CBSEClass12Economics
NCERTSolutions
Chapter-04 (Microeconomics)

Theory of the Firm Under Perfect Competition

Question 1: What are the characteristics of a perfectly competitive market?

Solution : Perfect Competition: A market wherein we find perfect competition between a large number of buyers and sellers of a homogeneous product and the price of the product is determined by the industry is called perfect competition market. There is one price that prevails in the market and all the firms sell the product at the prevailing price.

Features of Perfectly Competitive Market

1. Free and PerfectCompetition:

In a perfect market, there are no checks either on the buyers or sellers. They are free to buy or to sell to any person. It means there are no monopolies.

2. CheapandEfficientTransportandCommunication:

Uniform price for the commodity would not be possible if the changes in the prices are not quickly adjusted or the commodity cannot be quickly transported. Thus, cheap and efficient means of transport and communication are must in perfectly competitive market.

3. WideExtent:

Sometimes wide market is regarded as the same thing as the perfect market. For wide market, the commodity should have permanent and universal demand. The commodity or product should be portable. Means of transport and communication should be quick enough. There should be peace and security and extensive division oflabour.

4. Large number offirms:

In this market, a product is produced and sold by large number of firms. Since there arelarge number of firms, therefore each firm is supplying only a small part of the total supply in the market, thus no one firm has any market power. It implies that no firm can influence the price of the product rather each must accept the price set by the forces of market demand and supply. The firms are price-takers instead ofprice-makers.

5. Large number ofbuyers:

In a perfectly competitive market, there are large numbers of buyers each demanding a small part of the total market supply of the product. As a result, no single buyer is in a position to influence the market price determined by the forces of market demand and supply.

6. HomogeneousProduct:

In a perfectly competitive market, all the firms produce and supply the identical products. It means that the products of all the firms are perfect substitutes of each otherin terms of quantity, quality, colour, size, features, etc.Due to the homogenous nature of products, existence of uniform price is guaranteed. As a result of this, the price elasticity of demand for a firm's product isinfinite.

7. Free entry andexit:

In a perfectly competitive market, there are no restrictions on the entry of new firms into market or on the exit of existing firms from the market. If there are abnormal profits, new firms will enter the market and if there are abnormal losses, a few existing firms will exit the market.

8. Perfectknowledge among buyers and sellers

In a perfectly competitive market, the firms and the buyers possess perfect information about the market. It implies that no buyer or firm is ignorant about the price prevailing in the market.The implication of this feature is that if any individual firm is charging higher (or lower) price for a homogeneous product, the buyers will shift their purchase to other firms (or shift their purchase from the firm to other firms selling at lower price).

9. Perfectmobilityoffactorsofproduction:

In a perfectly competitive market, the factors of production whether geographically or occupationally are completely mobile leading to factor-price equalization throughout the market.

10. No promotional and selling costs:

There are no advertisements and promotional costs incurred by the firms. The selling costs under perfectly competitive market are zero.

Question 2: Howarethetotalrevenueofafirm,marketprice,andthequantitysoldbythatfirmrelated to eachother?

Solution : Total revenue is defined as the total sales proceeds of a producer by selling corresponding level of output or sum total of revenue receipts from the sale of a given quantity of commodity. In other words, it is defined as price times the quantity of output sold.

Total Revenue = Market Price x Quantity of output sold

$$TR = P \times Q$$

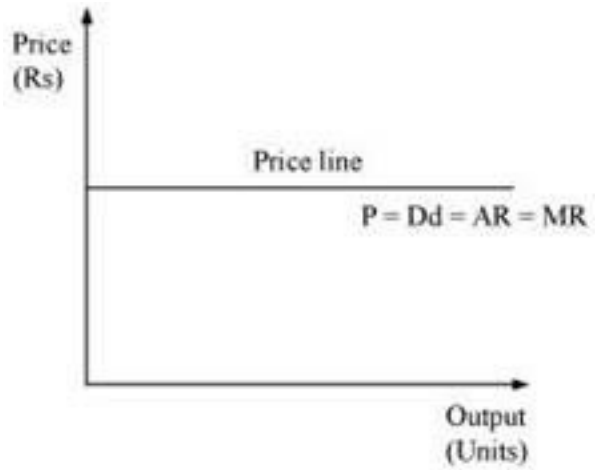
Hence, TR = PQ

In a perfectly competitive market, the market price is given, i.e., a firm act as a price taker and cannot influence the price. Hence, a particular firm can influence its TR by altering the quantity

of output sold.

Question 3: Whatisthepriceline?

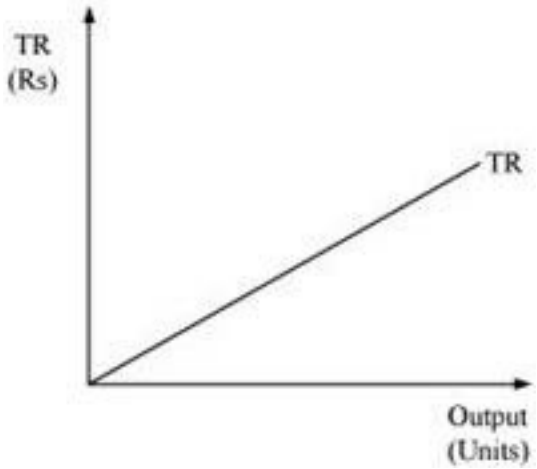
Solution : Price line is the graphical representation of the relationship between output and price, with *x*-axis denoting the output and *y*-axis denoting the price. In other words, the price line shows the relationship between the market price and a firm's output level. The vertical height of the price line is equal to the market price. For a perfectly competitive firm, price line and demand curve are the same.



