13.1 ASSUMPTIONS OF PERFECT COMPETITION

In economic theory, perfect competition has a meaning diametrically opposite to the everyday use of this term as synonymous to rivalry. The perfect competition means complete freedom in economic life and absence of rivalry among firms. It prevails, when all the conditions given here are simultaneously present in the market. However, most of these stringent conditions are unlikely to be present in the real world. The real world consists of various imperfections and monopolistic tendencies. The market is rarely perfect in the actual sense. This suggests that perfect competition is a purely

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theoretical market form, which is never observed in reality. However, the stock market is close approximation of perfect competition. Here, any particular stock is homogeneous, there is no information cost (information is readily available through published prices), free entry and exit conditions for the transactors having insignificant control on price.

Perfect competition has an edge over other realistic and complicated market forms, as it is relatively simple to handle. This kind of idealistic market structure provides a yardstick or a standard against which other more realistic market forms can be compared, evaluated and understood better. That is why, the whole of the economic analysis starts with the analysis of perfect competition and its assumptions. Perfect competition provides simple and logical analytical tools, which can be used to explain equilibrium determination in other market situations.

The following features serve as a necessary set of assumptions or conditions underlying the model of perfect competition

1. Large Number of Sellers and Buyers

In perfectly competitive market, there are a large number of sellers and buyers in the industry. On account of innumerable transactors, each seller produces a very small portion of the total quantity offered in the market and each buyer has an inappreciable portion of the total demand of the market. Thus, no individual seller (or buyer) has any economic or market power[1] to influence the market price in his favour through his own individual behaviour or action. The number of sellers and buyers are so numerous that variation in output by one seller or change in purchase by a single buyer can hardly make any difference to the total quantity of output offered in the market. The possibility of any illusion or agreement among the sellers or buyers to influence the price is ruled out.

2. Homogeneous Product

The products produced by all the firms in the industry[2] are homogeneous. The technical characteristics of the product (including its physical qualities) as well as the services associated with its sale as also delivery are identical . There should also be no imagined differences in the minds of different buyers for the products made available by various sellers. As the products of different firms are perfect substitutes to each other, it makes no difference to the buyer to purchase the product from one or the other seller. It should merely be a matter of chance from which seller a particular buyer makes his purchases.

Given the assumption of large number of sellers and buyers along with the assumption of product homogeneity ensure that each individual firm takes the price of the product as a given datum and adjusts its output to earn maximum profits. In other words, the firm is a *price taker* and *output adjuster*.

No individual seller would change its price from the prevailing level. If he attempts to raise the price above this level, he loses all his buyers, who will shift to products

1. Even some other characteristics of perfect competition like product homogeneity, free entry and exit, perfect knowledge, etc. also ensure the absence of market power on the part of economic agents.
2. Actually, an industry in Economics is defined as a group of firms producing a homogeneous product.

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supplied by some other seller. Similarly, no seller would like to lower his price below the prevailing level, as he can sell any quantity at the prevailing price. Any such attempt will also mean losses to the firm. Since the price of the commodity remains constant at its prevailing level, so all the units of the commodity must be sold at the same price. Thus, under perfect competition, each additional unit of the commodity sold at the margin leads to the equal increase in the total revenue as the price of the commodity. That is why, just like the price or average revenue, the marginal revenue of a seller also remains constant at all levels of output under perfect competition and is equal to the former.

3. Free Entry and Exit

Under perfect competition, the firms are free to enter or leave the industry. There are no barriers or impediment (natural, artificial or legal) on their free movements, in and out of the industry. This assumption is actually supplementary to the assumption of large numbers. If restrictions on entry or exit exist, the number of firms in the industry may be reduced. As a result, each or some of them may acquire economic power to affect the market price. Free entry and exit by strengthening the competitive process ensures that in the long-run economic profit cannot deviate from zero (that is, normal profit).

4. Absence of Government Regulation

Under perfect competition, each buyer/seller acts independently. There is no restraint upon their independence by custom, contract, collusion. Further, any type of government intervention into the free interplay of market forces is assumed to be absent. Thus, the intervention of the government through tariffs, taxes, subsidies, duties, licencing, rationing of production or demand is ruled out. The government intervention restricts the competition.

