Managerial Economics
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Lecture - 38
Product pricing

So, we will continue our discussion on price discrimination and few more types of product pricing in this session. So, if you remember in the last class, we discussed the concept of price discrimination, and this is a situation where the firm has the market power to charge different prices, to different consumer group in the different market. In that context, we discussed three types of price discrimination; one is the first degree price discrimination, where the discrimination is on the basis of the price. The basis in case of first degree price discrimination is to capture the consumer surplus from the consumer, and in that case, generally there is no consumer surplus, and there is no deadweight loss. The entire surplus goes to the producers account, and this is known as the extreme form of the price discrimination. However the difficulty in this case, in the case of first degree price discrimination. It is very difficult to assess, what is the willingness to pay for a particular product, for each consumer group, because that will only help to set the price, in order to extract the consumer surplus.

Then we discussed about the second degree price discrimination; second degree price discriminations talks about the discrimination on the basis of the quantity. So, here the basis is not the charging a different price at the different group, rather charging different price on the basis of the different quantity. And typically all the meter services like electricity, water or may be the telephone this comes under this second degree price discrimination.

Then we discussed about the third degree price discrimination, and third degree price discrimination is one; here the total market is segregated on the basis of the elasticity of demand. And the segmentation can be on the basis of the geographical, on the basis of the consumer or on the basis of the nature of the goods. And here the market, once it is segmented between two kind of market, that is elastic and inelastic market.

On the basis of the market, generally the price will be charged, whether it is a high price or whether it will be low price, and what will be good or what will be more preferred for the monopolist in order to maximize the profit. So, in the last class, we discussed that

how graphically, how two prices will be charged in case of third degree price discrimination. Just to refresh again we will look at the graphical representation of the third degree price discrimination, and then we will take a numerical, to understand that how this price differs, when the price discrimination is practiced, and when price discrimination is not practiced, among two different kind of firm or two different kind of the market. So, to start with, we will have the graphical representation first, and then we will take a numerical to understand this price discrimination.

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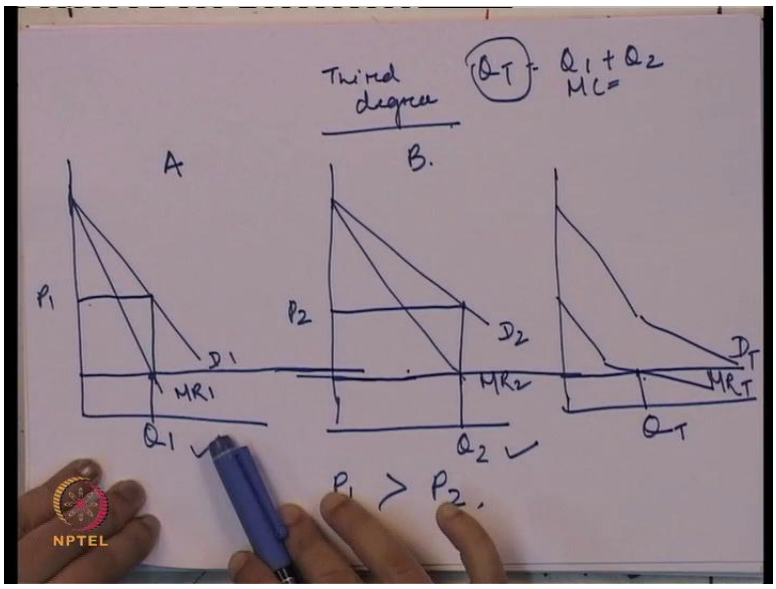

So, if you remember this also we discussed in case of our last session, when we discussed about the third degree price discrimination. The entire market is divided into two sub market, on the basis of the elasticity of demand. So, one this is where the market we can say inelastic, that is from the nature of the demand, and the other, its more elastic, this is again on the basis of the demand. Taken together, we have the total market demand and total. So, this is total market demand, this is marginal revenue of the total market. Here its elastic market, so let us call it market B, let us call it market A. We will take the MC function, where MC will be always the marginal cost, because marginal cost of producing is remain same, only the total output is getting divided between two markets, because this QT is only equal to Q 1 plus Q 2, but in general the Q 2 gets produced in by 1 firm, but when its only getting sold, that time only it is getting divided into two markets; that is why we get the common marginal cost for both the firms. And

on that basis, we identify the marginal cost under the basis, by the maximization rule marginal cost and marginal revenue rule, we have identified the quantity.

Now, how this total quantity will get distributed between both the markets. So, corresponding to this, we will take also the extension of marginal cost curve, in case of market A and market B. So, corresponding to this, we will get the price and quantity. So, this is the price, and this is the quantity, in case of first market. And this is the price and this is the quantity in case of the second market. So, if you look at, the P 1 is always greater than P 2. So here, what is the profit maximization rule for both the firms? For both the firms the profit maximization rule is to maximize the profit. But when it comes to how to maximize the profit, generally in case of elastic market, small change in the price generally leads a greater change in the quantity demanded; that is why the price cannot be increased here, rather here it will be a lower price will be more profitable.

But in case of inelastic market, since quantity is not going to change, even if there is a change in the price, generally the firm charges a higher price, and on that basis the quantity get distributed between both the firms; that is Q 1 and Q 2. And if you look at here, the basis of price discrimination is elasticity of demand, and higher price is charged in case of the inelastic market, and lower price is charged in case of the elastic market. So, the basis is again here the elasticity of demand, and the producer maximize the profit by charging a higher price, in case of the inelastic market, and lower price in case of the elastic market. Then we will take a numerical to understand this third degree price discrimination, how the price discrimination is, when the price discrimination is practiced, how its leads to a higher price, as compared to a price which is lower than the, when price discrimination is not being charged.

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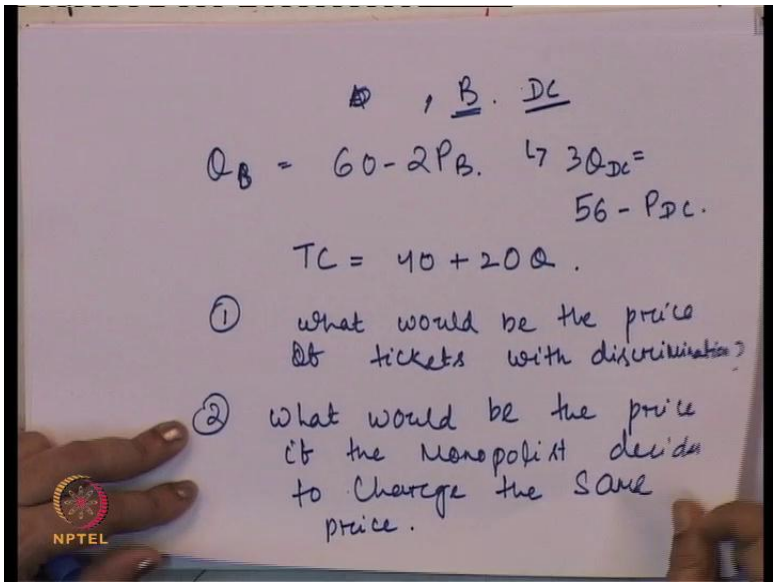

So, we will take suppose there are, we can say there are two markets A and B. So, we will take two demand function Q A is equal to 60 minus 2 P B, or we can say this, or there are two markets; one is B, or second is may be this. So, two kind of market Q B is equal to 60 minus 2 P B. And for this the demand function is, 3 Q D C is equal to 56 minus P D C. The total cost function is same, because it is only the market is divided for the selling the product, but when it comes to produce the product, it is the by produced by the one firm, and that is why the total cost is same. Now, we need to find out, what would be the price of tickets with discrimination, and what would be the price, if the firm or if the monopolist, decides to charge the same price there, or maybe we can when there is no discrimination. Now, let us find out the price without discrimination and price with discrimination. So, in the first case, we have a demand function; that is Q B is equal to 60 minus 2 P B and T R.

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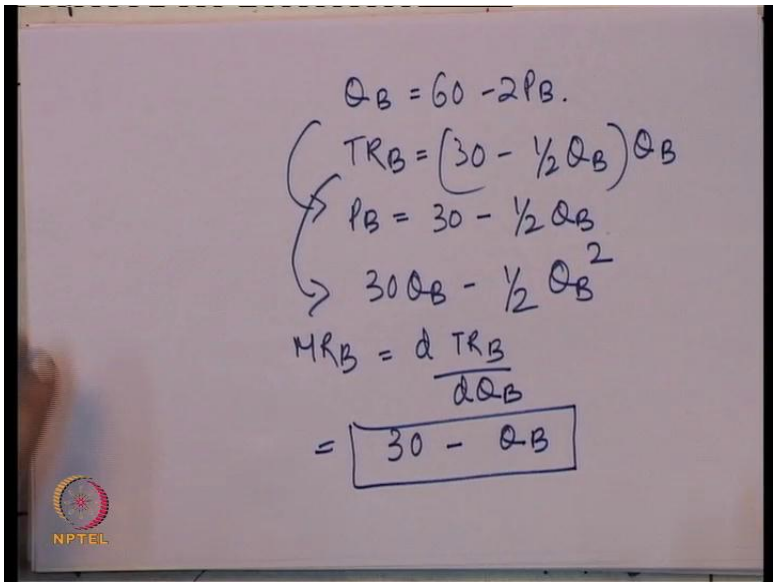

Here we need to find out the total revenue for B, and in this case what will be the total revenue of for B. First we will solve this in term of the P B, so what will be the P B. So, for Q B how to find out this P B, 2 P B is equal to 60 minus, 2 P B is equal to 60 minus Q B. So, P B is equal to this is 30 minus half Q B. So, total revenue for B is equal to 30 minus half Q B multiplied by Q B, which is equal to 30 Q B minus half Q B square. Now, marginal revenue for B will be, this is our total revenue. Marginal revenue for B will be total revenue B, with respect to d Q B. So, this we get as 30 minus Q B. So, marginal revenue for B is equal to 30 minus Q B. Now, what is our total cost, we will find what is our total cost.