Question 4: Whyisthetotalrevenuecurveofaprice-takingfirmanupward-slopingstraightline? Whydoesthecurvepassthroughtheorigin?

Solution : The total revenue curve for a firm in a perfectly competitive market is an upward sloping curve because the price or AR remains constant and MR is also equal to AR. Thus, TRcan only be influenced by altering the output sold, as the price remains constant. The increase in TR is in the same proportion as the increase in the output sold.

The curve passes through the origin, which implies that no matter what the price level is, if the output sold is zero, TR will also be zero.



Question 5: Whatistherelationbetweenmarketpriceandaveragerevenueofapricetaking firm?

Solution : Average Revenue is defined as the revenue per unit of the output sold. It is expressed as the ratio between total revenue and the output sold.

$$AR = \frac{TR}{Q}$$

We know that,
TR = P × Q

$$AR = \frac{P \times Q}{Q}$$

AR = P

Thus, the market price and the average revenue are the same for a perfect competitive firm.

Question 6: Whatistherelationbetweenmarketpriceandmarginalrevenueofaprice-takingfirm?

Solution : Marginal revenue is defined as the change in the total revenue that occurs due to the sale of one more unit of output. It is calculated as

$$MR_n = TR_n - TR_{n-1}$$

Where,

MR_n = Marginal revenue due to n^{th} unitofoutput

TR_n = Total revenue due to n unitsofoutput

TR_{n-1} = Total revenue due to (n - 1) units of output

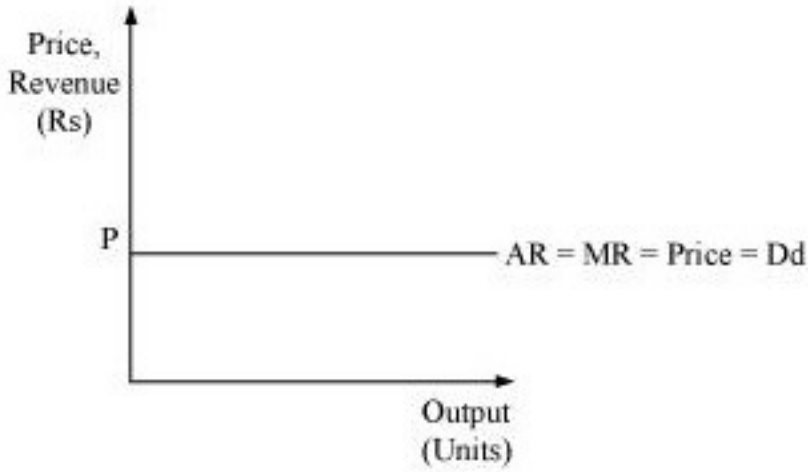
Suppose that the market price isP

$$MR_n = TR_n - TR_{n-1}$$

$$= PQ_n - P(Q_{n-1})$$

$$MR = PQ_n - PQ_n + P$$

MR = P. Thus, for a perfect competitive firm, marginal revenue is equal to the market price per unit of output. As a result that revenue from every additional unit (MR) is equal to price or average revenue.



Question 7: Whatconditionsmustholdifaprofit-maximizingfirmproducespositiveoutputina competitive market?

Solution : When price remains constant firms can sell any quantity of output at the price fixed by the market. AR remains same at all levels of output and also revenue from every additional unit (MR) is equal to AR. The following three conditions must hold if a profit maximizing firm produces positive level of output (say equilibrium output Q*) in a competitive market:

i) MR must be equal to MC atQ*.

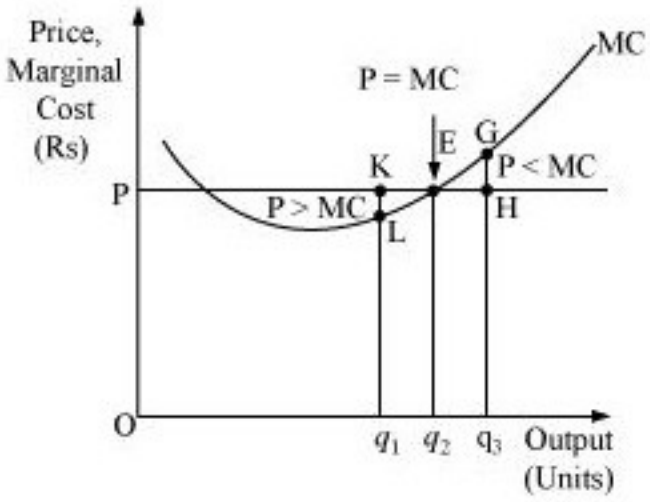
ii) MC should be upward sloping or rising atQ*.

iii) Inshortrun-Pricemustbegreaterthanorequalto AVC.i.e. $P \geq AVC$ atQ*.

