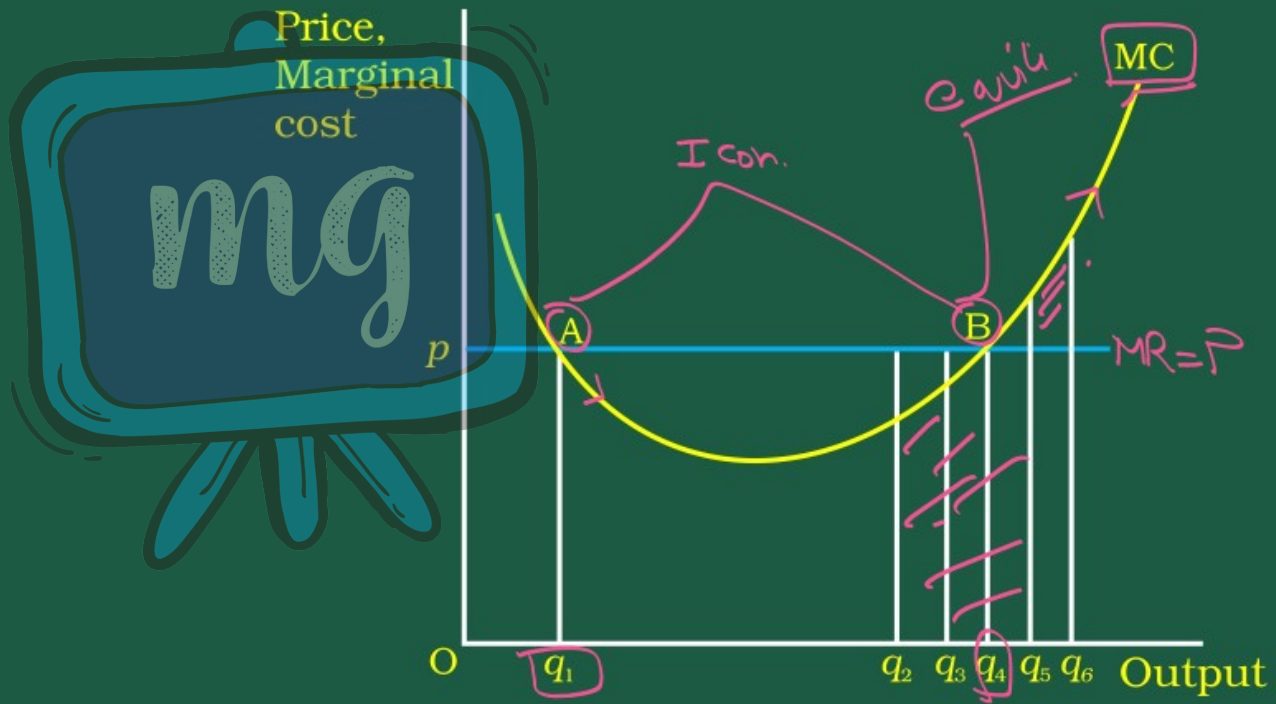
CONDITION 2 : MC must be rising when intersect MR

- This signifies a stable profit-maximizing point for a firm.
- If MC were falling at this intersection, it would imply that the firm could increase profits by producing more units.
- Implying that they haven't reached the optimal production level yet.



- Implies that the firm's profit at an output level slightly smaller than q_1 exceeds that corresponding to the output level q_1. This being the case, q_1 cannot be a profit-maximising output level.