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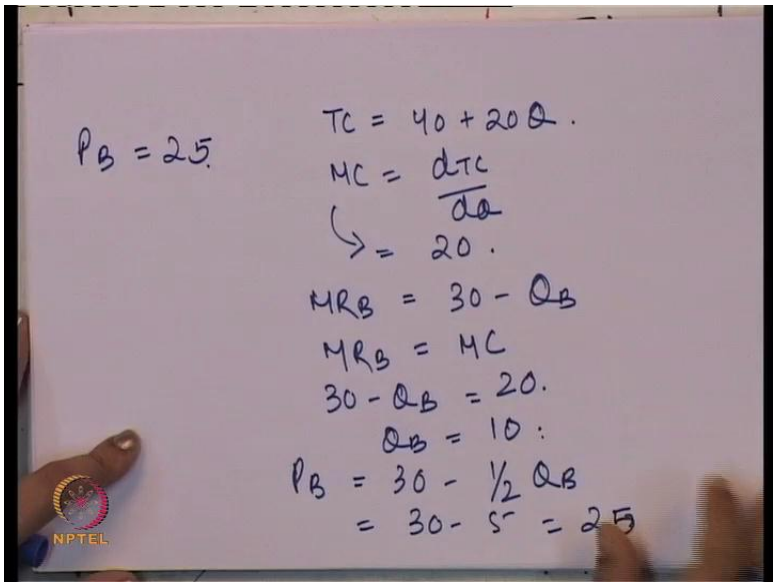

So, total cost is equal to 40 plus 20 Q, and marginal cost is d T C with respect to Q. So, that comes to 20. So, we have marginal revenue of B; that is 30 minus Q B, and M C is equal to 20. To find out the price we need to equalize the marginal revenue with marginal cost, so this is 30 minus Q B is equal to 20 and Q B is equal to 10. So, if Q B is equal to 10, what is P B? P B is equal to 30 minus half Q B, so that comes to 30 minus 5. So, this comes to 25. So, when the price is decided individually, so in this case we get a price, which is equal to 25. Now, what we will do? We will find out, when there is a discrimination, and what is the price in that particular case?

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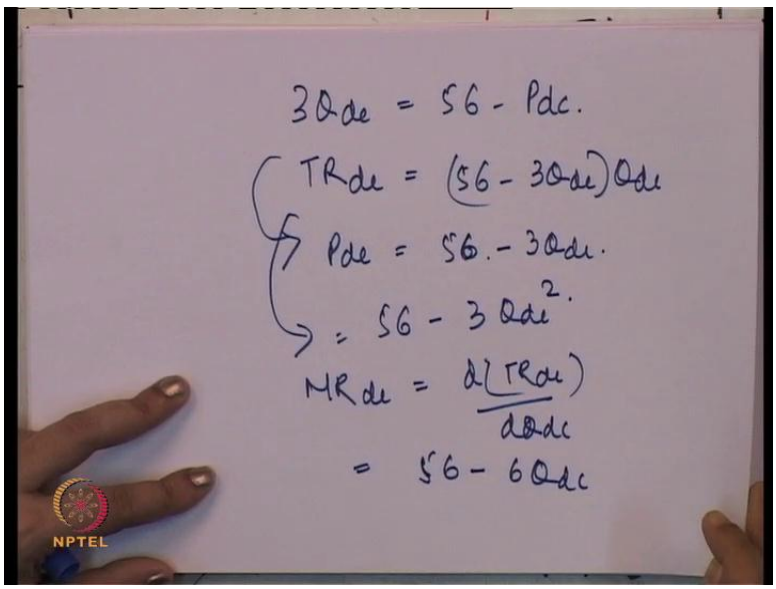

So, for that, we will take the second demand function; that is 3 Q d c is equal to 56 minus P d c, and to find out the total revenue of d c is equal to, before this we need to find out the p d c. So, p d c will be 56 minus 3 Q d c, so that comes to, T R d c is equal to 56 minus 3 Q d c multiplied by Q d c, so that comes to 56 minus 3 Q d c square. And marginal revenue of d c will be; that is d T R d c with respect to d Q d c, so that comes to 56 minus 6 Q d c. Now, we need to again get the price, when the price discrimination is being practiced.

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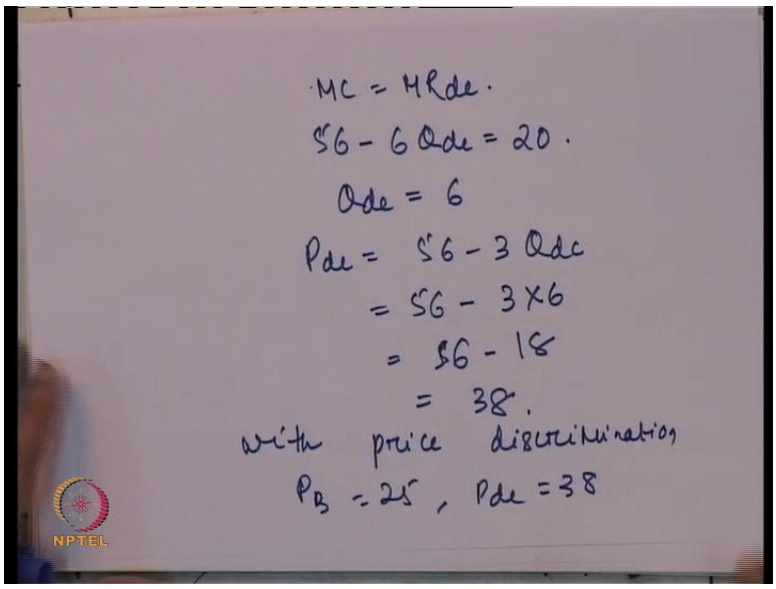

So, in this case we get, marginal cost is equal to marginal revenue; that is M R d c. So, 56 minus 6 Q d c; that is equal to 20 Q d c is equal to 6, and P d c is equal to 56 minus 3 Q d c. So, that comes to 56 minus 3 into 6; that comes to 56 minus 18, which come to 38. So, with price discrimination, in the both the market, if there is a price discrimination, that market P B is equal to 25 and p d c is equal to 38. Now, we will need to see, what is the case when there is no discrimination, why we call it is price discrimination, because in both the cases the market price is decided on the basis of the specific marginal revenue curve, and specific marginal revenue curve dependent on the, what is the elasticity of demand.

So, that is why when we are finding out the price individually of both the markets, we know that the prices are different in both the markets and that is why the price discrimination is being followed. Now, we will take together for both the market, and we

will find out the price, and that price where there is no discrimination, because in the first case also when we found the price, for the specific market on the price on the basis of the specific market, on the specific MR curve; that is the price being followed in that particular market. And in this case also, when you found the price on the basis of specific MR curve, this is the price being followed in that particular market. Now, we will say if there is no discrimination, what is the price they should be following.

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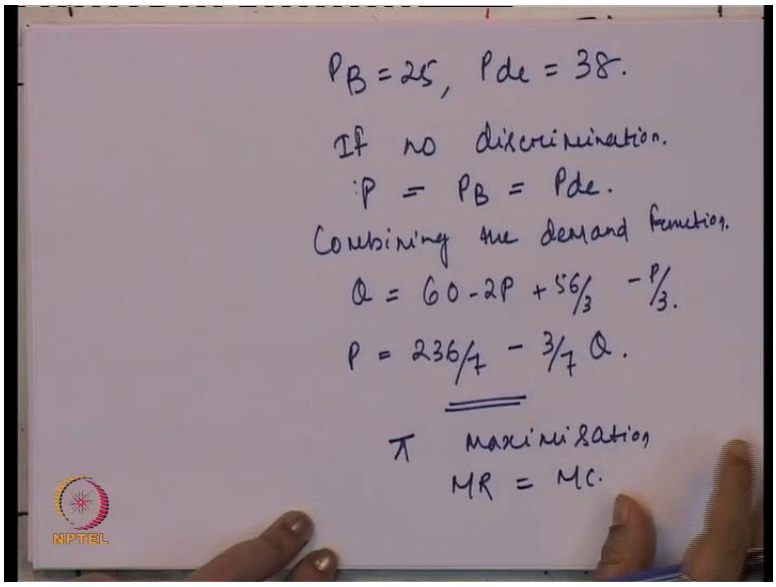

So, taking the previous case, when discrimination was being followed; that is the price by both the market. Now we will see that, there will be no discrimination what will be the price. If there is no discrimination, then we will get a combined demand curve. So, basically no discrimination means, price should be equal to the price of B, that is should be equal to the price of d c. So, combining this demand function, we will get a combined demand function taking both the markets. So, here it is Q is equal to 60 minus 2 p, plus 56 minus 3, minus p by 3. So, p is equal to 236 by 7, minus 3 by 7 Q, and this is the p for profit maximization, we require for profit maximization, we require the marginal revenue and marginal cost. So, next we will find out the marginal revenue.

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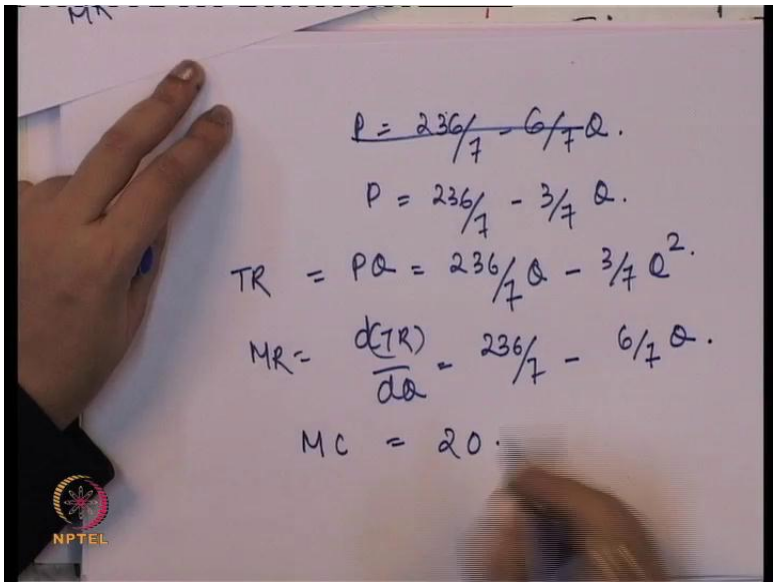

So, now we have p which is equal to 236 by 7, minus 6 by 7 Q, and 6 by 7 Q this is the. sorry this is P is equal to 236 by 7 minus 3 by 7 Q. Now what will be the P Q, P Q is, which is equal to the total revenue. So, this is 236 by 7 Q, minus 3 by 7 Q square. To find the marginal revenue, we will take the derivative with respect to Q. So, this comes to 236 by 7, minus 6 by 7 Q. So, this is our marginal revenue, and we know marginal cost is equal to 20. Now we will take the marginal equality between the marginal revenue and the marginal cost.

