Chapter
The theory of the Firm under Perfect Competition

Perfect competition: It is a market situation in which a very large number of buyers and sellers buy and sell homogeneous products. The following are the features of perfect competition.

1. A large number of buyers and sellers.

2. Homogeneous products.

3. Free mobility of factors of production.

4. Perfect knowledge about market conditions.

5. Freedom of entry and exit.

6. Absence of transportation cost.

7. Uniform price. 8. Absence of selling cost.

The most important features of perfect competition are- Homogeneous products and every buyer and seller are price takers. Price takers mean every buyers and seller in the market receive the price determined by1 market forces such as Demand and Supply. Perfect Competition does not exist in the real world because of the features such as homogeneous products, absence of transportation cost.

REVENUE: The Income earned by a producer by selling products in the market is called Revenue. There are three types of Revenue.

1. **Total Revenue (TR):** Income earned from selling all the units of output in the market is called Total Revenue. It is the product of price(P) and quantity sold(q). The total Revenue curve is an upward-sloping straight line. We use the following formula to find TR. $TR = P \times Q$
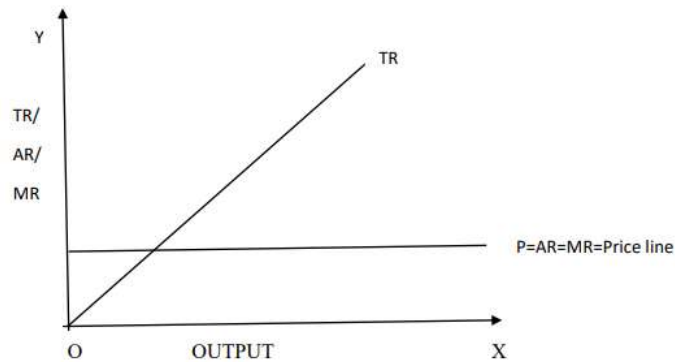
2. **Average Revenue (AR):** Total Revenue pet unit of output is called AR. It is calculated by dividing TR by the quantity of output sold. $AR = TR = P \times Q = P$ AR is equal to P.

   AR curve is a horizontal straight line. It is also the price line, Demand curve, 3. Marginal Revenue curve of a firm under perfect competition.

3. **Marginal Revenue (MR):** MR is the additional Revenue by selling an additional unit output in the market. We use the following equations for finding MR. $MR = \Delta TR = TRn - TR(n-1)$

PROFIT MAXIMISATION: Every producer produces goods2 and services to maximize profit. Profit is the difference between the Total Revenue and Total Cost. It can be written as PROFIT (π) = TOTAL REVENUE (TR) – TOTAL COST (TC). A firm under perfect competition reaches maximum profit (equilibrium) when the following conditions are satisfied

1. Market price (p) should be equal to the Marginal Cost (MC). P= MC.

2. MC Should be non-decreasing. Or MC Curve should cut the MR curve from below.

3. In short-run $P \geq AVC$ and In long run $P \geq AC$.

The profit maximization of a firm under perfect competition in the short run is illustrated with the following diagram.

Supernormal Profit in Perfect Competition Market
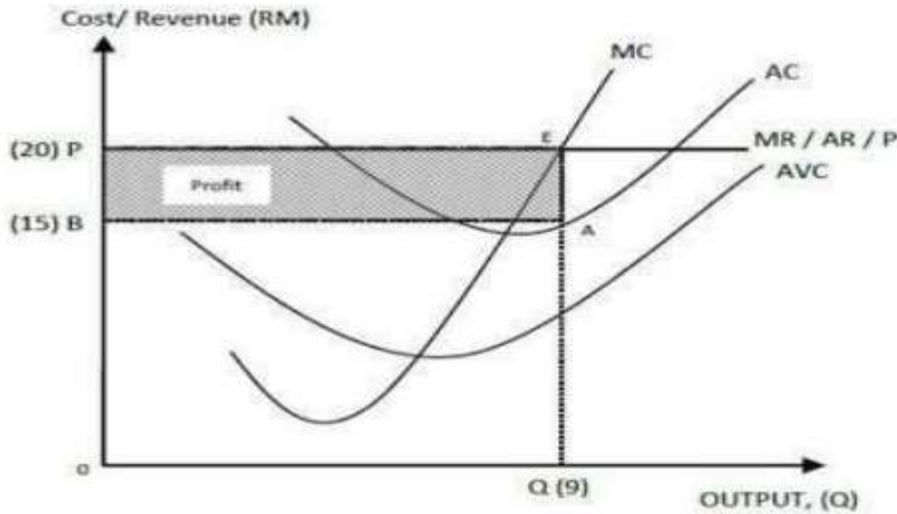
In the above diagram AVC, AC, MC represents Average Variable Cost Curve, Average cost curve, Marginal cost curve respectively. At the point, A MC Curve interest price line (P=MC), After that Point MC Curve is rising. At the point, A Price is greater than AC so point A is considered as the equilibrium point. At point A the firm enjoys maximum profit. Profit is the difference between TR and TC. At point A