Price,
Marginal
cost
mg
p
I Con.
Equili.
MC
A
B
MR=P
O
q_1
q_2
q_3
q_4
q_5
q_6
Output

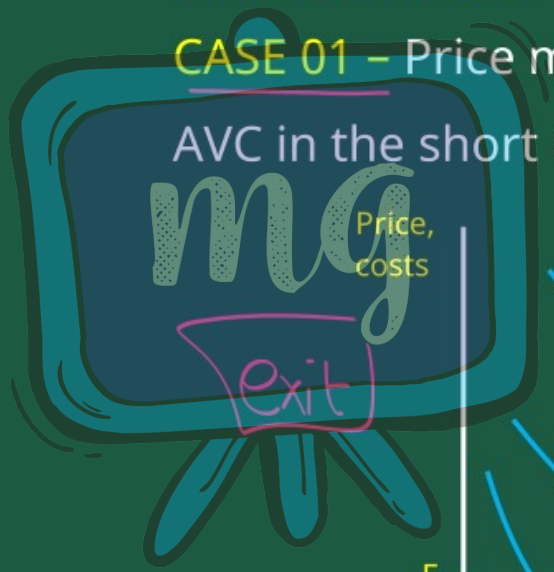


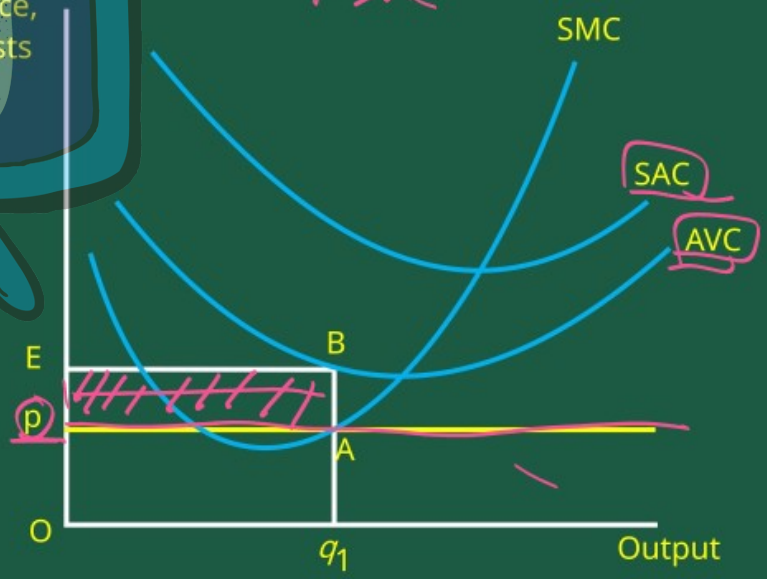
CONDITION 3 :