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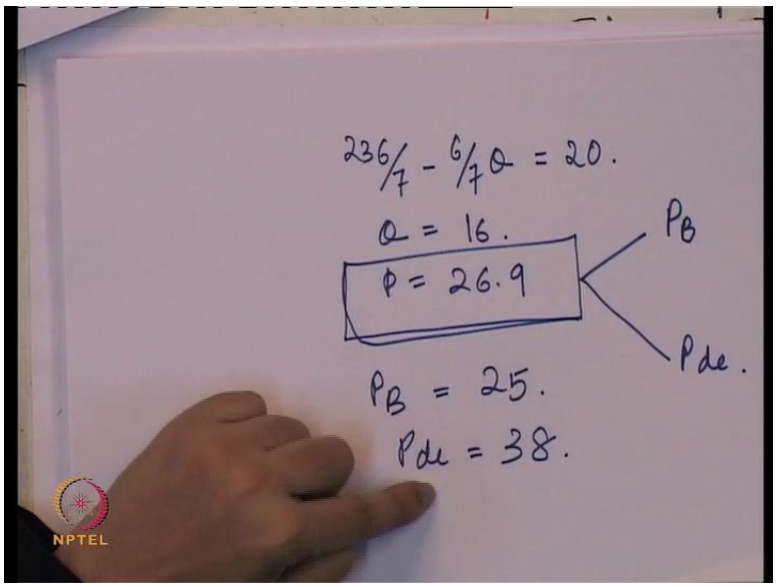

So, marginal revenue is equal to 236 by 7, minus 6 by 7 Q, which is equal to 20 as we know that marginal cost is equal to 20. So, solving this we will get Q is equal to 16, and putting the value of Q here in p equation we get p is equal to 26.9. So, this is the price, which is going to followed by the price of B, and this is also the price of the other firm, other market. It means when there is no discrimination, they are charging a price that is 26.9, and when there is a discrimination they are charging price 25, and they are charging a price that is 38. So, if there is a discrimination, this is the price that is going to be followed by both the firm that is B and d c, but if there is discrimination by specific firm, B charges 25 for the price, and d c charges 38 for the price. So, the point here, what to remember here is that, they always, the monopolist they check for the price level, where they can maximize the profit, and on that basis they fix up the price in the both the market, whether its elastic or inelastic. Generally, in case of inelastic they charge a higher price, and in case of elastic they charge a low price. Then, we will discuss about this, international price discrimination and dumping. So, till now we have understood the price discrimination from the point of view from the concept and from the theory.

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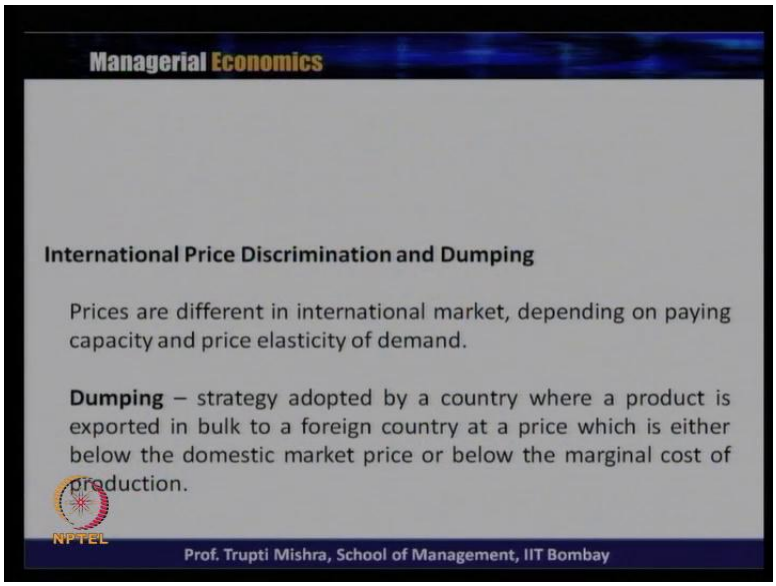

Now when this price discrimination is followed in the international market, we will see what is the outcome and how that can be taken. So, international price discrimination generally if you look at, prices are different in different international market for the same product, and why it is different, because it depends on the paying capacity and the price elasticity of demand. So, it is different in the different international market, for the same

product, and why it is different because different economy has a different paying capacity, and also they have a different price elasticity of demand. Some market is more sensitive to the price, some market is less sensitive to the price, and this is when it is done deliberately when the prices are different in the different market, and when it is done deliberately generally we call it is a the strategy, generally known as dumping. And dumping is the strategy adopted by a country, where product is exported in bulk to a foreign country at a price, which is either below the domestic market price or below the marginal cost of production. So, what they do in case of dumping. In case of dumping, generally they adopt a strategy, where the country export the product in a bulk, and the price what they follow that is less than the domestic price, and below the domestic price, and below the marginal cost of production.

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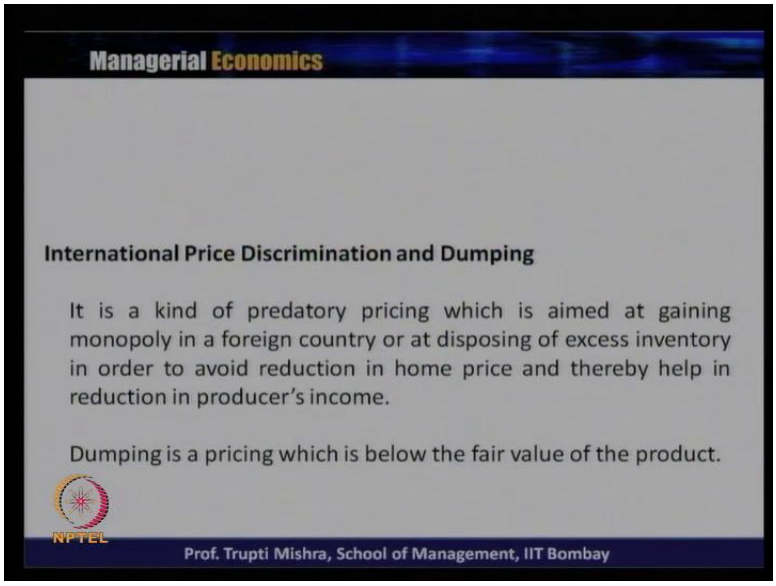

Now, what is this dumping, if you look at, this is a kind of predatory pricing, or a kind of price low price what they follow, which is aimed at gaining monopoly in a foreign country, or at disposing the excess inventory. So, why generally this is done, why the export is at the bulk at a less than the domestic price, because it is a kind of predatory pricing, and what is the aim of this pricing. Generally they will gain monopoly in the foreign country, because they are sending it in the bulk, and also they are charging a lower price to this. So, either they try to gain a monopoly market, they will try to get a monopoly status in the international market, or to dispose the excess inventory in order

to avoid reduction in home price, and thereby help in reduction in the producer's income also.

So, either they try to become the monopolist, or they try to dispose the excess inventory. Suppose it has been produced much in the home country, and in order to avoid that reduction in the home price, thereby help in the reduction also producer income. So, if they have already produced, they have that in the inventory, they try to dispose the excess inventory. So, that they can avoid the reduction in the home price, rather than charging a lower price at home, and thereby help the reduction in the producer income. So, what is the gain from the producer point of view, they are giving, they are, either they will get a monopoly status, or they try to disposes whatever their excess inventory, and in that way it helps to increase the producers income. And generally dumping is also known as, the fair value product, the pricing which is below the fair value of the product, because they are exporting in the bulk in the typical economy, where the price is lower than even whatever is being charged as the domestic price.

Ideally, when we export something we export at a higher price, because it also involve, apart from the price it also involve the transport cost of putting from one economy to the another economy. But in case of international price discrimination in case of dumping, it does not happen in that way, generally it is bulk is given in the lower price, and the motivation is to either become a monopolist, or gaining a monopoly in the foreign country, or reduce the excess inventory in the home country. But whenever this dumping is not legal, whenever this dumping is being done, it is generally protected by the economy; that none of the economy or none of the foreign economist would come and dump it in the home economy, because when they are charging something less than the domestic price, there is always a question about what is the quality of the product.

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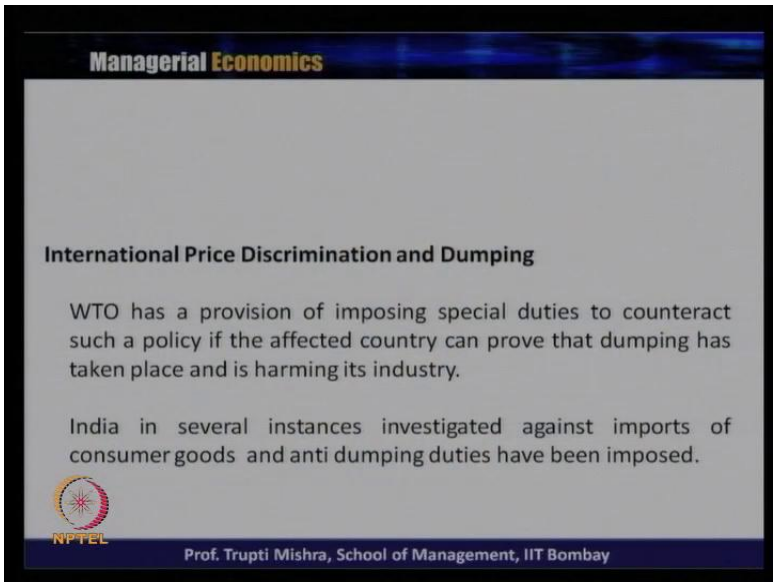

So, world trade organization, they has a provision of imposing special duties to counteract such a policy, if the affected country can prove that dumping has taken place and is harming its industry. So, WTO world trade organization, they have certain rule for this or they have certain law for this, and they have a provision of imposing special duties, if such kind of dumping is happened, and in that case the affected country they have to prove that, the dumping has taken place and its harming it is industry. Generally, if you look at in the Indian market, china always try to dump the low value product in the Indian market, and in that way they try to gain the monopoly. Now also if you look at, the toys the plastic product it is over flooded, as it comes from the china economy.

