(2)   Short run supply curve of the firm and industry under perfect competition.

(3)   Long run equilibrium of the firm under perfect competition.

(4)   Long run supply curve of an industry under perfect competition.

1-   Short Run Equilibrium of the Firm Under Perfect Competition

Perfect Competition

As told earlier, it a market structure where a single price is charged for all the units of a good. It has five main assumptions like (1) Homogenous good (2) Large number of buyers and sellers (3) Free entry (4) Perfect Knowledge and (5) Perfect mobility.

Short Run

It is a time period where a firm can change only its variable factors of production like labor etc. In such period, it is not possible for the firm to install new plant or construct new building. Moreover, in short run, neither new firms can enter the industry nor the old firms can leave the industry. For example, if in the month of August, because of more hot demand for towels increases, such can be met through over timing or through employing more labor. But, it is not possible to install new plant because the installation of plant or construction of building requires a lot of time.

Costs of Production

As the firm engages itself in production, it requires the services of different factors of production. For this, the firm has to make expenditures. The sum of expenditures is known as costs of production. The firm under perfect competition has to face the cost curves like AVC, AC, MC etc which we have discussed in the previous chapter.

Revenues of the Firm Under Perfect Competition.

They have been discussed in previous chapter.

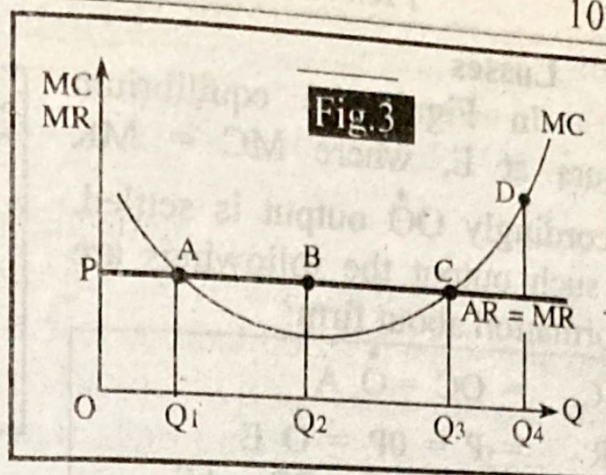### Firm's Equilibrium

By firm's equilibrium we mean the determination of such an output where firm's profits are maximized; or if it has to face the losses, they must be minimized. Accordingly, a firm will be in equilibrium where the difference between TR and TC is maximum. Mathematically, a firm will be in equilibrium where the slope of TR curve is equal to slope of TC curve. As slope of TC is marginal cost (MC) while slope of TR is marginal revenue (MR). Accordingly, "A firm is in Equilibrium where $MC = MR$". This is called necessary condition for firm's equilibrium. In addition to necessary condition, we have also the sufficient condition which states that "At equilibrium MC must cut MR from below". In other words, at equilibrium slope of MC must be greater than slope of MR. Hence Slope of $MR < Slope$ of MC. Slope of $MC > $ Slope of MR or MC cuts MR from below. All is shown with the help of Fig:3.

Here the firm is not in equilibrium at A, because the necessary condition (MC = MR) is fulfilled while the sufficient condition is not met because MC is cutting MR from above. This shows that MC of the firm are still falling — need is to expand the output. At B and D none of the conditions of equilibrium is met. Accordingly, the firm will be in equilibrium at 'C' where (1) MC = MR, (2) MC is cutting MR from below.

Fig.3

DIFFERENT POSSIBILITIES OF FIRM'S EQUILIBRIUM UNDER PERFECT COMPETITION IN SHORT RUN

As told earlier that a firm is in equilibrium where its profits are maximized. And if it has to face the losses, they must be minimized. Now we discuss different situations of firm's equilibrium in short run under perfect competition.

1. Abnormal or Economic Profits

In Fig:4, the firm is in equilibrium at E, where MC cuts MR from below. Hence $O\overset{*}{O}$ output is determined. Here AR > AC. Hence firm earns the abnormal profit. At such output followings are the information about the firm.
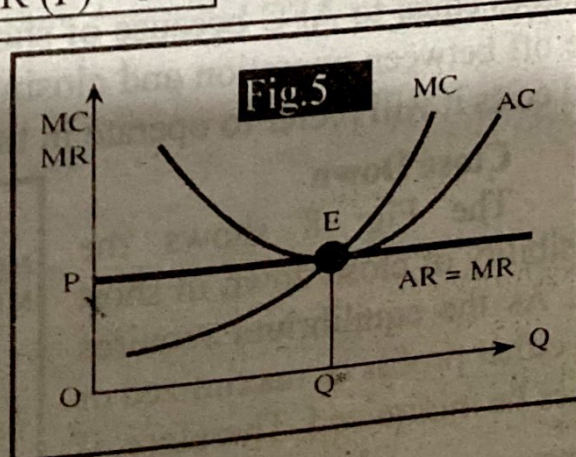