CASE 01 – Price must be greater than or equal to AVC in the short run

P > AVC

P > AC





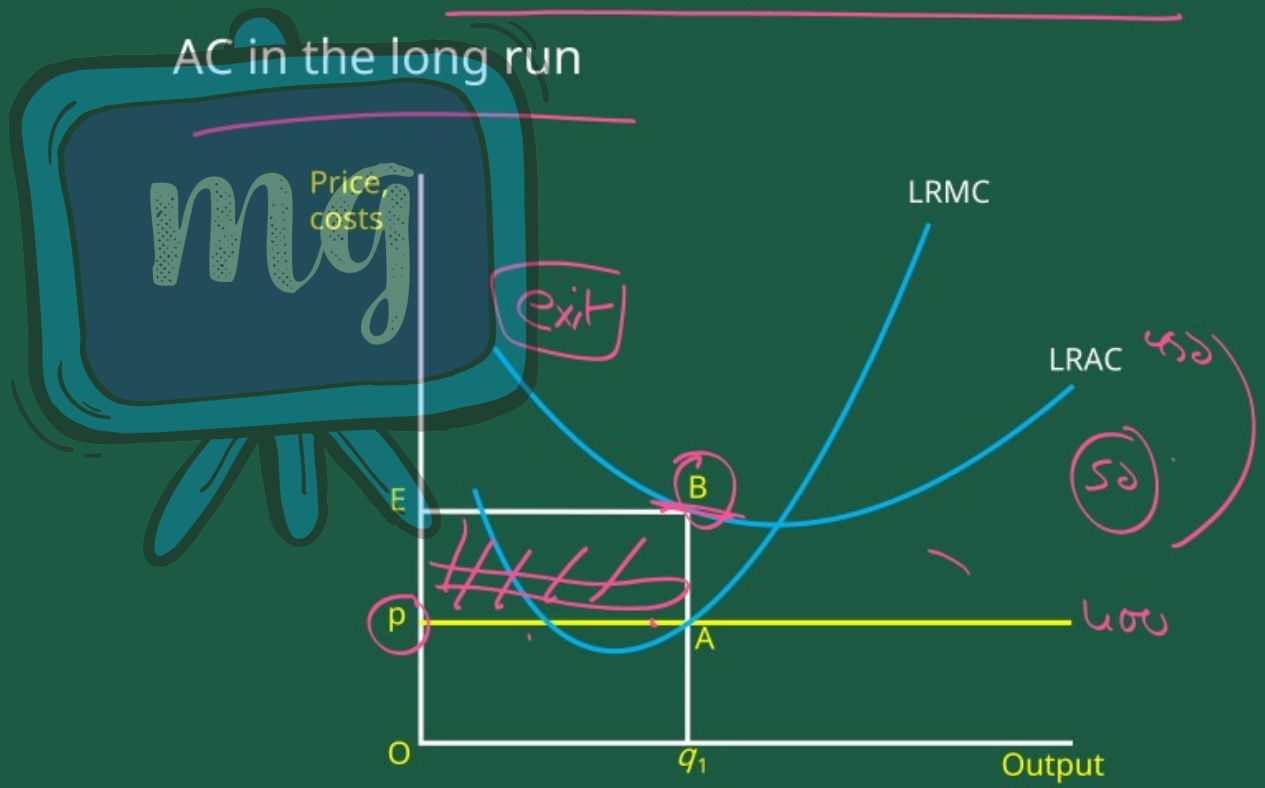
EXERCISE



- Firm's profit at q_1 is TR – (TVC + TFC)
- Since output is zero, TR and TVC are zero as well.
- Firm's profit at zero output is equal to – TFC.
- Firm's profit at q_1 is [(area EBAp)-TFC], which is strictly less than what it obtains by not producing at all.
- So, the firm will choose not to produce at all, and exit from the market.



CASE 02 - Price must be greater than or equal to AC in the long run



EXERCISE



- Firm's total revenue, TR, at q_1 is the area of the rectangle $OpAq_1$.
- Firm's total cost, TC , is the area of the rectangle $OEBq_1$.
- Since the area of rectangle $OEBq_1$ is larger than the area of rectangle $OpAq_1$, the firm incurs a loss at the output level q_1.
- But, in the long run set-up, a firm that shuts down production has a profit of zero.
- Firm chooses to exit in this case.



8 Can there be a positive level of output that a profit-maximising firm produces in a competitive market at which market price is not equal to marginal cost? Give an explanation.