It is the entire the plastic or the toy industry is over flooded with the Chinese product. So, India in several instances, they have investigated against the import of the consumer goods, especially from china, and there are also instances that there is anti dumping duties have been imposed. So, dumping, when it comes to dumping, it is always a, if it is being proved, then it is not a healthy way of the pricing or healthy way of doing the trade, and that is why dumping is not legal, and if the dumping is found, generally there is a special duties provision from world trade organization. Then we will take a case of Indian railway, and we will try to analyze, because if you look at, try to analyze whether they have the price discrimination or not.

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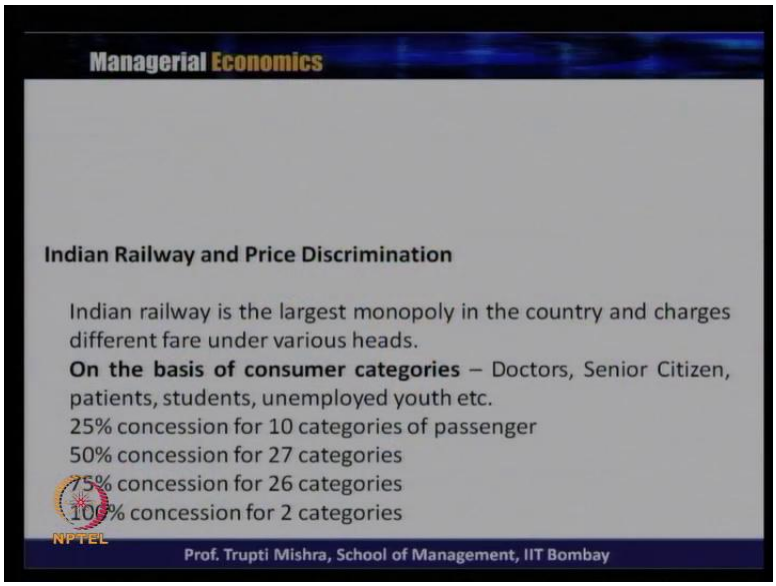

Because, if you look at Indian economy is such that, in this case we always consider they are the largest monopoly, this is the regulated monopoly. And since this is a regulated monopoly, they have freedom about their prices, and they charges the different fare under various heads for this, different kind of services. Now on the basis of this, consumer category we will see, on what basis generally they discriminate. On the basis of the consumer category, if you look at there is special fare for doctors, senior citizens, patients, students, unemployed youth, and even for the kid. So, they give 25 percent concession of 10 categories of passenger, 50 percent concession for 27 categories of passengers, 75 concessions for 26 categories, and 100 percent concession for 2 categories. So, here what is the discrimination. The discrimination is among the different kind of consumer, and on that basis they generally get the concession. Like if it is unemployed youth or students, they get 100 percent concession. If they get only 25 percent concession, may be this is for a specific category of the consumer. Similarly if it is senior citizens they get 50 percent concession. So, on the basis of the different kind of consumers, generally they offer the concession and we can say that, here the discrimination is on the basis of the, different consumer group, not on the basis of the any other factor over here.

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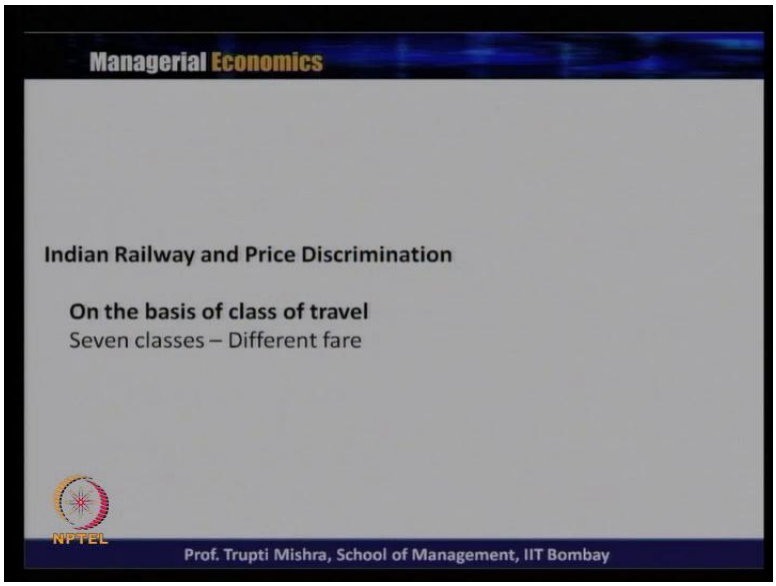

Then on the basis of the class of travel. So, if you look at, there are seven classes, starting from unreserved class to the sleeper class to the third AC to the second AC to the first AC. There are total 7 classes in the, 7 class; like with sitting, it is AC sitting. There are 7 category of services offered to the consumer. And here for each category it charges a different prices or different fare. Of course, the comfort associated with the different classes are different, but still as a whole if you look at its one product, and for that product, because anyway its we are using, it is a mode of travel. And in case even it is a mode of travel its one class still the different prices are charging, on the basis of the different classes being offered in the train journey, then on the basis of the category of train.

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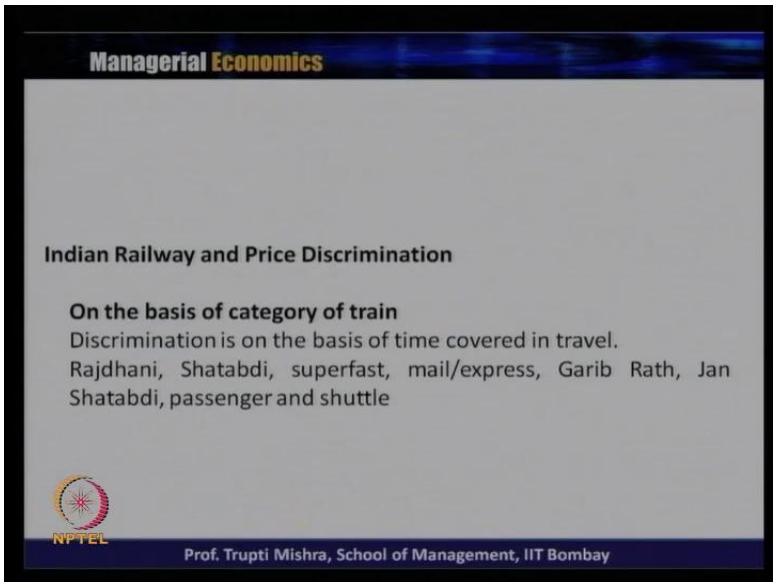

So, discrimination here is, what is the big difference, if someone is travelling by Rajdhani, someone is travelling by passenger, someone is travelling by mail and express. Here the discrimination is on the basis of the time covered in the travel. Rajdhani takes the lowest time or may be the passenger takes a highest time. So, in this case, since the consumer is able to reach in a less time, he is being charged for that. Or if the consumer is travelling through passenger train, and there is no there is he is taking his, may be higher time to reach the destination, he is getting a concession for this. So, in this case if the train service is offering a seat in the Rajdhani, he is charging for it, but if he is in the passenger, I think he is just charging the normal fare, what is applicable for a railway as a mode of travel. So, here the discrimination is on the basis of the time taken by the train, to cover the entire distance or cover the travel distance. Then also the entire, if you look at this entire thing can get, what is the services associated with this. If you look at its not classes may to the also services associated with it. If it is food then, may be a special fare for it. If it is bedding, because if you are travelling in AC, if they are giving bedding, so that cost is included in the ticket. So, different classes, different consumer group, and also different category of train, on the basis of that Indian railway generally practice the price discrimination.

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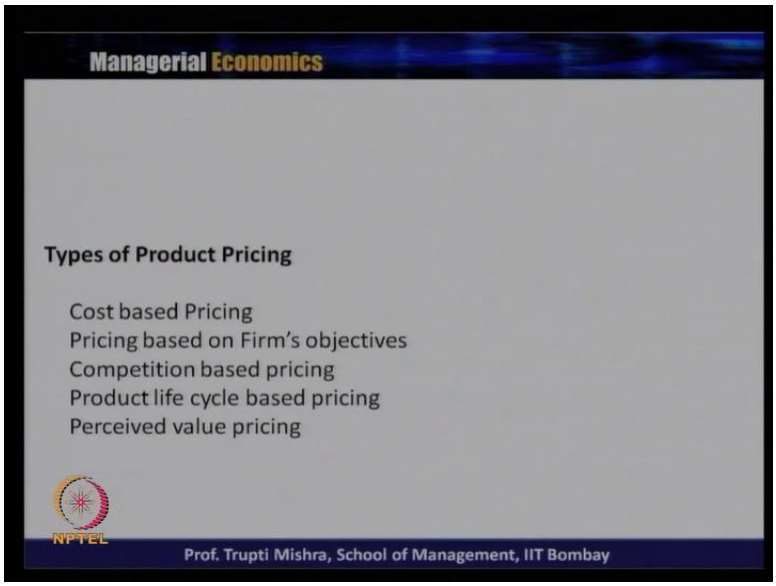

Then, we will take about some five distinctions of the, or five types of product pricing. So, we will start with a cost based pricing, where the basis of pricing is cost. Then we will talk about the pricing based on firm's objective. Then we will talk about the competition based pricing. Then we will talk about the product life cycle based pricing, and finally we will talk about the perceived value pricing.