5. Perfect Mobility of Factors of Production

The factors of production are assumed to move freely from one firm to another throughout the economy. Here, mobility means geographical and occupational freedom. It is assumed that workers can move between different occupations. They tend to move, where they derive greatest advantage (*i.e.*, highest remuneration). This implies that new skills can be acquired easily. Trade unionism is assumed away. Further, there is unimpeded flow of raw materials and other resources (or factors) between alternative uses in response to price differentials. This mobility of resources also enables the firms to adjust their supply in response to the changing market demand and achieve equilibrium positions. Finally, it is assumed that raw materials and other resources are not monopolised. In short, there is perfect competition in the factor market. Firms have equal access to all the inputs, which are available on similar terms.

6. Perfect Knowledge

All the sellers, buyers and input suppliers are supposed to have perfect knowledge about the present as well as future conditions in the market. Under these conditions, uncertainty about future developments in the market is ruled out. The information regarding the availability, cost, price, quantity, nature of the factor or product,. *etc.* is

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assumed to be available free of cost. Knowledge transmission is also quick and costless. Perfect knowledge coupled with product homogeneity ensures that no two prices can prevail in the perfect competitive market.

Perfect knowledge means perfect foresight and certainty. Under perfect competition, uncertainty of any kind does not exist. Further, perfect knowledge leads to optimal allocation of the resources.

7. Absence of Transportation and Selling Costs

Under perfect competition, there is no transportation costs for either the movement of factors or products between different parts of the market. This condition is also necessary for uniform price to prevail in the market. If cost of transportation is considered, then prices will differ in different segments of the market. Expenses on sales promotion and advertisement is ruled out under perfect competition on account of perfect knowledge on the part of sellers, buyers and input suppliers.

13.2 PURE COMPETITION VERSUS PERFECT COMPETITION

Some economists, notably *E.H.Chamberlin* and *F.H. Knight* make distinction between pure competition and perfect competition. According to *Chamberlin*, "Pure competition is unallowed by monopoly elements. It is much simpler and less exclusive concept than perfect competition for the latter may be interpreted to involve perfect in many other respects than in the absence of monopoly, *e.g.*, perfect mobility or perfect knowledge or such other perfection as the particular theorist finds convenient or useful to him".

Pure competition involves purity only in one respect, namely absence of monopoly elements, *i.e.*, absence of control over price. Hence, the firm in pure competition is a price taker and the demand curve facing it is perfectly elastic (parallel to the horizontal axis). The competitive firm can alter its rate of production and sales within any feasible range without its action having any effect on the price of the product it sells. Thus, the firm passively accepts whatever price happens to be ruling on the market. Pure competition is said to exist in an industry, where there are a large number of sellers and buyers producing homogeneous product. In the industry, entry and exit of the firms is assumed to be free and the Government regulation or control is also supposed to be non-existent[3]. Pure competition may exceptionally be found in the real life situations. The market for foodgrains can reasonably be approximated to pure competition, where large number of sellers and buyers interact with each other for almost homogeneous product. The sellers in the market behave like price takers. Even the buyers treat the market price as a given datum that cannot be tempered by them. The conditions quite akin to pure competition are present in the market for almost every agriculture commodity.

Perfect competition is a broader term and involves absence of monopoly as well as presence of other perfections like perfect mobility of the factors of production, perfect

3. The first four conditions or assumptions discussed under previous heading explain the features of pure competition.

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knowledge, absence of transportation and selling costs, perfect divisibility[4] of resources. It is difficult to present examples of perfect competition with these perfections besides all the features of pure competition.

Usually, the term pure competition and perfect competition are used interchangeably[5], since in both the cases sellers as well as buyers are price takers with no control over the prevailing market price. Further, the demand and supply curves of the firms as well as industry are similar in either situations.

13.3 EQUILIBRIUM OF A PERFECTLY COMPETITIVE FIRM

A perfect competitive firm will be in equilibrium, when it earns maximum profits. Profits here are abnormal, excess or supernormal. These are over and above the normal profit[6] (returns on own factors of production including the imputed remuneration for the managerial services of the entrepreneur) and are equal to the difference between its total revenue and total cost. At equilibrium, the surplus of total revenue over total cost is maximised and the marginal cost curve cuts the marginal revenue curve from below.

Now, we are in a position to explain the equilibrium of a perfectly competitive firm with reference to the short-run and long-run.