TR = P×Q. Here P=OP× OQ = OPEQ. TC = AC×Q= OBAQ

PROFIT = TR-TC= OPEQ - OBAQ= BPEA

A FIRM INCURRING LOSS UNDER PERFECT COMPETITION (P< AVC)

A firm under perfect Competition incurring a loss when it's AVC is greater than the market price. This is shown in the following diagram.
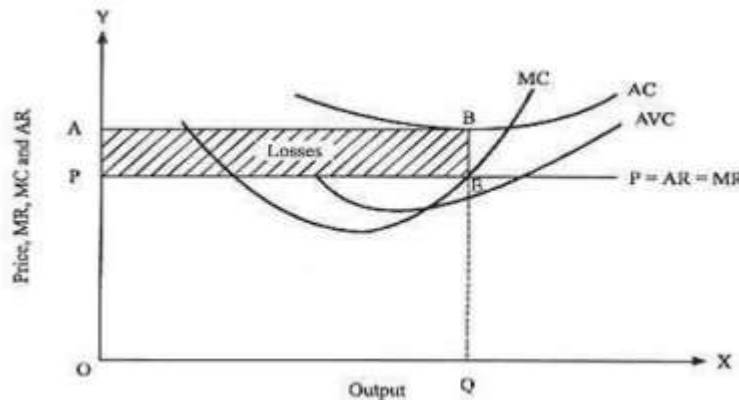
In the above diagram AVC, SAC, SMC is the short run Average Variable cost, Average Cost curve, and Marginal Cost curve respectively. At the point, A, the firm's Total expenditure is greater than it's Total Revenue so at that point the firm incurring a loss.

TR = Price × Quantity

   = Vertical height Op × width OQ

   = The area of rectangle OPEQ

Similarly, the firm's total variable cost at q1 is as follows

TC = Average cost × Quantity

   = Vertical height OA × Width OQ

   = The area of rectangle OABQ.

LONG RUN PROFIT MAXIMISATION

If most firms are making supernormal profits in the short run there will be an expansion of the output of existing firms and we expect to see the entry of new firms into the industry. Firms are responding to the profit motive and supernormal profits act as a signal for a reallocation of resources within the market. The addition of new suppliers would increase supply. Assuming that the market demand remains the same, higher market supply will reduce the equilibrium market price until the price = long-run average cost. At this point, each firm is making normal profits only. There is no further incentive for the movement of firms in and out of the industry and a long-run equilibrium is established.
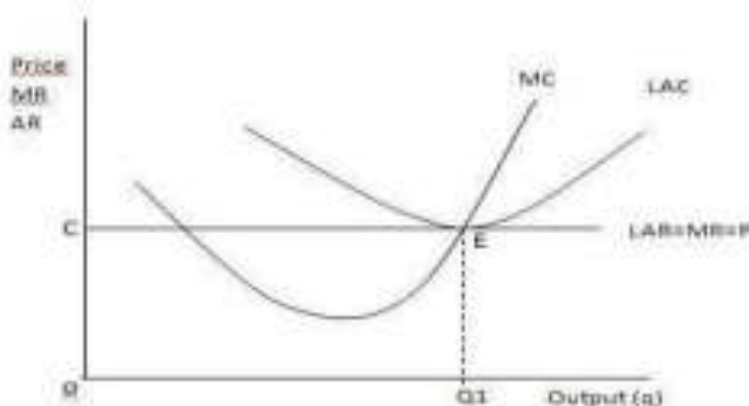
• E is the equilibrium point. At this point MR= MC.

• Drawing a straight line from E to LAC curve gives us the cost of the product.