In long run - Price must be greater than or equal toLAC.

Question 8: Cantherebeapositivelevelofoutputthataprofit-maximizingfirmproducesina competitive market at which market price is not equal to marginal cost? Give an explanation.

Solution : No,There cannot be any positive level of output that a firm produce at which price is not equal to MC. Let us evaluate the following two cases where price is not equal to MC.



Case A: If P > MC

At output Oq_1, Price is Kq_1, while the MC is Lq_1. So, Oq_1 is not the profit maximising output. This is due to the fact that the firm can increase its profit level by expanding its output to Oq_2.

Case B: If P < MC

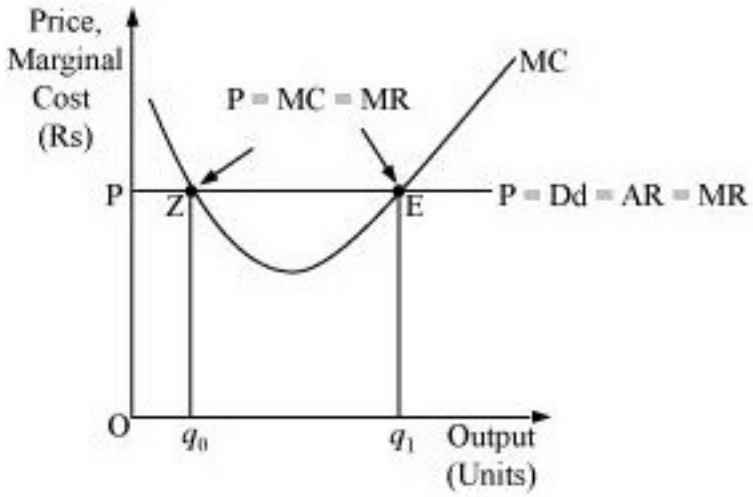
At output Oq_3, price is Hq_3 and MC is Gq_3. So, Oq_3 is not the profit maximising output. This is because the firm can increase its profit by reducing its output level to Oq_2.

Thus, at profit maximising point, price must be equal to MC and it cannot be greater or lesser than MC.

Question 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.

Solution :No, It is not possible for any perfect competitive firm to produce a positive level of output in a range where MC is falling. This is because, according to one of the conditions of profit-maximization, MC curve should be upward sloping or the slope of MC curve should be positive at the equilibrium level of output.

Let us take an example: At point Z price is equal to MC, but MC is falling and is negatively sloped. For any level of output more than Oq_0, the firm is facing price > MC, which implies that the profit can be maximized by increasing the output level further.

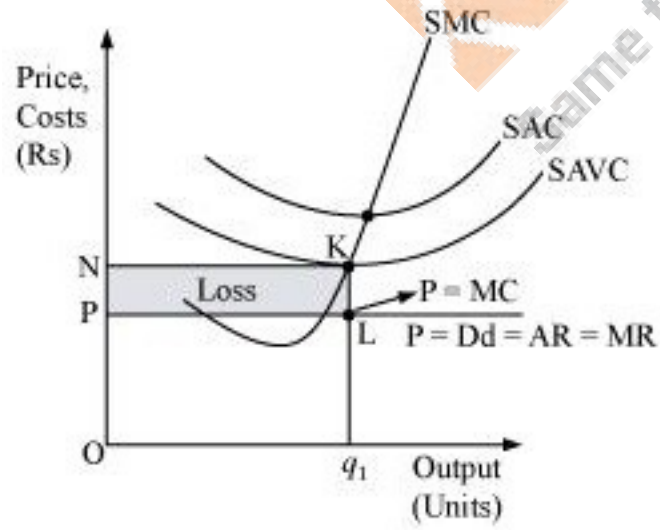


Hence,thepoint'E'istheequilibriumpoint,whereaprofitmaximisingfirmwouldoperate and produce Oq_1 units of output and its profit will bemaximized.

Question 10: Willaprofit-maximisingfirminacompetitivemarketproduceapositivelevelof outputintheshortrunifthemarketpriceislessthantheminimumofAVC?

Solution :No, it is not possible for a firm to produce positive level of output in the short run if theprice is less than the minimum of AVC. This is because as soon as the market price falls below the minimum of SAVC, which implies that the firm is not able to cover its fixed as well as variable costs, and thus it will stop production.

Let us understand this concept by taking an example:



At the point K, price charged by the firm is ON and output sold is Oq_1, and the firm generates TR.

$TR = P \times Q$

$= OP \times Oq_1$

= area (rectangle Oq_1LP)

And incurs the variable cost of TVC
TVC =SAVC × Quantity ofoutput
= $ON \times Oq_1$

= area (rectangle Oq_1KN)

Profit earned by the firm = TR - TC = TR - (TVC + TFC)

= TR - TVC – TFC

If the firm is not producing anything then at zero level of output, the firm's TR and TVC willbe zero. However, the firm has to bear TFC. Thus at zero level of output, the profit earned by the firm is