13.3.1 Short-Run Equilibrium of a Competitive Firm

When firms are taken together in the study of industry, the TR-TC approach of finding equilibrium of firm is quite awkward to handle. Fig. 13.1 illustrates the equilibrium of a perfectly competitive firm using *alternative approach, i.e.*, through *MR and MC curves*. The diagram on the left in Fig. 13.1 shows the equilibrium of the industry at point 'E', where the market demand (DD) curve and market supply (SS) curve intersect each other. The equilibrium price OP so determined by the industry (through the collective actions of all sellers and buyers in the industry) is to be accepted by all the firms. Thus, the demand curve (*i.e.*, the average revenue curve) of the individual firm is a horizontal straight line parallel to X-axis at a distance equal to price as shown in Fig. 13.1. The marginal revenue curve of the firm also coincides with the average revenue curve, since each additional unit of the product is sold at the prevailing price OP. In order to maximise the profits, the firm will try to reduce its costs and passively adjust its level of output to any given price situation. If the firm wants to get maximum profits (or minimum losses), it should not produce even a single additional unit at a loss for that would reduce the total profits of the firm.

For levels of output below OQ_0, MC curve lies above MR curve. Thus, the addition to cost (*i.e.*, marginal cost) is more than the addition to revenue (*i.e.*, marginal revenue) implying losses. The losses are equal to the area enclosed by region PP_1A, when OQ_0 level of output is sold in the market. Further, by producing beyond OQ_0 level of output,

4. Edgeworth introduced this perfection as condition for perfect competition.
5. American economists prefer to use the term pure competition, while the term perfect competition is popular with the British economists.
6. Normal profits are invariably treated as cost items and are included under the total costs.

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the firm can add to its profits, since here each additional unit of output brings to the firm a revenue which exceeds its marginal cost (MR curve lies above MC curve). This implies that each additional unit of output sold contributes more to the total revenue than what it adds to the total costs, so long as the output of the firm remains lower than OQ. Ultimately, the equilibrium of the firm is established at point 'B', where marginal revenue (MR) is equal to marginal cost (MC) and the firm produces OQ level of output. At this level of output, the firm gets maximum profits equal to the area enclosed between point 'A' and 'B' minus the losses equal to the area enclosed by the region PP_1A.

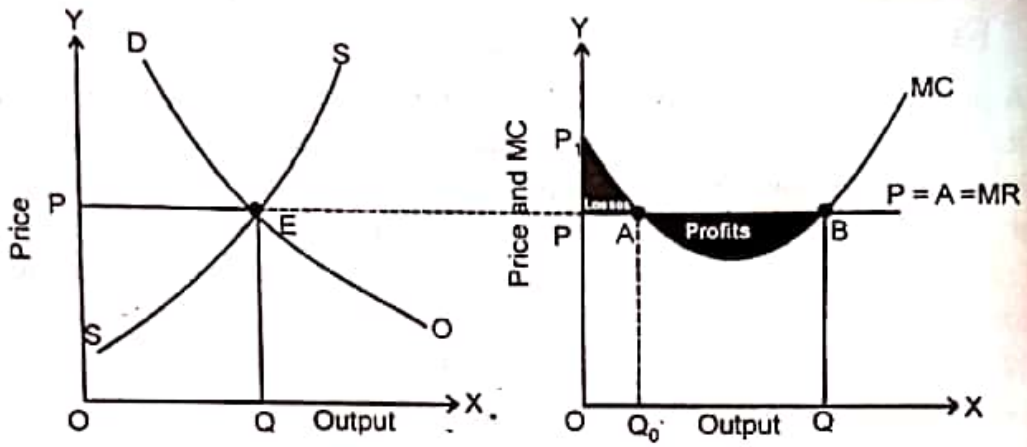

Fig. 13.1 : Short-Run Equilibrium of a Perfectly Competitive Firm Using Marginal Analysis

Expansion of each unit of output beyond OQ level adds more to total costs than to total revenue (indicated by the fact that MC curve rises above the MR curve, while the latter remains horizontal) resulting in losses to the firms. Therefore, the profitability of the firm comes down. The firm should contract its output to secure maximum profits.

Now, we observe that the total profits of the firm decline with sales beyond OQ level of output, as marginal cost exceeds marginal revenue for output greater than OQ. While there is still scope to raise the level of profits for any level of output below OQ, since marginal cost is less than marginal revenue for output less than OQ.