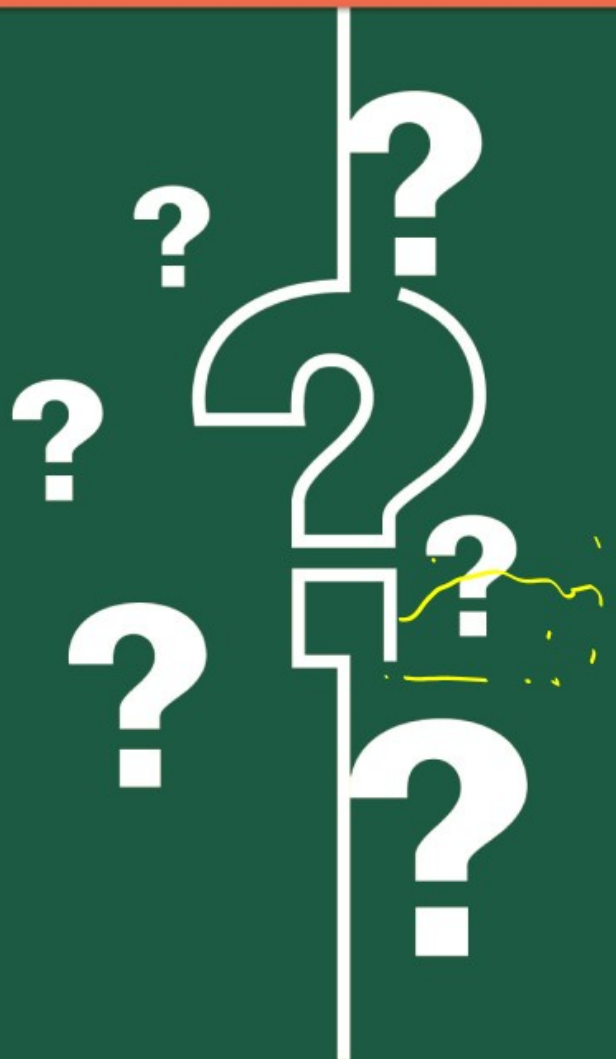
Ans :

- No, a profit-maximizing firm in a perfectly competitive market will not produce at a positive level of output where market price is not equal to marginal cost.

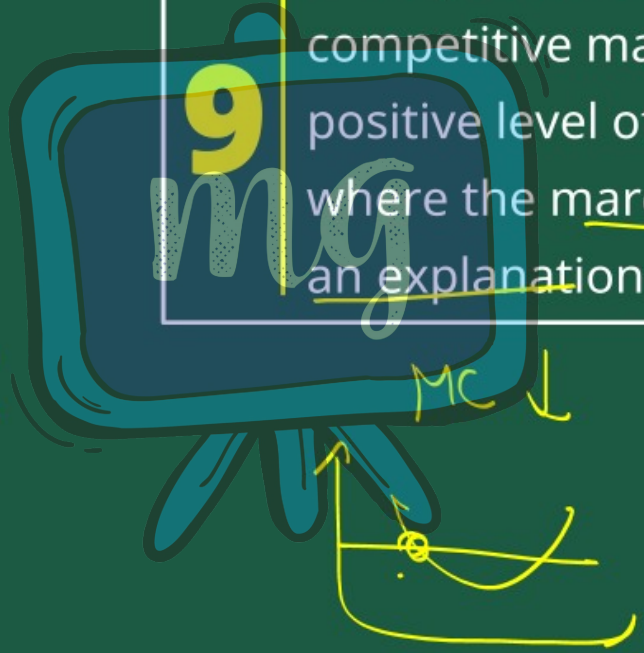
EXERCISE



- In perfect competition, a firm maximizes profit where market price (which equals marginal revenue) is equal to marginal cost (P = MR = MC).
- If price is greater than marginal cost, the firm could increase profit by producing more; if price is less than marginal cost, the firm could increase profit by producing less.



9 Will a profit-maximising firm in a competitive market ever produce a positive level of output in the range where the marginal cost is falling? Give an explanation.





9 Will a profit-maximising firm in a competitive market ever produce a positive level of output in the range where the marginal cost is falling? Give an explanation.

Ans :

- No, a profit-maximizing firm in a competitive market will not produce a positive level of output in the range where marginal cost is falling.

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EXERCISE

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- A firm will produce at the point where marginal cost (MC) equals marginal revenue (MR), and a falling MC implies that the firm is not producing at the profit-maximizing output level.

MR > MC → SNP → Entry of firm → equilibrium



10 Will a profit-maximising firm in a competitive market produce a positive level of output in the short run if the market price is less than the minimum of AVC? Give an explanation.

P < AVC
NO
exit

P — 50
AVC — 80
30
exit



10 Will a profit-maximising firm in a competitive market produce a positive level of output in the short run if the market price is less than the minimum of AVC? Give an explanation.