• Here, LAC=LAR (or price). So, the firm is incurring a normal profit.

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

The short-run supply curve of the perfectly competitive firm is the summation of the upward sloping portion of SMC (above the minimum point of SAVC), when price min SAVC, and the vertical portion of price-axis when price < min SAVC.
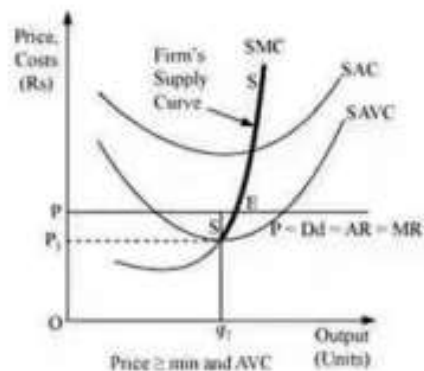
Stage 1

When the price is greater than or equal to the minimum of SAVC, i.e., P min SAVC.

At the market price OP, the three following4 conditions for equilibrium are fulfilled:

MC = MR, MC is upward sloping, Price exceeds the minimum of SAVC

At this market price, the firm is producing profit-maximizing output.

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 the minimum of SAVC, the supply curve is indicated by SS.

Stage 2

When the price is less than the minimum of SAVC

Let us suppose that the firm is facing a price that is lesser than the minimum of SAVC. 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 a 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 at this price and thereby the quantity supplied will be zero. The firm's supply curve is indicated by the

darkened vertical line. Therefore, the short-run supply curve of a perfectly competitive firm is (SS +).
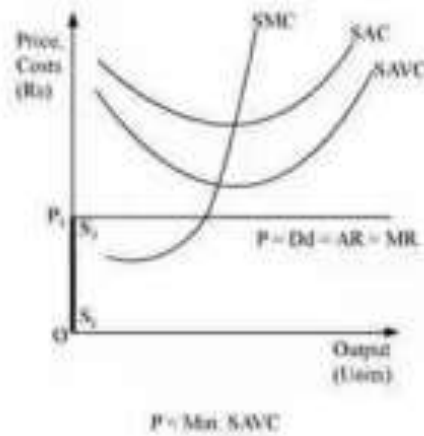

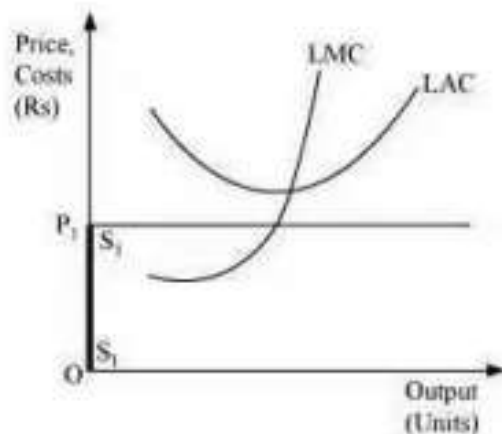What is the supply curve of a firm in the long run?

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 minimum LAC), and the vertical portion of the price axis (when price < minimum of LAC). The long-run supply curve of a perfectly competitive firm is derived in two stages.

i. When the price is equal to the minimum of LAC: Let us suppose that the firm is facing a market price OP that exceeds the minimum of LAC. MC is equal to MR (at point E) and MC is 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 output. The supply curve is 'SS', represented by the upward portion of LMC above the minimum of LAC. 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 S1S1 and is represented by the darkened vertical part of the price axis.