Hence, the profit maximising competitive firm can be in equilibrium only by producing the OQ level of output, where the revenue from the last unit (*i.e.*, MR) is equal to the cost of the last unit (*i.e.*, MC).

It should, however, be noted that the equality of MC and MR is only a necessary, but not a sufficient condition for an equilibrium. MC-MR equality necessary condition is satisfied even at point 'A' corresponding to OQ level of output. Here, the firm invariably incurs losses equal to the area enclosed by the region PP_1A, since total cost (represented by area OP_1AQ_0 under the MC curve) exceeds total revenue (represented by area $OPAQ_0$ under the average revenue curve, *i.e.*, price x quantity). Thus, point 'A' does not represent equilibrium of the firm, where MC curve cuts MR curve from above and the former is falling. There is a scope to raise the profitability of the firm by expanding output beyond OQ_0 level of output, since in that situation, marginal revenue exceeds marginal cost. Further, for output less than OQ_0, marginal cost exceeds marginal revenue, indicating that these units reduce profits. Thus, OQ_0 level of output does not

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maximise profit, rather it minimises the profits. Total profits can be increased either by raising or lowering output from OQ_0 level.

The sufficient condition for the equilibrium of the perfectly competitive firm is that the marginal cost curve must be rising *(i.e.,* upward sloping) at the point of intersection with the marginal revenue curve. In other words, MC should exceed MR for levels of output beyond equilibrium, so that there is no incentive or motive to produce additional units of the product. This sufficient condition is satisfied only at point 'B' in Fig. 13.1, while necessary condition of MC-MR equality is satisfied at both the points 'A' and 'B'.

It is clear from the above discussion that the firm is in equilibrium only at point 'B' in Fig. 13.1. The equilibrium level of output of the firm is OQ. Now, the two conditions to equilibrium can be stated as under.

(a) **Necessary Condition:** MC = MR

(b) **Sufficient Condition:** Slope of MC > Slope of MR

Since under perfect competition MR=AR=P, the necessary condition becomes MC=MR=AR=P. The sufficiency condition requires that the MC curve of a firm must be steeper than the MR curve, since the slope of MR curve, being horizontal curve, under perfect competition is equal to zero at all points. Thus, the sufficient condition under perfect competition requires that the slope of MC should be positive at the equilibrium point, *i.e.,* MC curve should be upward sloping at the equilibrium point of a perfectly competitive firm.

It is important to note that it is not necessary for a perfect competitive firm in equilibrium to always enjoy positive level of profits in the short-run. In fact, depending upon the cost conditions[7], a perfect competitive firm may earn abnormal profits or incur losses or just get normal profits (no profit-no loss). The firm will make positive profits, negative profits or no profits in the short-run depending upon whether its level of average cost corresponding to equilibrium level is less than, more than or equal to the prevailing market price (or average revenue) in the three cases respectively. These three situations are shown in Fig. 13.2, Fig. 13.3 and Fig. 13.4 respectively.

1. Short-Run Equilibrium of a Competitive Firm (Maximising Profits)

The case of a perfectly competitive firm earning supernormal profits in the short-run is shown in Fig. 13.2, where the average cost curve of the efficient firm lies below its average revenue curve. The firm is in equilibrium at point 'E', where the MC curve cuts the MR curve from below. Corresponding to the equilibrium point, the equilibrium output is OQ, which is sold at the equilibrium price OP. Since this price (OP or EQ) exceeds the average cost (BQ), the firm will earn super normal or excess profits in this situation (shown by shaded area in Fig. 13.2). Total profits from the sale of equilibrium output are 'profit per unit of output × quantity', *i.e.,* (EQ – BQ) × OQ = Area (APEB). (Here, the equilibrium point is above the break-even point). Alternatively,

7. The differences in the cost conditions may arise on account of differences in raw materials quality, production techniques, managerial efficiencies, plant sizes, entrepreneurial abilities, locations, etc. Efficient firms have relatively low costs of production.