Profit = Π_1 = TR - TVC –TFC

Π_1 = -TFC

Nowifitproduces Oq_1 levelofoutput,thentheprofitearnedwillbe

Π_2 = TR - TVC –TFC

= area (rectangle Oq_1LP) - area (rectangle Oq_1KN) – TFC

Or, Π_2 = -area (rectangle PLKN) –TFC

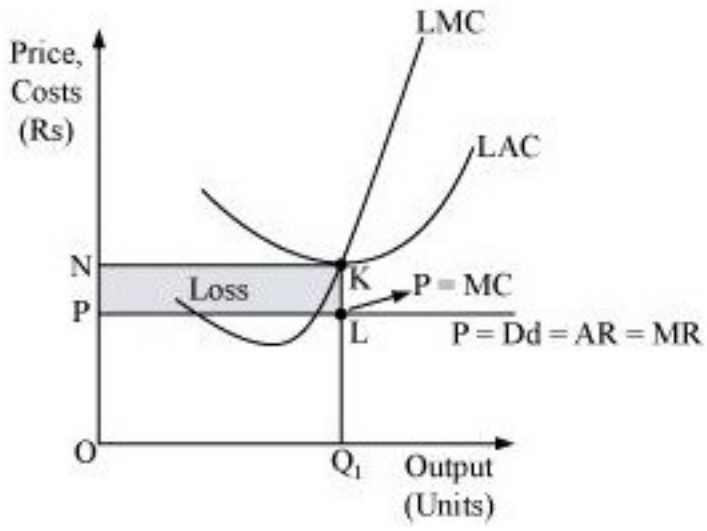
Thisimpliesthat Π_1 isgreaterthan Π_2 .Thefirmincursmorelossifitproduces Oq_1 level

of output than the loss associated with zero level of output. Thus, the firm will stop production whenever P < SAVC and therefore at profit maximising level of output, the price must be greater than or equal to SAVC in the short run.

Question 11: Willaprofit-maximisingfirminacompetitivemarketproduceapositivelevelof outputinthelongrunifthemarketpriceislessthantheminimumofAC?Givean explanation.

Solution :No, it is not possible for a firm to produce positive level of output in the long run if the market price falls short of the minimum of AC. This is because, in the long run there is free entry and exit of firms and all firms earn normal profit. Therefore, any firm making losses in long run will stop production.

Let us understand this concept through an example:



At Oq_1 level of output,

Price charged by the firm = OP.

Revenue generated by the firm (TR)= $P \times Q$

= $OP \times Oq_1$

= area (rectangle Oq_1LP)

Cost of producing Oq_1 level of output (TC) = × Quantity ofoutput

= $ON \times Oq_1$

TC = area (rectangle Oq_1KN) Profit earned by the firm = TR –TC

= area (rectangle Oq_1LP) - area (rectangle Oq_1KN)

= - area (rectangle NKLP)

Thus, the loss incurred by the firm is equal to the area of the rectangle NKLP.

In the long run, all firms earn zero economic profit, and if any firm earns loss or negative profit,thenthefirmwillshutdownitsproduction.Thus,ifthefirmearnsloss,i.e.ifpriceis lesserthanLACatanylevelofoutput,itwillnotbetheprofitmaximisingoutputlevelofthe firm.

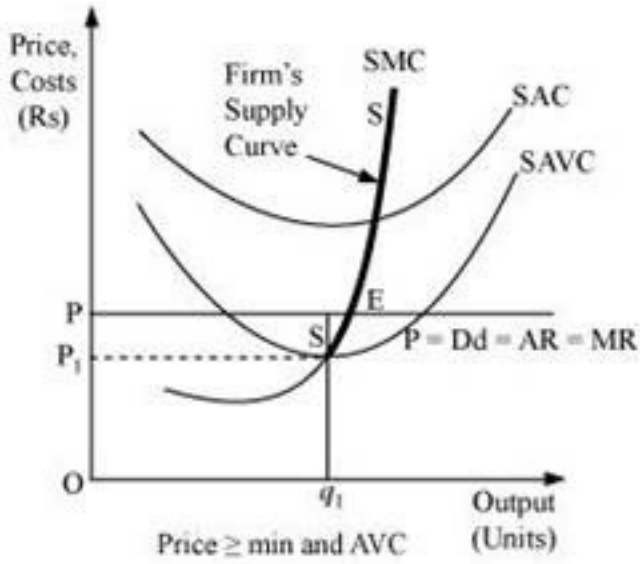
Question 12: Whatisthesupplycurveofafirmintheshortrun?

Solution : The short run supply curve of perfect competitive firm is the summation of the upward sloping portion of SMC (above the minimum point of SAVC), when price ≥ min SAVC, and vertical

portion of price-axis, when price < minSAVC.

Stage 1

Whenthepriceisgreaterthanorequaltominimumof SAVC,i.e., ≥ min SAVC.