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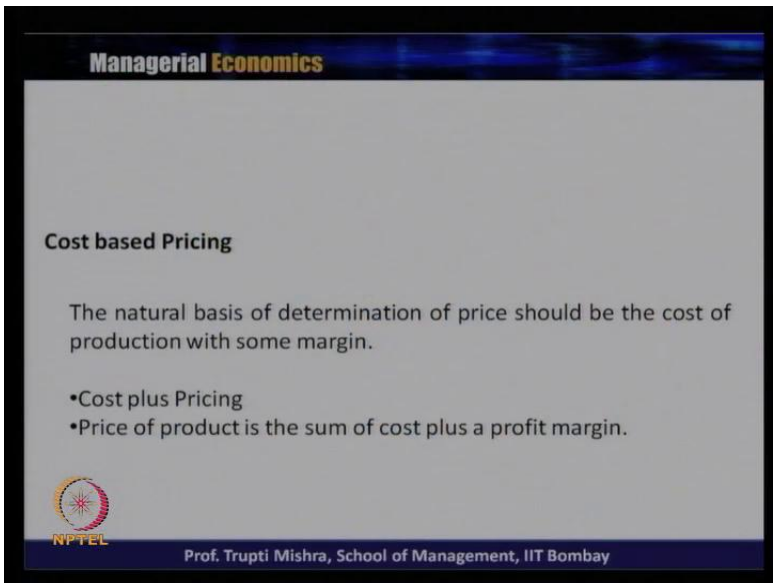

So, in case of cost based pricing, the basis is cost, but what is the natural basis of determination of price. The natural basis of determination of price should be the cost of

production with some margin. So, when you find what is the market value or what is the market price for the product. We always say that what is the first component here, the first component here, is that what is the cost of production or what is the cost being incur to produce the product. So, the natural basis of determination of price should be the cost of production with some margin, and in that case, the first one comes as the cost plus pricing, and here the price of product is the sum of cost plus a plus a profit margin.

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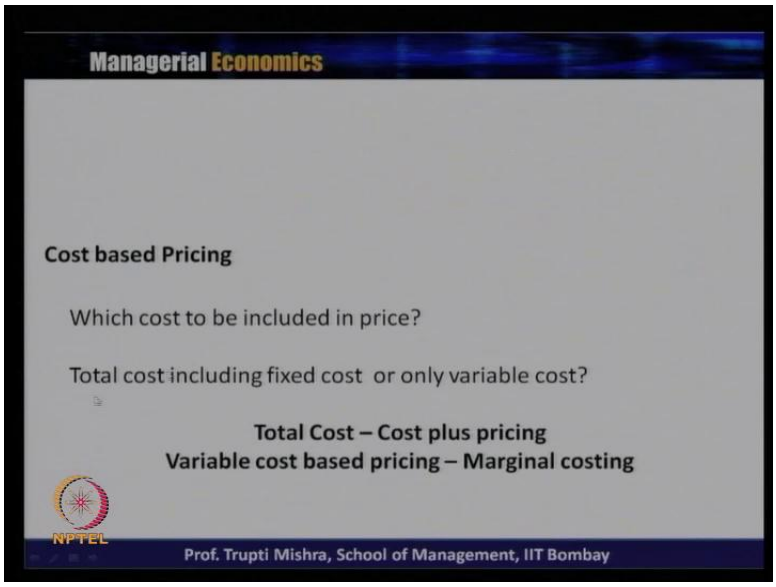

Now, the question comes, if cost is a component of the price, which cost to be included in the price, whether it is the total cost including fixed cost or only variable cost, or if, but the options are two; either total cost including fixed cost or only the variable cost. So, if the total cost is being used in the determination of price, this is generally known as the cost plus pricing. And if the variable cost is being used in the determination of pricing; that is known as the variable cost based pricing, and also this is known as the marginal cost pricing. So, there are two main category of the cost plus pricing; one is total cost, that is when total cost is being taken into consideration, this is cost plus pricing, and when the variable cost is being taken into consideration, this is known as the marginal costing. So, we will talk about the cost plus pricing first, that is also known as the markup pricing. And here the firm will consider the total cost per unit or the average cost, because total cost per unit is nothing but the average cost.

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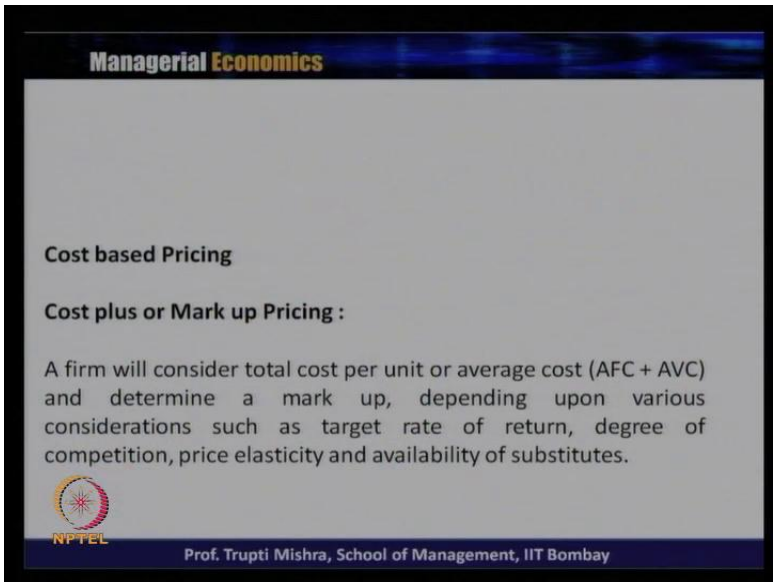

And here the average cost has two components that is average fixed cost and the average variable cost, and determine the markup depending upon various considerations; such as target rate of return, degree of competition, price elasticity and availability of substitute. So, how this price is determined here; first the cost component will be identified, and here the cost component is the total cost per unit, or the average cost; that is average fixed cost and the average variable cost. And then to determine a markup, that is the margin, and this margin is depending on that, what is the target rate of return of the company, what is the degree of competition, what is the price elasticity, and what is the availability of the substitute. These are the factors on which generally the margin dependent.

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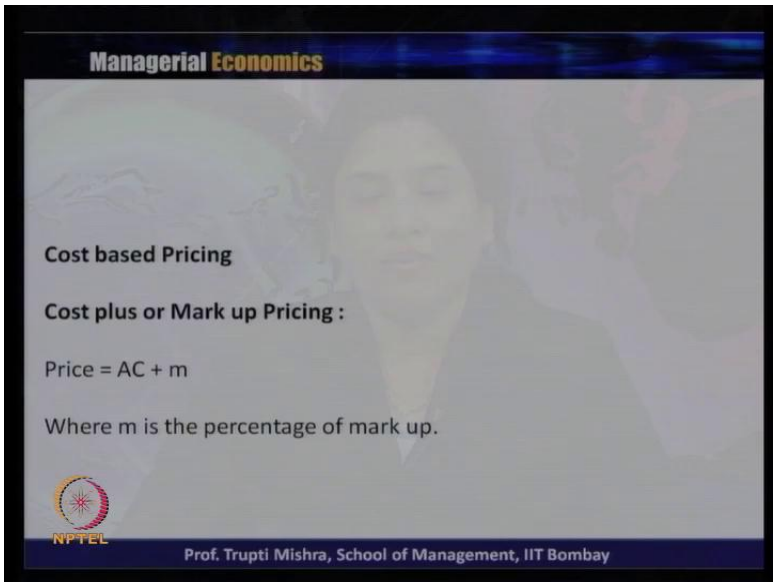

Then, the price is decided; that is average cost, which is average fixed cost plus average variable cost, plus m m is the percentage of the markup, and this m is dependent on what is the availability of the substitute, what is the competition, what is the elasticity of demand, and what is the target rate of return of the company.

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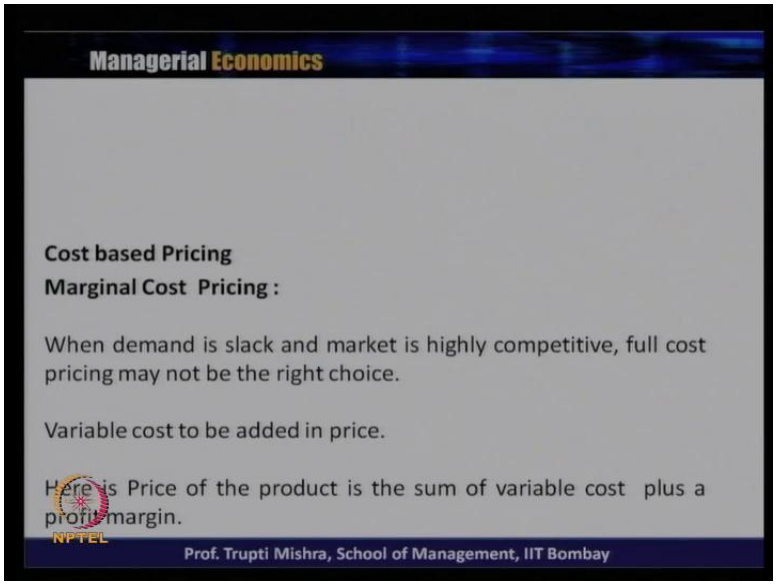

Then, the other part is marginal cost pricing. In case of marginal cost pricing, when this marginal cost pricing is followed as a method of cost price determination. When the demand is slack and the market is highly competitive, full cost pricing may not be the

right choice, and in this case generally the marginal cost pricing is being followed. So, here the variable cost to be added in the price, and the price of product is the sum of variable cost plus a profit margin. And this is also known as the incremental cost pricing. Here the base price or the cost is less than in case of full cost pricing, hence price should be highly competitive, because in this case, we are only considering the variable cost, but in case of the cost plus generally we consider the fixed cost also. And since we consider the variable cost, here the base price is always less as compared to full cost pricing, and that is why this price is highly competitive. Generally this method is used to beat the competitors, and used in case of the public utility service, like social justice, where profitability is not the objective. So, we will just take an example to understand the difference between the cost plus pricing and the marginal cost pricing or the incremental pricing.