Long-run Supply Curve of
firm when P ≥ Min LAC
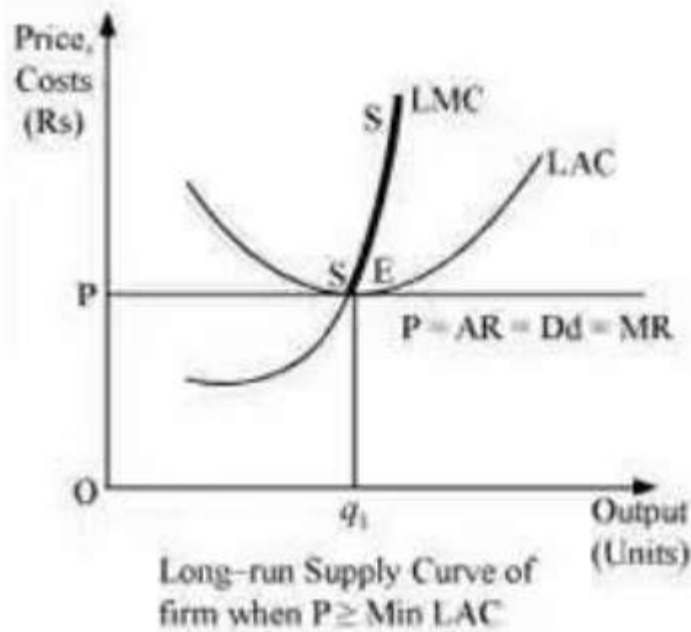
ii.   When the price is less than the minimum of LAC: Let us suppose that the market price
      faced by a firm is OP1, which is less than the minimum of LAC. At this price, the firm
      would not produce any output because producing any output will lead the firm to incur
      losses. Therefore, the firm would not produce anything. So, the supply curve of the firm
      in the long run for the priceless than5 the minimum of LAC is given by S1S1 and is
      represented by the darkened vertical part of the price axis.

Combining the 1st and 2nd stages, the firm's long-run supply curve under perfect competition is
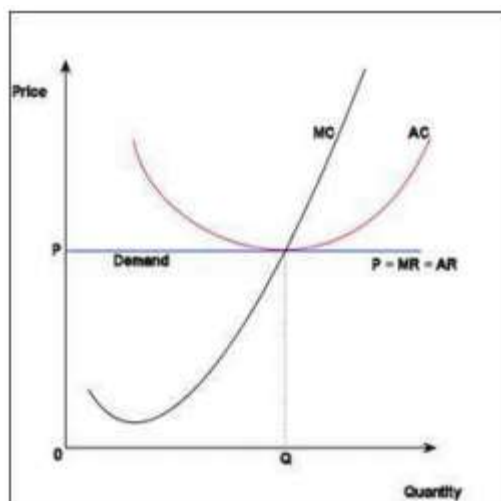given by (SS1+ SS).
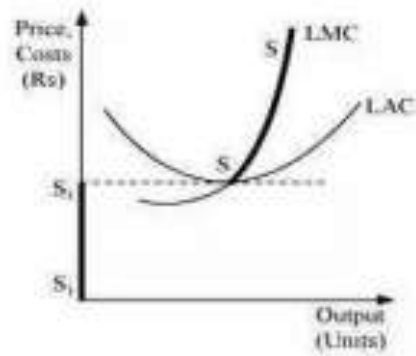
SHUT DOWN POINT: It is a situation in which a firm stops production and leaves the market is called Shut Down Point. In the short run shut down point is the minimum point of AVC. It is shown in the following diagram.

Fig. 13.
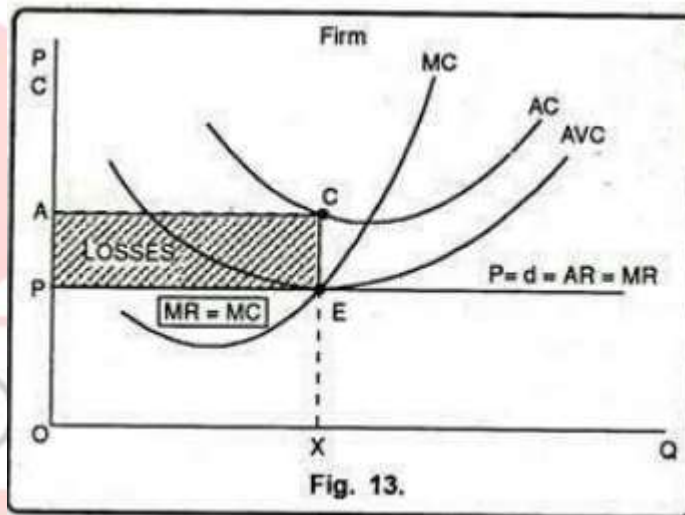
In the long run, the shutdown point is the minimum point of AC. It is shown by the following diagram

SHUT DOWN POINT IN SHORT RUN = MINIMUM POINT OF AVC.

SHUT DOWN POINT IN LONG RUN =MINIMUM POINT OF AC

BREAK-EVEN POINT: It is the point where total Revenue 6of a firm equals Total Cost. TR = TC. It is otherwise called no Profit no loss point. Break-Even Point = TR=TC.