At the market price OP, the three following conditions for equilibrium are fulfilled: MC = MR
MC is upward sloping

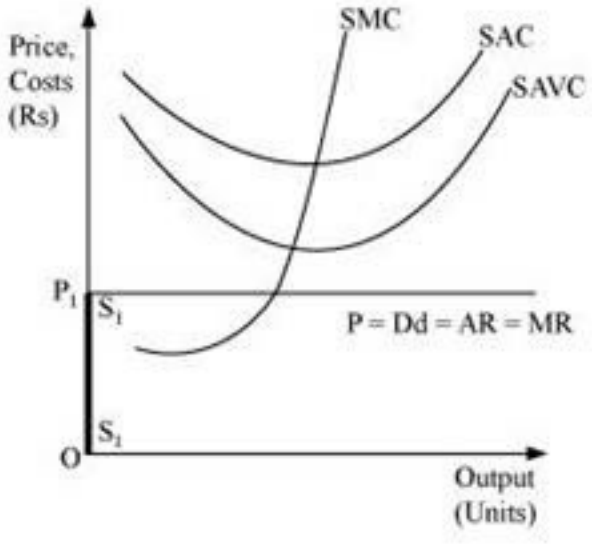
Price exceeds the minimum of SAVC

Atthismarketpricethefirmisproducingprofitmaximizingoutput Oq_1.

In this case, the supply curve of the firm is regarded as the upward sloping part of SMC (above the minimum point of SAVC), i.e. SS. When the price is greater than or equal to minimum of SAVC, the supply curve is indicated by SS.

Stage 2

When the price is less than the minimum of SAVC



P < Min. SAVC

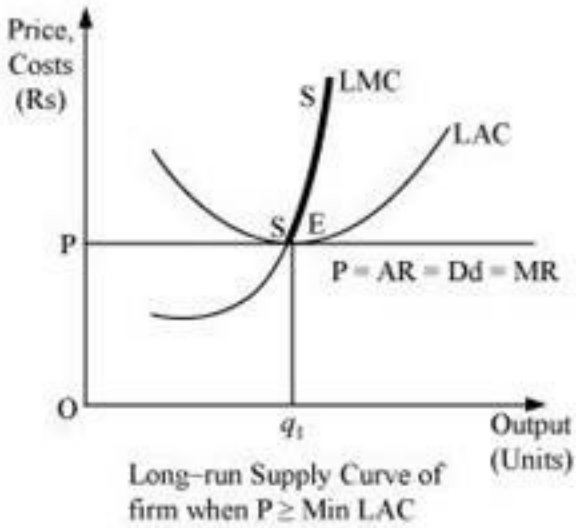
Letussupposethatthefirmisfacingprice OP_1 thatislesserthantheminimumofSAVC.At this price, the firm cannot continue production as it cannot even cover up its variable costs and thereby incurs losses, which implies that the firm would produce nothing. Thus, it will incur loss that will be equivalent to its fixed costs. It will be lesser compared to the losses associated with producing any positive output level. Thus, the firm will not produce anything atthispriceandtherebythequantitysuppliedwillbezero.Thefirm'ssupplycurveisindicated by the darkened vertical line S_1S_1.

Therefore,theshortrunsupplycurveofperfectcompetitivefirmis($SS\,S_1S_1$). Thus, we can say that the supply curve of a firm in the short run is less elastic and it is responsive to changes in price.

Question 13: Whatisthesupplycurveofafirminthelongrun?

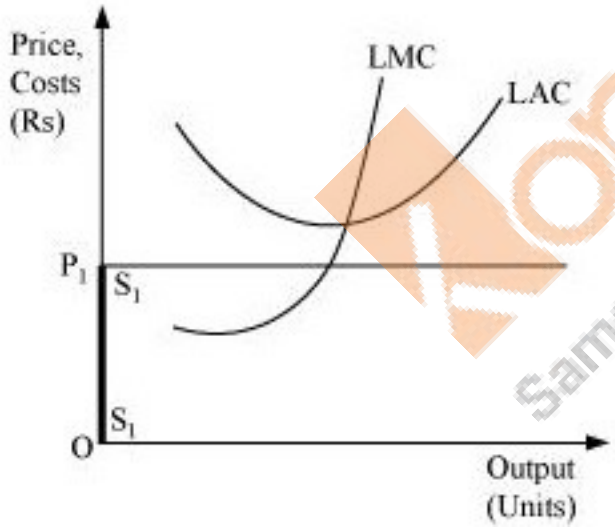
Solution : In the long run, as there is no fixed cost, the perfectly competitive firm's supply curve will be the summation of the upward sloping portion of SMC above the minimum point of LAC (when price $\geq$ minimum LAC), and the vertical portion of the price axis (when price < minimum of LAC). The long run supply curve of a perfect competitive firm is derived in two stages.

i. **When price is equal to the minimum of LAC:**Letussupposethatthefirmisfacing marketpriceOPthatexceedstheminimumofLAC.MCisequaltoMR(atpointE)andMCis positively sloped at this point of intersection. Also, the price is greater than the minimum of LAC. Thus, the firm is at long run equilibrium, facing the price OP and producing Oq1 units of output. The supply curve is 'SS', represented by the upward portion of LMC above the minimum of LAC.