Ans : No, a profit-maximizing firm in a competitive market will not produce a positive level of output in the short run if the market price is less than the minimum of AVC.

EXERCISE



A firm will cease production when the market price falls below the minimum of AVC, as they are unable to cover their variable costs at that price.

If a firm is making losses (price is below AC), it will shut down and exit the market.



11 Will a profit-maximising firm in a competitive market produce a positive level of output in the long run if the market price is less than the minimum of AC? Give an explanation.

P < AC

No — Shut down.

100 — 150

S_0 — Loss — Exit



11 Will a profit-maximising firm in a competitive market produce a positive level of output in the long run if the market price is less than the minimum of AC? Give an explanation.

Ans :

☞ No, a profit-maximizing firm in a competitive market will not produce a positive level of output in the long run if the market price is less than the minimum of its Average Cost (AC).

EXERCISE



- In the long run, firms can freely enter or exit the market, and this dynamic ensures that all firms, on average, earn normal profits.
- If a firm is making losses (price is below AC), it will shut down and exit the market.



12 What is the supply curve of a firm in the short run?

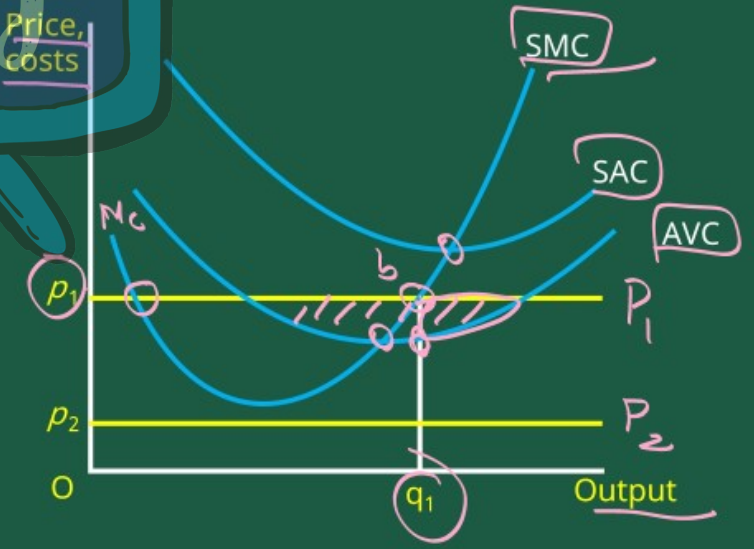




Ans :

1. Short Run Supply Curve of a Firm

Case 01 : Price is greater than or equal to the minimum AVC



EXERCISE



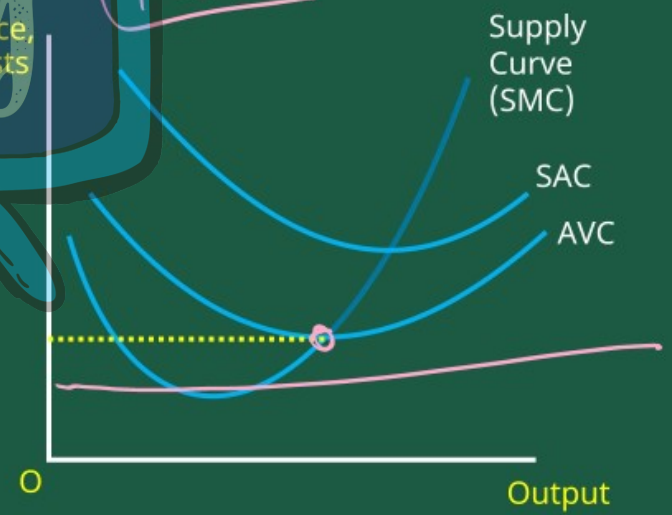
- Suppose the market price is p_1, which exceeds the minimum AVC.
- We start out by equating p_1 with SMC on the rising part of the SMC curve; this leads to the output level q_1.
- The AVC at q_1 does not exceed the market price, p_1.
- Thus, all 3 conditions highlighted in section 3 are satisfied at q_1.