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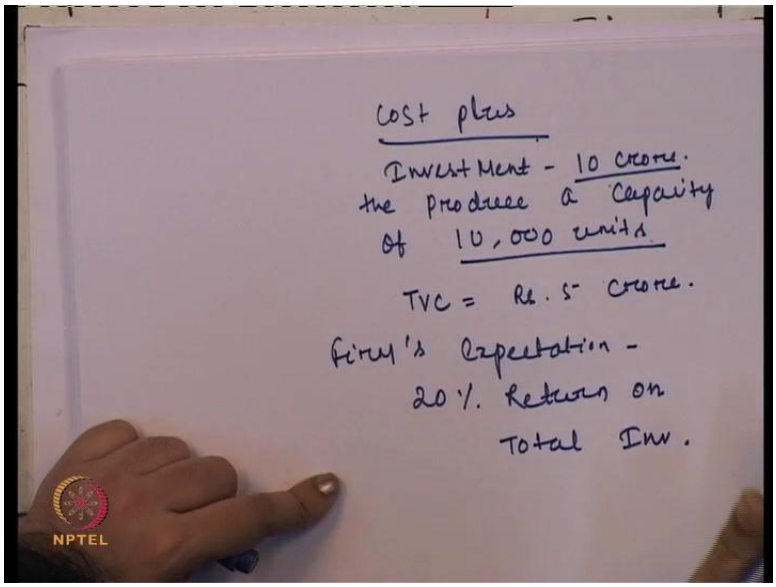

So, suppose a typical producer has invested 10 crore, to produce a capacity of 10,000 units. So, investment is 10 crores, the capacity is 10,000 units. Total variable cost is, this is 5 crore, and the firm expect or firm's expectation is 20 percent return on total investment. So, now we will find out the price under the cost plus.

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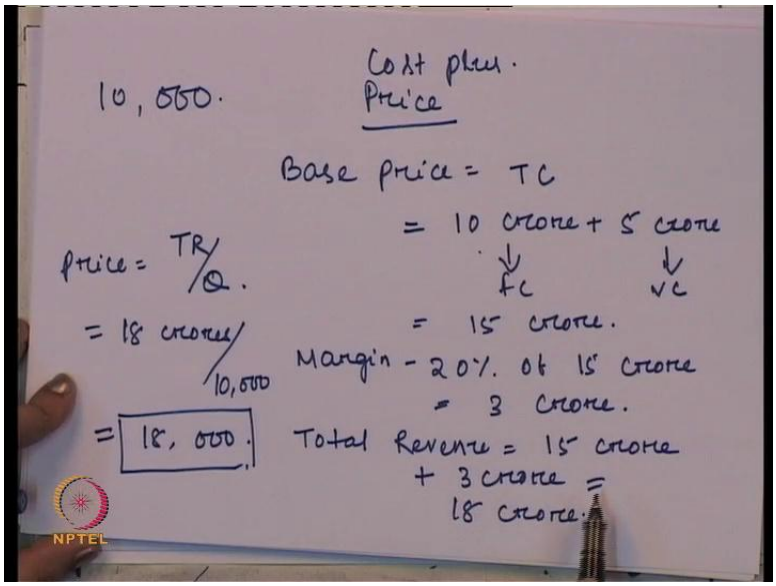

We will decide the price or we will determine the price, what will be the base price. Base price will be total cost, what is total cost, investment; that is 10 crore part of fixed cost, plus 5 crore; that is part of the variable cost. So, the total cost will be 15 crore. Margin the expectation is 20 percent return, so margin is 20 percent of 15 crore. So, that comes to 3 crore. Then what will be the total revenue, total revenue should be 15 crore, plus margin is 3 crore. So, this should be 18 crore. So, total revenue should be 18 crore, and total revenue if it is 18 crore, then how we will decide the price. Price is, this is the total revenue divided by the, whatever the quantity. So, entire total revenue has to be, generated from this 10,000 unit.

So, if the price, we will take 18 crores plus 10,000 unit, so that comes to 18,000. So, price is equal to 18,000, and how we have calculated this price over here. The base price is on the basis of the total cost, since this is cost plus, the total base price, the total cost will be both the fixed cost and the variable cost. So, fixed cost is 10 crore variable cost is 5 crore, so total cost is 15 crore. The firm expect at least 20 percent return from the investment, so 20 percent of 15 crore is 3 crore, total revenue has to be 15 crore plus 3 crore that comes to 18 crore. And how we will decide the price, the entire total revenue has to be generated from this 10,000 units, and that is why the 18,000 has to be the price.

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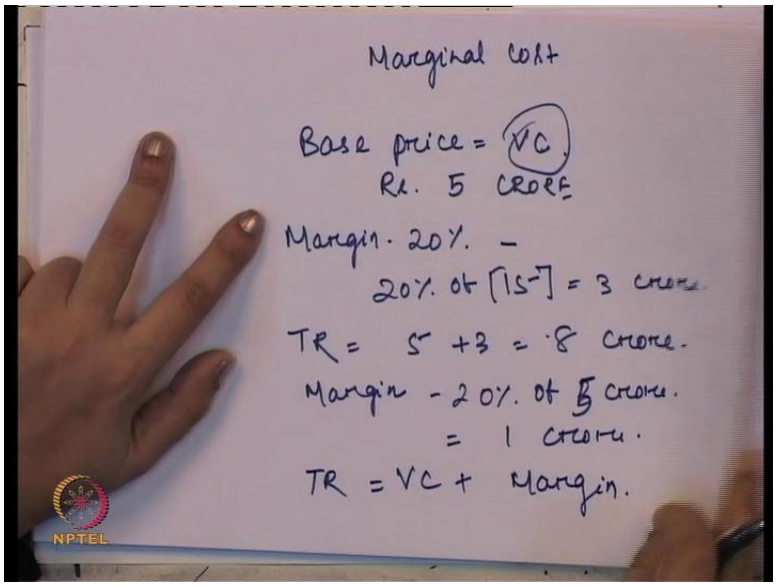

Now, we will do, taking the same example, the same facts and figures that the same information about the company. We will find out or we will determine the price on the basis of the marginal cost. This is known as the marginal cost pricing or incremental cost pricing. Here what will be the base price, here the base price is, only on the basis of the variable cost, and what is the variable cost here, variable cost is 5 crores in this case. Now, margin is, again 20 percent, if margin is 20 percent, then this should be 20 percent of the 15 crores, so that comes to 3 crore. So, total revenue will be 5 plus 3, that comes to 8 crore. How in this case we will decide the margin again, the margin will be again 20 percent of the, because this is on the basis when the full cost is being taken, but here the base price is variable cost. So, margin will be 20 percent of 3 crore, so that comes to 20 percent of the variable cost; that is 5 crores, so that comes to 1 crore.

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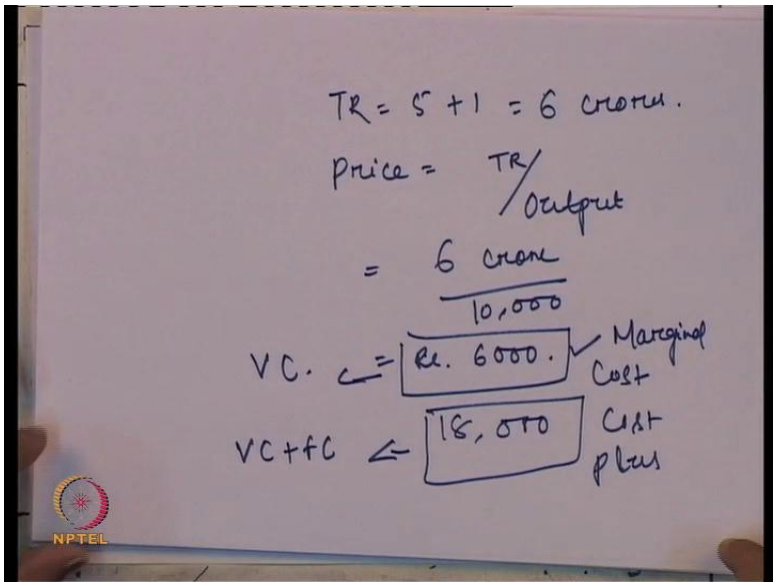

So, total revenue will be variable cost plus the margin, and if it is variable cost plus the margin, then it is total revenue is equal to 5 plus 1; that is 6 crore, and price will be, total revenue minus the total output, so that comes to 6 crore divided by 10,000 is equal to rupees 6000 price. So, when we have found out the full cost on the basis the full cost; the price is equal to 18,000, and when on the basis of the marginal cost the price. So, this is cost plus, this is marginal cost, and what is the difference between this two. In case of cost plus, we take variable cost plus fixed cost. In case of marginal cost, we only take the variable cost. So, when the price determination is on the basis of the cost, generally we have two kind of method one is cost plus pricing and another is the marginal cost pricing. In case of cost plus pricing, we take the full cost as the variable cost and the fixed cost. And in case of marginal cost pricing only we take the variable cost.

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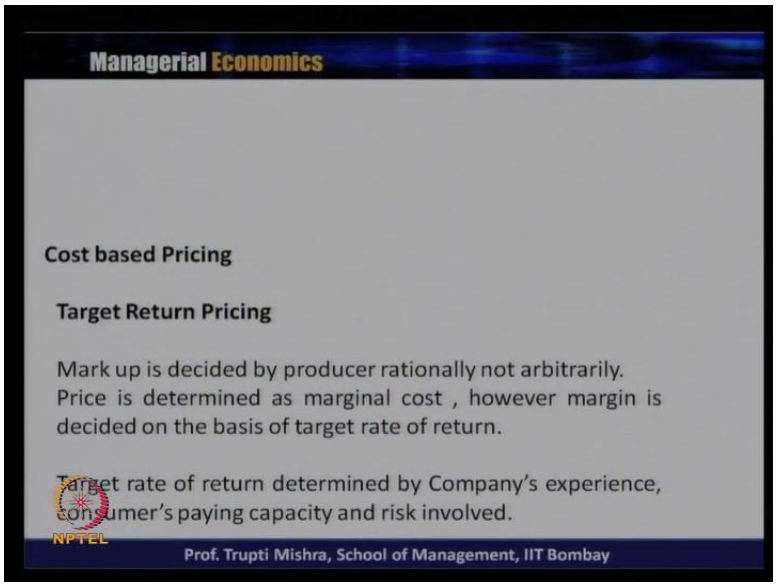

Then we have target return pricing, and here the markup is decided by the producer rationally, not arbitrarily, price is determined as the marginal cost, however the margin is decided on the basis of the target rate of return. And here agai,n the pricing is on the basis of the marginal cost pricing, but here the margin; that is the cost plus m, the margin is decided on the basis of the target rate of return, and how target rate of return is determined. Target rate of return is determined by, what is the company's experience, consumers paying capacity and the risk involved. They have to assess that how much the consumer ready to pay or how much they can pay for this product, and on that basis generally they charge the price or they set their margin. Then second category of pricing is based on the firm's objective, and what is the base price here or what is the objective here.