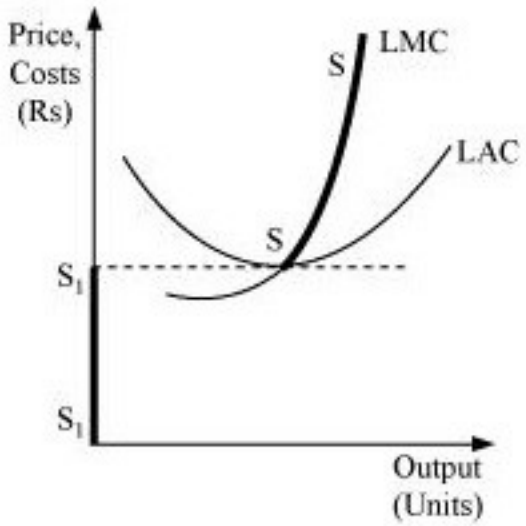


Long–run Supply Curve of firm when P ≥ Min LAC

ii. **When the price is less than the minimum of LAC:** Letussupposethatthemarketprice faced by a firm is OP_1, which is less than the minimum of *LAC*. At this price, the firm would not produce any output because producing any output will lead the firm to incur losses. Therefore, the firm would not produce anything. So, the supply curve of the firm in the long run for the price less than the minimum of *LAC* is given by S_1S_1 and is represented by the darkened vertical part of the priceaxis.



Combining 1st and 2nd stages, the firm's long run supply curve under perfect competition isgiven by $S_1S_1 + SS$.



Thus, the supply curve of a firm in the long run is highly elastic and is more responsive to changes.

Question 14: Howdoestechnologicalprogressaffectthesupplycurveofafirm?

Solution : The supply curve of a firm is a positive function of a state of technology. That is, if the technology available to the firm appreciates, more amount of output can be produced by the firm with the given levels of capital and labour. Due to such innovations or technological advancements, the firm will experience lower cost of production, which will lead to downward shift (to the right)of the MC curve. This will further lead to rightward shift of the firm's supply curve. Thus, due to the appreciation and advancement of production techniques, the firm will produce more and more output that will be supplied at a given market price. It can cause fall to the marginal cost also.

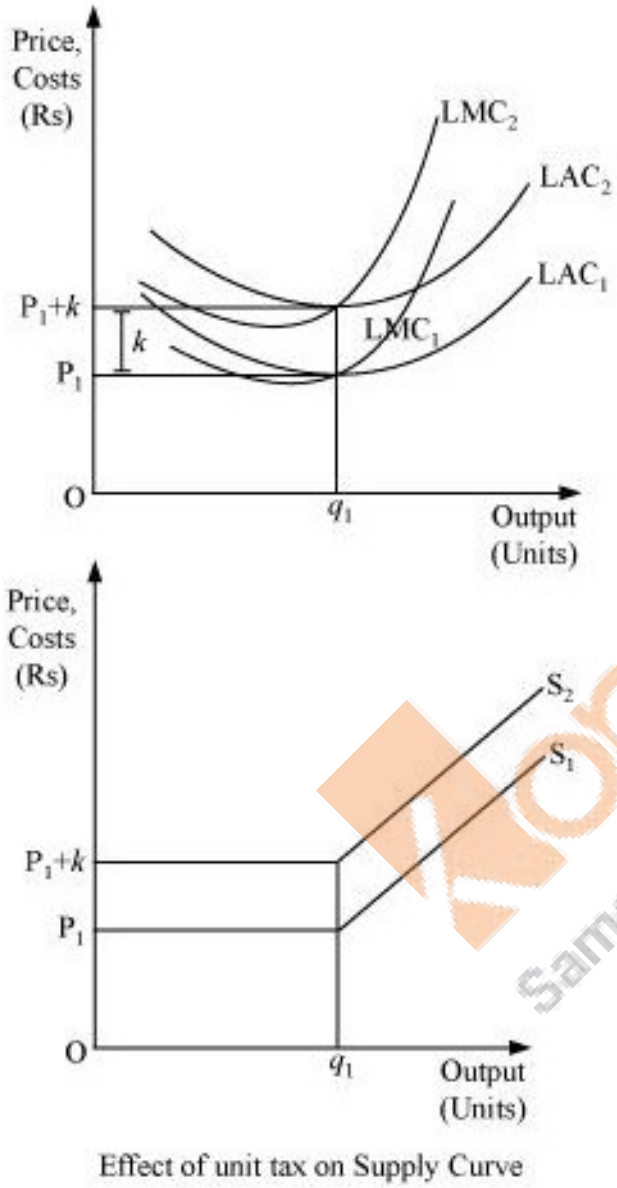
Question 15: Howdoestheimpositionofaunittaxaffectthesupplycurveofafirm?

Solution :A unit tax is the tax imposed by the government on per unit of the output sold. Due to the imposition of unit tax, the cost of production per unit of output increases, which ultimately increases the marginal cost. Consequently, the LMC curve will shift leftward upward and as the supply curveisaportionofLMC,sothesupplycurvewillalsoshiftleftwardupward.

Let us understand the effect of imposition of unit tax through an example.

Suppose that a firm is facing the price OP_1. LAC_1 and LMC_1 are the long run average cost curve and long run marginal cost curve respectively. Also assume that the government has

imposed a unit tax of Rs k per unit of output produced. Now, this will rise the firm's LAC and *LMC*, as the firm needs to pay Rs *k* extra on each output produced. LMC_1 and LAC_1 will shiftleftward upwards to LMC_2 and LAC_2. The magnitude of shift is equalto Rs *k*. As the supply curve is a part of LMC, it will also shift leftward from S_1 to S_2, due to theimpositionofthetax.Consequently,thefirmwillnowsupplylesserunitsofoutput.