- Hence, when the market price is p_1, the firm's output level in the short run is equal to q_1.

Case 02 : Price is less than the minimum AVC

$P < AVC$

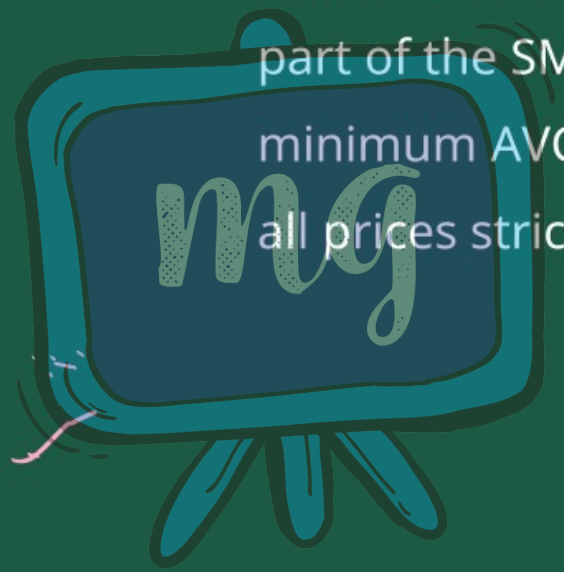




- Suppose the market price is p_2, which is less than the minimum AVC.
- It cannot be the case that the firm supplies a positive output. So, if the market price is p_2, the firm produces zero output.
- Combining cases 1 and 2, we reach an important conclusion.

EXERCISE





- A firm's short run supply curve is the rising part of the SMC curve from and above the minimum AVC together with zero output for all prices strictly less than the minimum AVC.



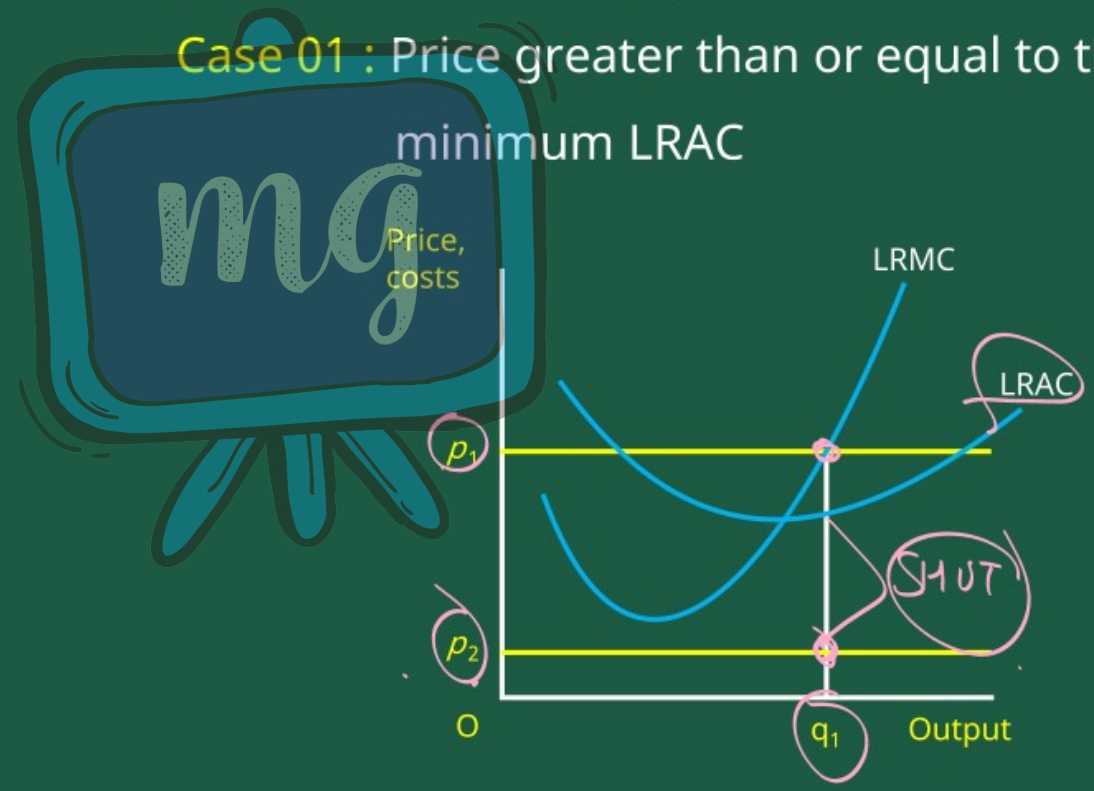
13 What is the supply curve of a firm in the long run?