SUPPLY: It refers to the number of goods and services offered to sell in a market at a particular price and a particular point of time.

SUPPLY FUNCTION

Like demand, supply also depends on many things. In general, the quantity supplied of a product is expected to depend on its price, prices of related products, prices of inputs, state of technology, expectations, number of producers (sellers) in the market, etc. This list can be summarised in a supply function

QXS= f (Px, Pr, Pi, T, E, N)

Where., QXS= Quantity supplied of commodity x, Px = Price of the commodity x, Pr = Prices of related products

Pi = Prices of inputs, T = State of technology, E = Expectations, N = Number of producers in the market.

LAW OF SUPPLY: Other things remaining unchanged, the quantity of a commodity supplied varies directly with its price. It indicates the direct relationship between the price of the commodities and it's quantity supplied.

SUPPLY SCHEDULE: It is a table which shows the amount of quantity supplied during a given period at different prices. The following is a supply schedule.

Price of Apple/kg(in RS)	1	2	3	4	5
Quantity supplied (kg)	15	20	25	30	35

FACTORS THAT AFFECT THE SUPPLY CURVE OF A FIRM

1. TECHNOLOGICAL PROGRESS: 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 labor. Due to such innovations or technological advancements, the firm will experience a lower cost of production, which will lead to a rightward downward shift of the MC curve. This will further lead to a rightward shift in 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.

2. UNIT TAX: unit tax is the tax imposed on per unit of the output sold. Due to the imposition of a unit tax, the cost of production per unit7 of output increases, which ultimately increases the marginal cost. Consequently, the LMC curve will shift leftward upward and as the supply curve is a portion of LMC, so the supply curve will also shift leftward upward.

3. THE PRICE OF AN INPUT: 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 and the supply curve will also shift leftward upward. Therefore, an increase in the input price negatively affects the supply of the firm.

THE PRICE ELASTICITY OF SUPPLY: Price elasticity of supply is defined as the degree of the responsiveness of quantity supplied, to the change in the price of a good. It is expressed as:

$$\text{The price elasticity of supply} = \frac{\%change\ in\ quantity\ supplied}{\%change\ in\ price}$$

$$= \Delta Q/\Delta P \times P/Q$$

According to the responsiveness price elasticity of supply is broadly divided into five. They are the following.

1. PERFECTLY ELASTIC SUPPLY: Refers to a situation when the quantity supplied completely increases or decreases to proportionate change in the price of a product. In such a case, the numerical value of elasticity of supply ranges from zero to infinity. The following is a perfectly elastic Supply curve.
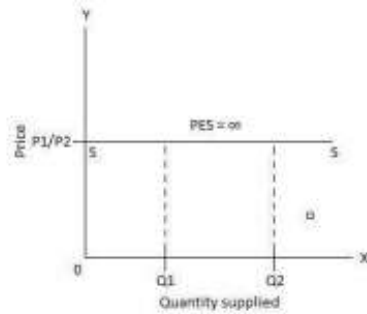
2. PERFECTLY IN ELASTIC SUPPLY: Any changes in price do not affect quantity supplied is called perfectly inelastic supply. The perfectly inelastic Supply curve is a vertical straight line. It is shown in the following diagram. Here PES = 0.
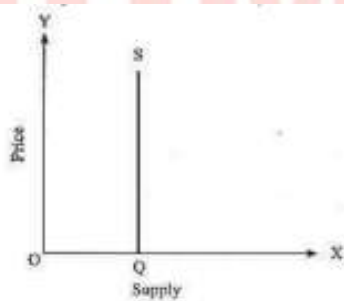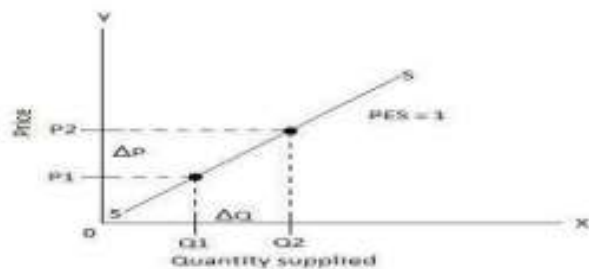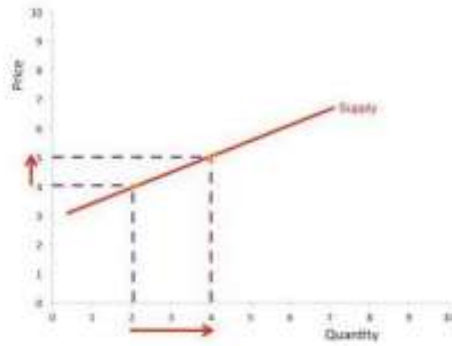