Effect of unit tax on Supply Curve

Question 16: Howdoesanincreaseinthepriceofaninputaffectthesupplycurveofafirm?

Solution : An increase in the price of an input increases the cost of production, which in turn increases the marginal cost of the firm. Consequently, the MC curve will shift upward to the left. As a result, supply curve will also shift leftward upward. Therefore, an increase in the input price negatively affects the supply of the firm.

Question 17: Howdoesanincreaseinthenumberoffirmsinamarketaffectthemarketsupply curve?

Solution : The market supply curve is a horizontal summation of all the supply curves of individual firms in the market. If the number of firms in a market increases, then the market supply curve will shift rightward as there will be more number of firms supplying more amount ofoutput. Increase in number of producers will cause increase in supply.

Question 18: What does the price elasticity of supply mean? How do we measure it?

Solution : Price elasticity of supply (e_s) or PES is defined as the degree of the responsiveness of quantity supplied, to the change in the price of agood. In other words, the price elasticity of supply is the measure of the responsiveness in quantity supplied to a change in price for a specific commodity.

It is mostly expressed in numerical form as:

Price elasticity of supply (e_s)

$$e_s = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

$$= \frac{\frac{\Delta Q}{Q} \times 100}{\frac{\Delta P}{P} \times 100}$$

$$= \frac{\Delta Q}{Q} \times \frac{P}{\Delta P}$$

$$= \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

Where,

ΔQ = change in quantitysupplied

ΔP = change in price

P = initial price Q
= initialsupply

Question 19: Calculate the total revenue, marginal revenue and average revenue schedules in the followingtable.MarketpriceofeachunitofthegoodisRs10.

Quantity Sold	TR	MR	AR
0			
1			
2			
3			
4			
5			
6			

Solution :

Quantity Sold	$TR = P \times Q$	$MR = TR_n - TR_{n-1}$	**AR =** $AR = \frac{TR}{Q}$
0	-	-	-
1	$10 \times 1 = 10$	10 - 0 = 10	10
2	$10 \times 2 = 20$	20 -10 = 10	10
3	$10 \times 3 = 30$	30 - 20 = 10	10
4	$10 \times 4 = 40$	40 - 30 = 10	10
5	$10 \times 5 = 50$	50 - 40 = 10	10
6	$10 \times 6 = 60$	60 - 50 = 10	10

Question 20: The following table shows the total revenue and total cost schedules of a competitivefirm.Calculatetheprofitateachoutputlevel.Determinealsothemarket price of thegood.

Quantity Sold	TR	TC	Profit
0	0	5	

1	5	7	
2	10	10	
3	15	12	
4	20	15	
5	25	23	
6	30	33	
7	35	40	

Solution :

Quantity Sold	**TR**	**TC**	**Profit**	$AR = \frac{TR}{Q}$
0	0	5	0 - 5 = -5	-
1	5	7	5 - 7 = -2	$\frac{5}{1} = 5$
2	10	10	10 - 10 = 0	$\frac{10}{2} = 5$
3	15	12	15 - 12 = 3	$\frac{15}{3} = 5$
4	20	15	20 - 15 = 5	$\frac{20}{4} = 5$
5	25	23	25 - 23 = 2	$\frac{25}{5} = 5$
6	30	33	30 - 33 = -3	$\frac{30}{6} = 5$
7	35	40	35 - 40 = -5	$\frac{35}{7} = 5$

Question 21: Thefollowingtableshowsthetotalcostscheduleofacompetitivefirm.Itisgiven thatthepriceofthegoodisRs10.Calculatetheprofitateachoutputlevel.Findthe profitmaximisingthelevelofoutput.

Quantity Sold	TC
0	5
1	15
2	22
3	27
4	31
5	38
6	49
7	63
8	81
9	101
10	123

Solution :

Quantity Sold	Price	TC	$TR = P \times Q$	Profit = TR - TC
0	10	5	$10 \times 0 = 0$	0 - 5 = -5
1	10	15	$10 \times 1 = 10$	10 - 15 = -5
2	10	22	$10 \times 2 = 20$	20 - 22 = -2
3	10	27	$10 \times 3 = 30$	30 - 27 = 3
4	10	31	$10 \times 4 = 40$	40 - 31 = 9
5	10	38	$10 \times 5 = 50$	50 - 38 = 12
6	10	49	$10 \times 6 = 60$	60 - 49 = 11
7	10	63	$10 \times 7 = 70$	70 - 63 = 7
8	10	81	$10 \times 8 = 80$	80 - 81 = -1
9	10	101	$10 \times 9 = 90$	90 - 101 = -11

10	10	123	$10 \times 10 = 100$	100 - 123 = -23

Profit maximising output is where the difference between TR and TC is the maximum. This exists at 5 units of output, where firm is earning profit of Rs 12.

Question 22: Consideramarketwithtwofirms.Thefollowingtableshowssupplyschedulesof two firms: SS_1 denotes the supply schedule of firm 1 and SS_2 denotes the supply scheduleoffirm2.Calculatethemarketsupplyschedule.