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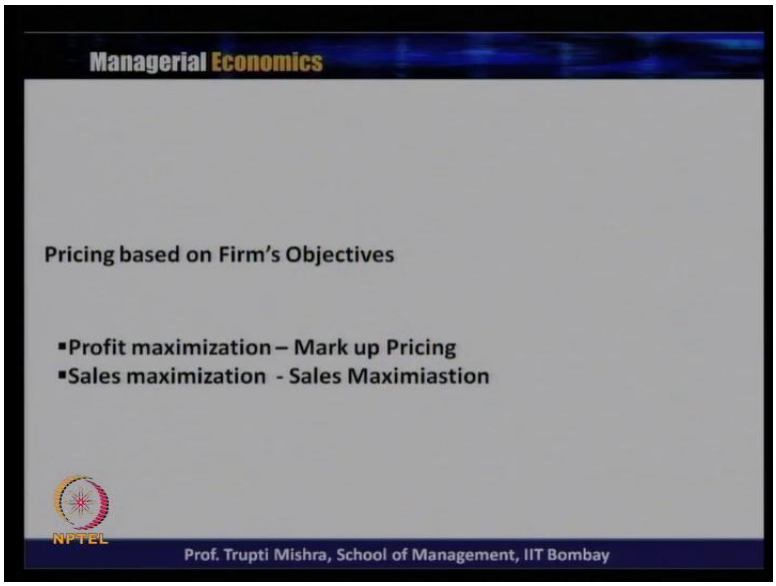

There are two objectives to the firms; one profit maximization, and second is the sales maximization. So, in case of profit maximization, generally the markup pricing is being followed. And in case of sales maximization, generally the sales maximization is, sales maximization generally the marginal cost pricing is being followed. So, we will just take an example to understand how the price differs, if the objective of the firm is to maximize the profit, and the objective of the firm is to maximize the revenue.

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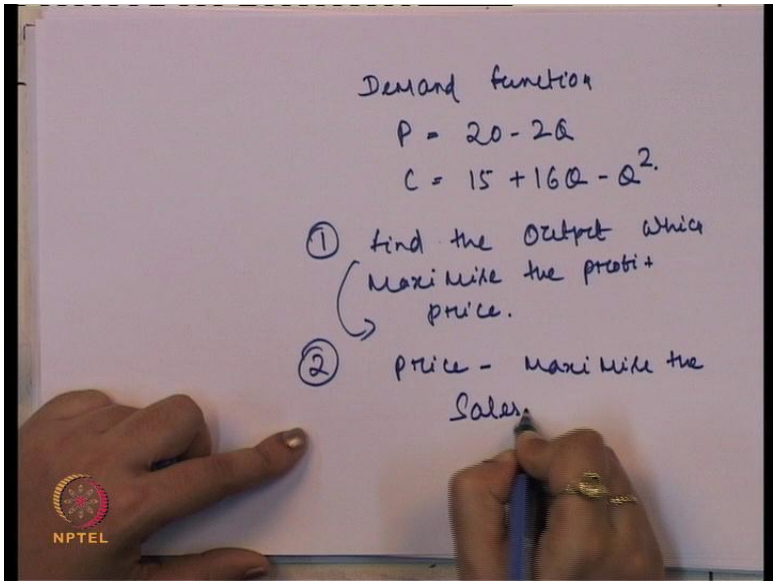

So, we will take a demand function; p is equal to 20 minus 2 Q, c is equal to 5 plus 16 Q minus Q square. Now we need to find out the output, find the output which maximizes the profit or the other word we can say, find the price at which the output will maximize the profit, and second we have to price, find out the price, which will maximize the sales. Now, we will see how we will find out the price in both this cases.

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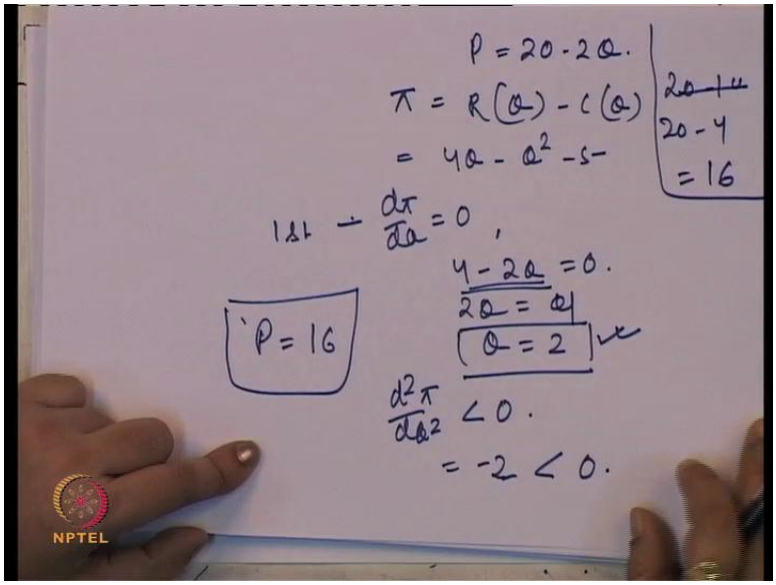

So, the first case we need to find out the profit, profit is r Q minus c q, so that comes to 4 Q minus Q square minus 5. So, d pi d Q should be equal to 0. So, d pi d Q if you look at then it comes to, 4 minus Q is equal to 0, and 2 Q is equal to 0, 2 Q is equal to 4, Q is equal to 2. Now, we need to check this is first order condition. So, we need to check whether second order condition is being fulfilled or not. So, in this case we will take d square pi by d Q square, has to be less than 0. So, again taking the derivative of this 4 minus 2 Q, we get minus 2 which is less than 0. So, second order condition gets fulfilled Q is equal to 2. Now, we need to find out what is p, and to find p we can put the value of Q in that equation, and p is equal to 20 minus 2 Q. So, that comes to 20 minus 4 and equal to 16, so p is equal to 16. So, 16 is the price which maximize the profit in the market.

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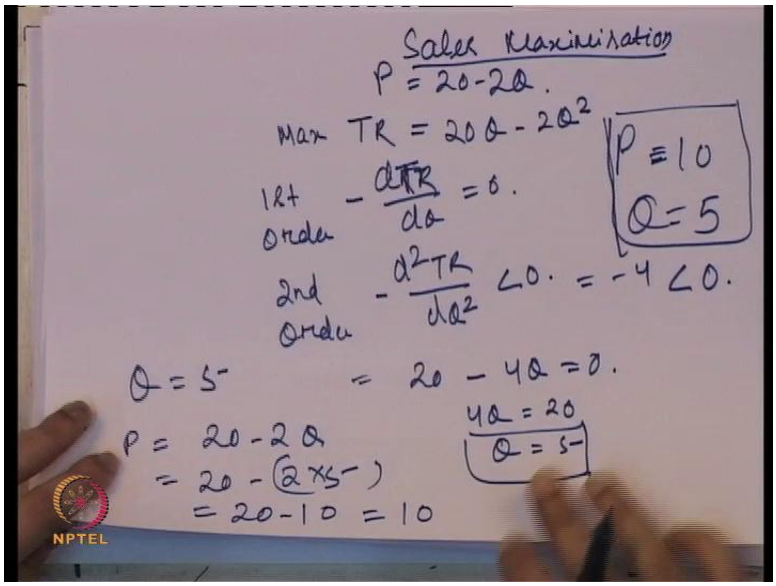

Now, we will see what is the price, where the sales are getting maximized, or the revenue is getting maximized. So, in this case again we will take the total revenue. So, P is equal to 20 minus 2 Q, and total revenue is equal to 20 Q minus 2 Q square. So, this first d T R d Q has to be equal to 0, because here this is to maximize the total revenue. So, in this case the first order condition will be, the first order derivative with respect to the total revenue has to be equal to be 0. And second d square T R by d Q square; that is the second order, this has to be less than 0. So, taking that, if you take this equal to 0, then it comes to 20 minus 4 Q is equal to 0. So, 4 Q is equal to 20, Q is equal to 5. And second order condition is minus 4, which is less than 0. So, if it is Q is equal to 5, then p is equal to 20 minus 2 Q. So, this is 20 minus 20 multiplied by 5, so 20 minus 10 which is equal to 10.

So, p is equal to 10 and Q is equal to 5, in case of the sales maximization. So, if it is a case of the profit maximization, the price what we discussed in the previous case; price was 16, quantity was 2. And if it is sales maximization P is equal to 10, Q is equal to 5, so how we can conclude this two kinds of pricing. So, if the same demand function, if the firm is having the same demand function, and the same cost function. If the objective is different, they have to charge a different price. If they are trying to maximize the profit, they have to charge a higher price, and if they because in that way even if the quantity getting sold if it is less, still they are getting a higher amount of, gap between total revenue and the total cost. Whereas in case of the sales maximization the focus is,

more on getting more revenue and more share, that is why they charge a lower price, so that they can maximize the sales revenue, because a small change in the price, would also leads to greater change in the quantity demanded.