Ans : Long Run Supply Curve of a Firm

Case 01 : Price greater than or equal to the minimum LRAC



EXERCISE

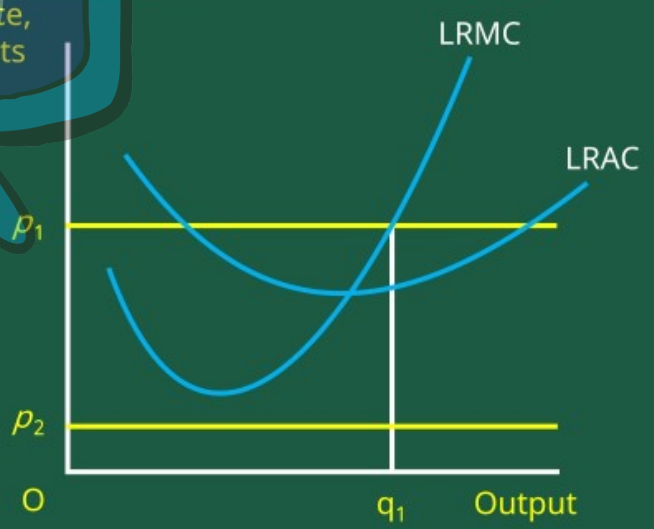


- Suppose the market price is p_1, which exceeds the minimum LRAC.
- Upon equating p_1 with LRMC on the rising part of the LRMC curve, we obtain output level q_1.
- The LRAC at q_1 does not exceed the market price, p_1.
- Thus, all 3 conditions are satisfied at q_1.



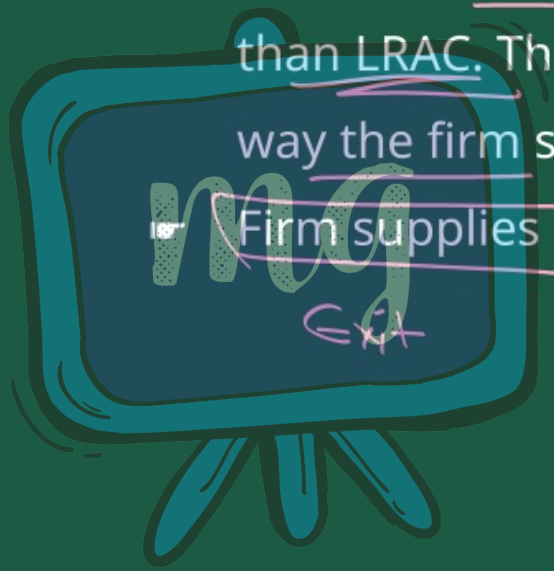
- Hence, when the market price is p_1, the firm's supplies in the long run become an output equal to q_1.

Case 02 : Price is less than LRAC



EXERCISE





- Suppose the market price is p_2 that is less than LRAC. That means it cannot be the case way the firm supplies positive output.
- Firm supplies zero output.