Fig 3.9: Perfectly Inelastic Supply Curve

3. UNITARY ELASTIC SUPPLY: A proportionate change in price causes a proportionate change in quantity supplied is called unitary elastic Supply. The following is a Unitary Elastic Supply curve. Here PES = 1.
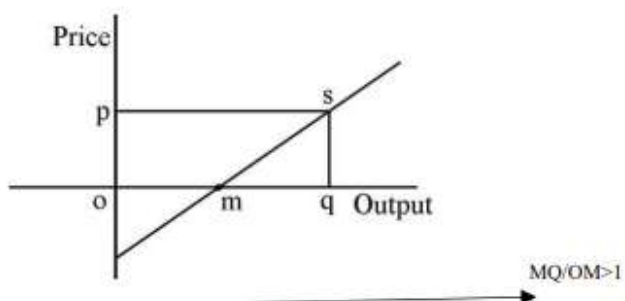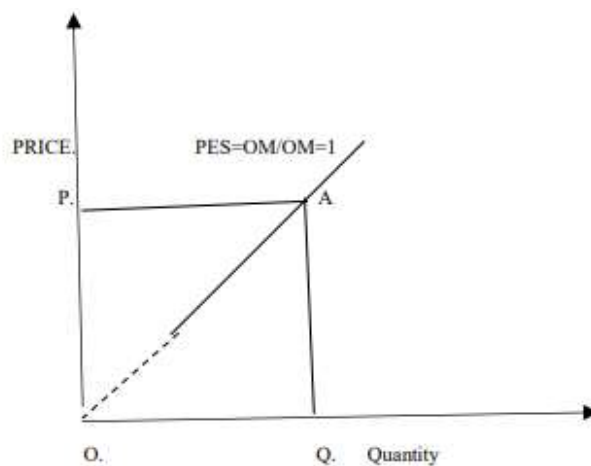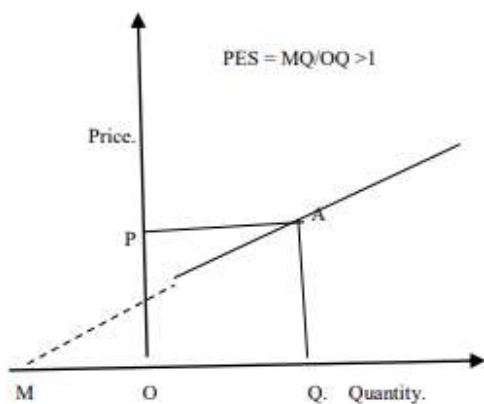
4. **RELATIVELY ELASTIC SUPPLY:** A change in price causes more proportionate change in quantity supplied is called relatively elastic supply. It is shown in the following diagram. Here PES >1.

5. **RELATIVELY INELASTIC SUPPLY:** A change in price causes a more proportionate change in quantity supplied is called relatively inelastic supply. It is shown in the following diagram. Here PES

Fig. 9.22
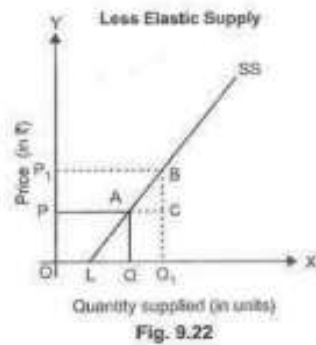
PRICE ELASTICITY IN A SUPPLY CURVE: If the supply curve is a straight line, extend the supply curve in such a way that it8 cuts on the 'OX' axis. It is shown by the following diagram

PES = MQ/OQ >1

Price.

P
A

M   O   Q.   Quantity.

PRICE.   PES=OM/OM=1

P.   A

O.   Q.   Quantity

Price

p   s

o   m   q Output

MQ/OM>1

EDUCATIONAL GROUP

Changing your Tomorrow