Price	SS_1 **(units)**	SS_2 **(units)**
0	0	0
1	0	0
2	0	0
3	1	1
4	2	2
5	3	3
6	4	4

Solution :

Price	SS_1 **(units)**	SS_2 **(units)**	**MarketSupply=** $SS_1 + SS_2$
0	0	0	0 + 0 = 0
1	0	0	0 + 0 = 0
2	0	0	0 + 0 = 0
3	1	1	1 + 1 = 2
4	2	2	2 + 2 = 4
5	3	3	3 + 3 = 6
6	4	4	4+ 4 = 8

Question 23: Consideramarketwithtwofirms.Inthefollowingtable,columnslabelledas SS_1 and SS_2 give the supply schedules of firm 1 and firm 2 respectively. Compute the market supplyschedule.

Price	SS_1 **(kg)**	SS_2 **(kg)**

0	0	0
1	0	0
2	0	0
3	1	0
4	2	0.5
5	3	1
6	4	1.5
7	5	2
8	6	2.5

Solution :

Price	SS_1 **(kg)**	SS_2 **(kg)**	**MarketSupply=** $SS_1 + SS_2$
0	0	0	0 + 0 = 0
1	0	0	0 + 0 = 0
2	0	0	0 + 0 = 0
3	1	0	1 + 0 = 0
4	2	0.5	2 + 0.5 = 2.5
5	3	1	3 + 1 = 4
6	4	1.5	4 + 1.5 = 5.5
7	5	2	5 + 2 = 7
8	6	2.5	6 + 2.5 = 8.5

Question 24: Therearethreeidenticalfirmsinamarket.Thefollowingtableshowsthesupply scheduleoffirm1.Calculatethemarketsupplyschedule.

Price	SS_1 **(units)**
0	0
1	0
2	2
3	4
4	6
5	8
6	10
7	12

8	14

Solution :

Price	SS_1 **(units)**	SS_2 **(units)**	SS_3 **(units)**	**MarketSupply=** $SS_1 + SS_2 + SS_3$
0	0	0	0	0
1	0	0	0	0
2	2	2	2	6
3	4	4	4	12
4	6	6	6	18
5	8	8	8	24
6	10	10	10	30
7	12	12	12	36
8	14	14	14	42

Thus, from the above solution, we can understand that if the three firms are identical, supply from each firm will also be equal.

Question 25: AfirmearnsarevenueofRs50whenthemarketpriceofagoodisRs10.Themarket priceincreasetoRs15andthefirmnowearnsarevenueofRs150.Whatistheprice elasticityofthefirm'ssupplycurve?

Solution : At Market Price, (P_1)= Rs10

Total Revenue, $TR_1 = P_1 \times Q_1 = 50$

$$= Q_1 = \frac{TR_1}{P_1}$$

$$Q_1 = \frac{50}{10}$$

$$Q_1 = 5 units$$

At Market Price, (P_2)= Rs15

Total Revenue, $TR_2 = P_2 \times Q_2$ =150

$$Q_2 = \frac{TR_2}{P_2}$$

$$Q_2 = \frac{150}{15}$$

$Q_2 = 10$ *units*

Elasticity of supply, $e_S = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$

$$\Delta Q = Q_2 - Q_1$$

Change in quantity = 10 - 5 = 5 units

Change in price (ΔP) = $P_1 - P_2$ = 15 - 10 =Rs. 5

$$e_S = \frac{5}{5} \times \frac{10}{5}$$

$$e_S = 2$$

Thus, price elasticity of the firm's supply curve is 2.

Question 26: The market price of a good changes from Rs 5 to Rs 20. As a result, the quantity suppliedbyafirmincreaseby15units.Thepriceelasticityofthefirm'ssupplycurveis 0.5. Find the initial and final output levels of the firm.

Solution:

ElasticityofSupply, e_S =0.5

Initial Price, P_1 = Rs5

Final price, P_2 = Rs20

$$\Delta P = P_2 - P_1$$

= 20 – 5

ΔP = 15 (change in price)

ΔQ = 15 (change in quantity)

$$e_s = \frac{\Delta Q}{\Delta p} \times \frac{P_1}{Q_1}$$

$$0.5 = \frac{15}{15} \times \frac{5}{Q_1}$$

$$0.5 = \frac{5}{Q_1}$$

$$Q_1 = \frac{5}{0.5}$$

=10 units

Initial quantity = 10 units

Final quantity, $Q_2 = \Delta Q + Q_1$

= 15 + 10

Therefore, Q_2 = 25units

Question 27: At the market price of Rs 10, a firm supplies 4 units of output. The market price increases to Rs 30. The price elasticity of the firm's supply is 1.25. What quantity will the firm supply at the new price?

Solution:

InitialPrice, P_1 = Rs10

InitialOutput, Q_1 = 4 units

FinalPrice, P_2 = Rs30

$\Delta P = P_2 - P_1$

= Rs 30 - 10 = Rs 20

Elasticity of supply, e_s =1.25

$$e_s = \frac{\Delta Q}{20} \times \frac{10}{4}$$

$$1.25 = \frac{\Delta Q}{20} \times \frac{10}{4}$$

$$= 1.25 \times 8 = \Delta Q$$

$$= \Delta Q = 10 \ units$$

Thus, final output supplied, $Q_2 = \Delta Q + Q_1$

Q_2 = 10 + 4 = 14 units (quantity at new price)