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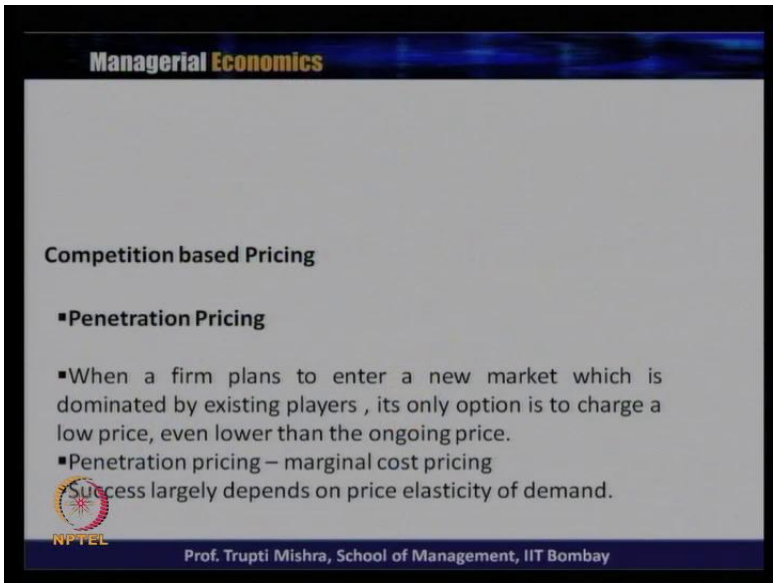

Then we will talk about the pricing method for which the base is competition. So, here the first category of price comes as the, penetration pricing, and generally when this pricing is being followed. When a firm plans to enter a new market which is dominated by existing player, its only option is to charge a lower price, even lower than the ongoing price. So, in this case generally this penetration pricing or the marginal cost pricing is being followed. And here when this particularly gets used, when a firm enters into the market, they have to charge a lower price, if they want to enter into the market and compete with the existing market. So, in this case, generally they follow a pricing method on the basis of the marginal cost pricing, which is known as the penetration pricing, and here the success is largely depend on the price elasticity of demand. And why we say that the success is dependent on the price elasticity of demand, because in this case penetration pricing, if they are charging a low price, the market should be elastic, so that when the firm is entering into the low price, there should be increase in the quantity demanded. Here you can take the example of like, when the reliance enter into the low cost segment or when Air Deccan enter into the airline industry, they charges, they enter as a low cost options, and that is why, whatever the pricing they followed; that is typically the example of the penetration pricing.

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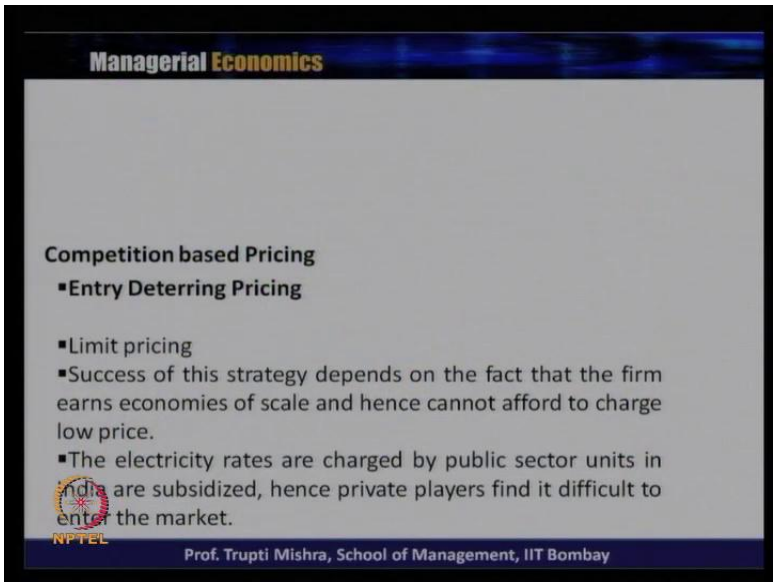

Then we have the second category of pricing under competition based pricing; that is entry deterring price. This is also kind of a limit pricing, and here the success of this strategy depends on the fact, that the firm earns economies of scale hence cannot afford to charge a lower price. So, here the strategy should be that, the price should below, so that or price should be limit, so that other should not get enter into the market. And typically the electricity rates charged by the public sector unit in India are subsidized. Hence the private players find it difficult to enter into the market, because at the lower price private sector, if they are entering into the market they are not getting any profit or any benefit, and that is why they get into a, they are not interested to operate in that typical market segment.

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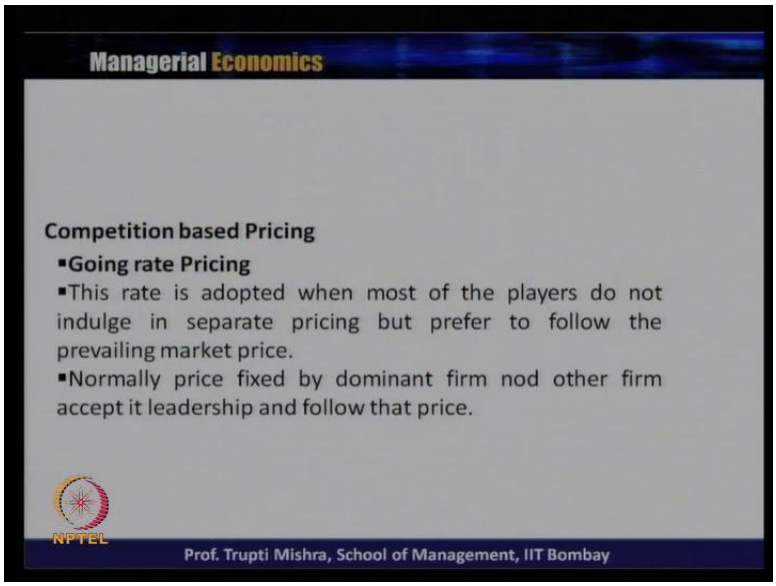

Then there is one more competition based pricing; that is going rate pricing. So, typically I will just give an introduction to this going rate pricing, and we will talk about this when we discuss in the next class, but here for the understanding, going rate pricing is the rate adopted when most of the player do not indulge in separate pricing, but prefer to follow the prevailing market price. Here we can take the example of the mineral water, but unlike if you look at, whether you are taking a Aquafina, whether you taking a Bisleri, at least those were the known brand they charged at the same rate.

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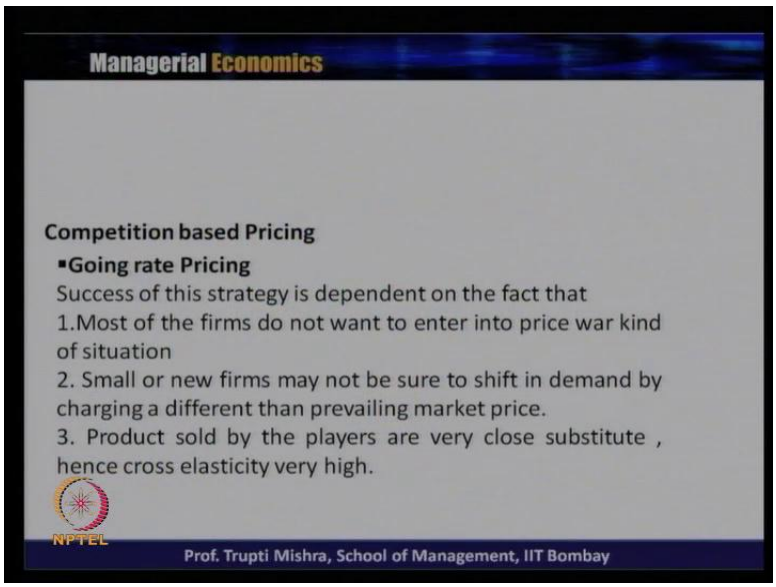

And here the normally the price is fixed by the dominant firm, and other firm generally accept it the leadership and follow the price. And here the success of the strategy is depended on the fact that, most of the firm do not want to enter into the price war kind of situation, because they know that if they are getting into the price war, it will benefit the consumer not benefit the producer. Small or new firm may not sure to shift the demand by charging a different than the prevailing market price, because if they are charging a different price they have to shift the demand, and that is to be in a different market price. And product sold by the players are very close substitute, hence cross elasticity is very high. So, whenever there is a change in one price, that is going to affect the price of the other product, and that is why people they or the firms they feel it is better to follow a uniform price across the market.

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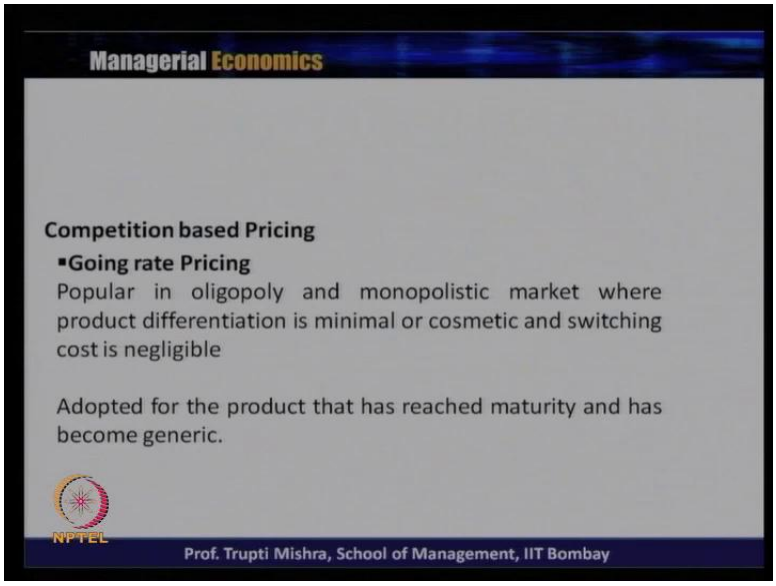

This going rate pricing is more popular in case of the oligopoly and monopolistic market, where product is differentiation is minimal, or cosmetic and switching cost is negligible. And typically, this is adopted for a product that has reached the majority, and generally it is a kind of a generic product, it has already reached the maturity. Then next class, we will discuss the pricing based on the product life cycle, and also on the basis of the policy, and few more category of the type of product pricing in the next session.