Fig.4
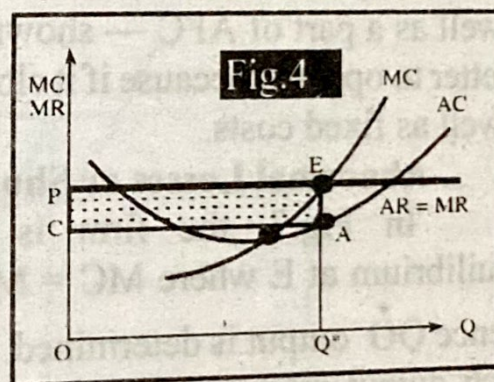
$$AC = OC = \overset{*}{Q}A$$
$$AR = P = OP = \overset{*}{O}E$$

Profit per unit = AR – AC = CP = AE
Total Profits = CPEA = CP (OQ*)

$$MC = MR = AR\ (P) > AC$$

2. Normal Profits

In Fig:5, the firm is in equilibrium at E where MC = MR. Hence $O\overset{*}{O}$ output is determined. At such output AC = AR. Thus, the firm is earning normal profits which are included in AC. In this situation, the following equation holds.
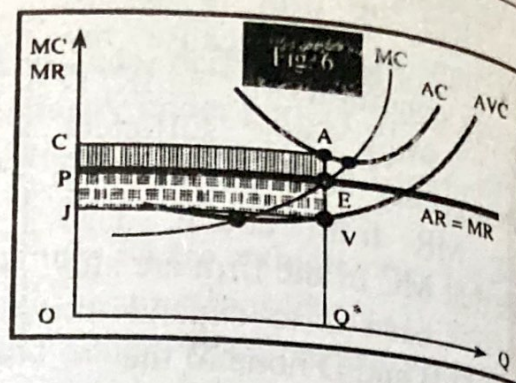

Fig.5

$$MC = MR = AR\ (P) = AC$$

3. Losses

In Fig:6, the equilibrium occurs at E, where MC = MR Accordingly OO output is settled. At such output the followings are information about firm:

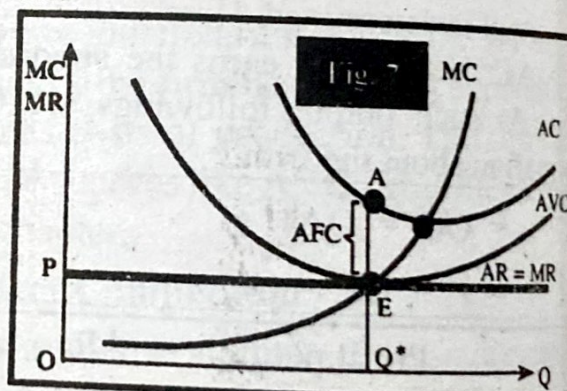| |
|---|
| AC = OC = Ö A |
| AR = P = 0P = Ö E |
| Losses = AC – AR = PC – AE |
| Total losses = PCAE . |

$$MC = MR = AR < AC$$

Now the question before us is this that when the firm is facing losses why does it operate? This is obvious from the fig that despite losses, the price OP charged by the firm is more than its average variable costs (AVC) — shown by ÖV or OJ. This shows that the firm is covering all of its AVC as well as a part of AFC — shown by VE or JP. Hence, the firm considers it better to operate, because if it closes down it will have to lose both variable as well as fixed costs.

### 4. Abnormal Losses or Shut Down

In Fig:7, the firm is in equilibrium at E where MC = MR. Hence OO output is determined. At such output minimum AVC = AR (P). Here AC > AR (P), and the price charged by the firm just meets the AVC. This shows that the firm is facing the losses equal to AFC — shown by the area AE. Despite such losses, the firm operates here because if it closes it will have to bear the losses equal to AFC because of short run. Therefore, if the firm has to trade off between operation and closing in the presence of losses equal to fixed costs it will prefer to operate in the hope of recovery of its business.