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Super normal Profits = Total Revenue – Total Cost
= Price × Equilibrium Quantity – Average Cost × Equilibrium Quantity
= OP × OQ – BQ × OQ = Area (OPEQ – OABQ) = Area (APEB)

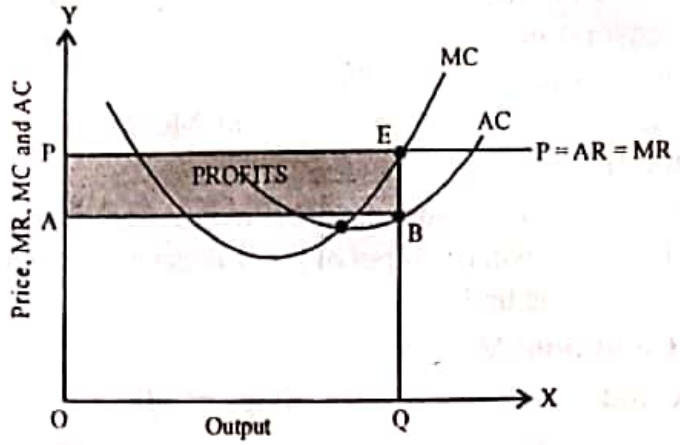

Fig. 13.2: Short-Run Equilibrium of a Competitive Firm Earning Supernormal Profits

2. Short-Run Equilibrium of a Competitive Firm (Minimising Losses)

If the average cost curve of the firm lies above the average revenue (price) curve, the firm suffers losses, as shown by the shaded area in Fig. 13.3. Here, the equilibrium point is below the break-even point. In this case, the average cost of the firm corresponding to its equilibrium output OQ is equal to BQ, which is greater than the equilibrium price EQ. The loss per unit of output incurred by the firm is Q – EQ = EB. The overall losses suffered by the competitive firm under consideration from the sale of equilibrium output are 'loss per unit of output × equilibrium quantity', *i.e.*, EB × OQ = Area (APEB). Alternatively,

Total Losses = Total Cost – Total Revenue
= Average Cost × Equilibrium Quantity – Price × Equilibrium Quantity
= BQ × OQ – OP × OQ = Area (OABQ – OPEQ) = Area (APEB)

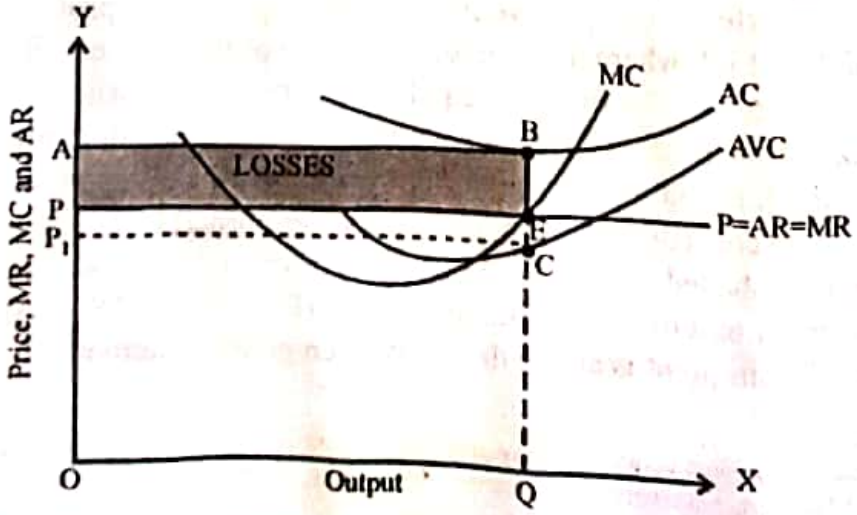

Fig. 13.3: Short-Run Equilibrium of a Competitive Firm Suffering Losses

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The competitive firm suffers losses in the short-run, when it cannot cover the full average cost (AC). In such situations, the firm tries to minimise the losses. The competitive firm will be willing to bear the loss, provided price (or total revenue) at least covers the average variable cost (or total variable cost). In the present case, the competitive firm will continue to produce, since, it is able to cover the entire average variable cost (AVC) and a part of fixed cost (EC per unit of output). Here, price is less than AC, but greater than AVC. If the firm ceases production, it will continue to incur full fixed cost (indicated by the gap between AC and AVC) though variable costs will be avoidable. In that situation, the losses of the firm would be much higher (loss per unit of output × quantity, *i.e.*, BC × OQ = Area (P_1ABC)), since, otherwise by continuing to produce, the firm was able to cover a part of the fixed cost. Thus, in the present case, the firm is minimising its losses by choosing to produce and sell. So long as these losses are less than the fixed cost (*i.e.*, when equilibrium price is greater than AVC, but, less than AC), a prudent firm will continue to operate the business rather than to stop production. In other words, *if the firm is incurring losses in the short-run, the maximum losses it can bear do not exceed total fixed costs. However, the firm cannot bear losses on the variable costs in the short-run.*

When the AVC is greater than the market price (*i.e.*, AVC curve is above AR curve), the competitive firm should temporarily suspend the operations in the short-run to avoid loss on variable costs, *i.e.*, the losses over and above the fixed cost. With no production and consequent zero sales (revenue), the losses equal to fixed cost will still be there, since, fixed cost is unavoidable in the short-run. The firm in such a situation will prefer to incur this loss by closing down and will avoid the losses incurred on variable costs. Further, if, the AVC is just equal to the market price (*i.e.*, AVC curve touches equilibrium point 'E' in Fig. 13.3), losses are equal to fixed costs and the competitive firm will be in a position of indecision. The decision to operate or shut down in that situation will depend upon future demand. If the firm expects the demand to expand in future, it will continue to operate in the short-run, otherwise 'not'.

3. Short-Run Equilibrium of a Competitive Firm (Earning Normal Profits)

In the short-run, there are some firms of average efficiency earning only normal profits just sufficient to induce them to continue to operate in the short-run. These normal profits are included in the costs. Fig. 13.4 illustrates such a case for a competitive firm, which is just able to *break-even* (no profit-no loss situation) at point 'E'. Here, the AC curve is tangent to the AR curve at the minimum point 'E' of the former. This means that the price of the product is equal to its average cost. In other words, total cost is equal to total revenue. Such a competitive firm, which neither makes excess profits nor suffers losses in the short-run is called a *marginal firm.*

The competitive firm in equilibrium always chooses the output for which price (AR = MR) = MC is above the level of average variable cost (AVC). The short-run equilibrium price of a competitive firm can be equal to or more than its AVC, but, cannot be less than AVC. The minimum price which can induce a firm to produce in the short-run is the one, which just equals AVC. It is also called the *shut down point* of

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the competitive firm. The competitive firm closes down the operation, if it is not in a position to cover AVC in the short-run. When price = MC, the firm would decrease its profits, if, it either increased or decreased its output. For any point to the left of this equilibrium, price is greater than the marginal cost and it pays to increase output. Similarly, for any point to the right of this equilibrium, price is less than the marginal cost and it pays to reduce output.

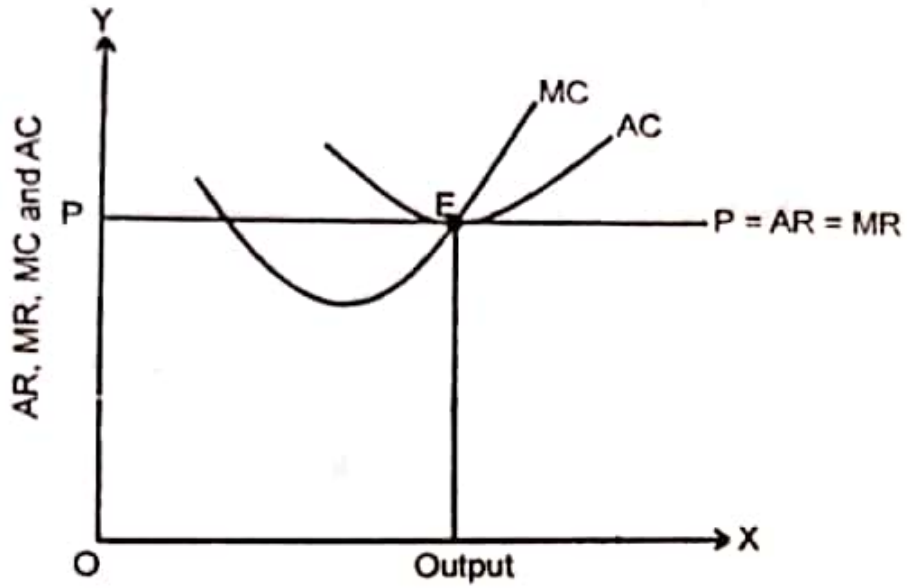

Fig. 13.4: Short-Run Equilibrium of a Competitive Firm Earning Normal Profits

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