5. Close Down

The Fig: 8 shows the possibility of close down in short run. As the equilibrium requires that either profits be maximized or losses be minimized. Therefore, if it operates at OÖ it will have to face two types of losses i.e, AFC equal to VF and AVC equal to FE.
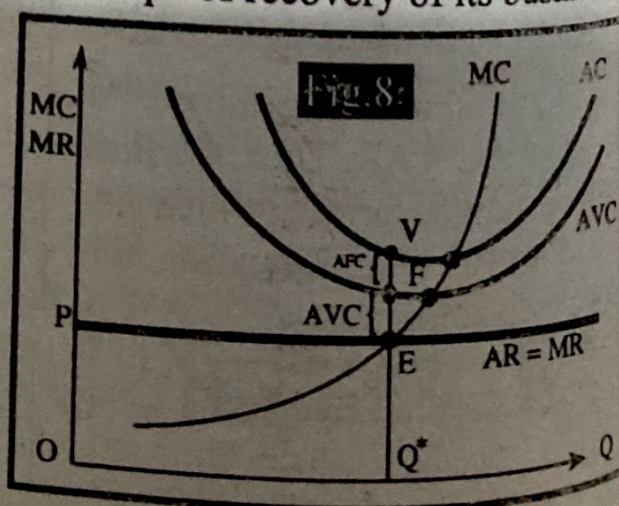
But if it closes down it will face a single loss i.e, AFC equal to VF. Therefore, it is better to close down and avoid the other loss of AVC equal to EF.

Profit Maximizing and Competitive Supply.

From the above discussion we get two main situations regarding profit maximization of a firm under perfect competition: (1) MC= MR and (2) A competitive firm will continue producing till it's a verge variable cost (AVC) are met. It means that if any firm in short run fails to coverts average variable cost it will close its business. These results give us the supply response of a competitive firm. Thus, the economist are of this view that, that part of marginal cost (MC) curve which lies above the minimum average variable cost represents. The supply curve of a competitive firm. It is shown with the fig 8-A.

Fig. 8-A
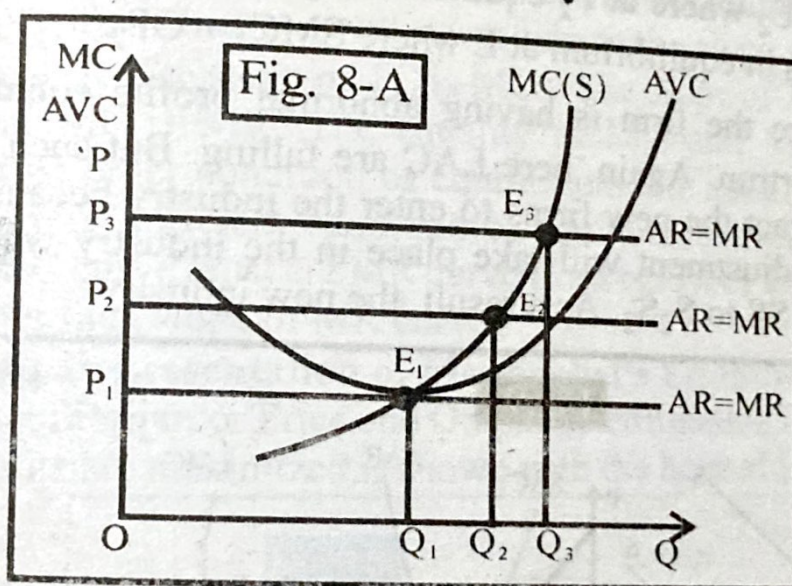
At the price OP$_1$ not only MC= MR= P$_1$ but here at such output of OQ, the average variable costs are also met. In case price happens to be lower than op$_1$, the firm will not be able to cover it, AVC hence it will not produce corresponding such price. However at the price oP$_2$ the competitive firm will maximize its profits by producing OQ$_2$ output where MC=Op$_2$. Again at the price Op$_3$, The competitive firm will maximize its profits by producing OQ$_3$ output where MC=Op$_3$. Thus by joining the points E$_1$, E$_2$ and E$_3$ we get the supply curve of a competitive frim. It is that part of MC curve which lies above the minimum of average variable costs.

2. **Long Run Equilibrium of a Firm Under Perfect Competition (PC)**

We have already defined PC that it is a market structure where a uniform price is charged for all the units of a good. Moreover, we know that this market has five main assumptions i.e, (1) Homogenous good. (2) Large number of buyers and sellers (3) Free entry and exist (4) Perfect mobility and (5) Perfect knowledge.