Managerial Economics
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Lecture - 25
Perfect Competition

So, we will continue our discussion on market structure. So, if you remember in the last class we were talking about the different kind of market structure, and how the classification is being done in order to understand the different kind of market. One is the substitution, the ease of entry and second is again the; what is the nature of competition. So, there are three parameters on the on that basis generally the markets are divided into different form, and from that if we remember the classification, we start with perfect competition. Then we come to monopoly; a perfect competition and monopoly two extent form of market structure, and in between this monopolistic and oligopoly market structure comes.

So, we will start our discussion with a detail on particular market structure, and today we will talk about the market that is talks about the perfect competition. Its name suggest this is perfect competition, but we will check that whether it really, there is a perfect competition or there is any kind of competition between this firm in this typical type of the market structure.

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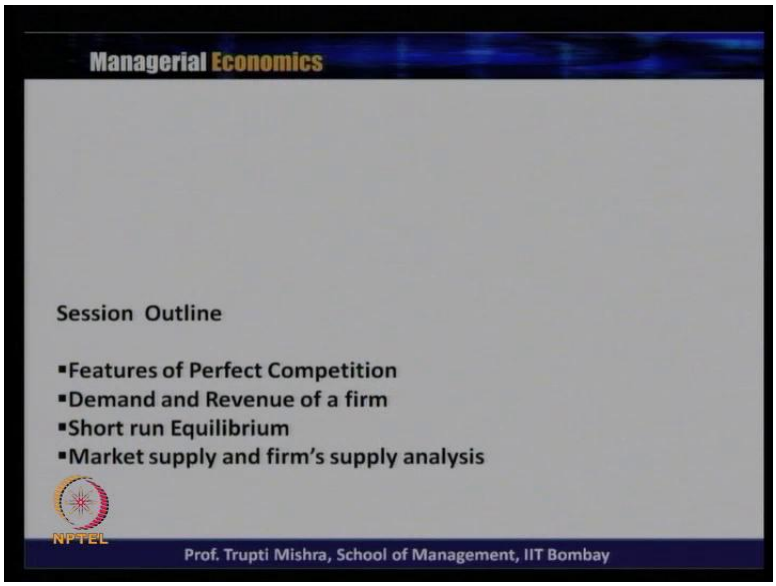

So, today our focus of our session will be on features of perfect competition; what are the characteristic or feature of perfect competition. Then we will see how the demand and revenue of a firm under perfect competitive market structure, then we will talk about the short turn equilibrium the price output determination, whether the in the short turn the firm is getting loss the firm is incurring profit or the firm is just getting the normal profit.

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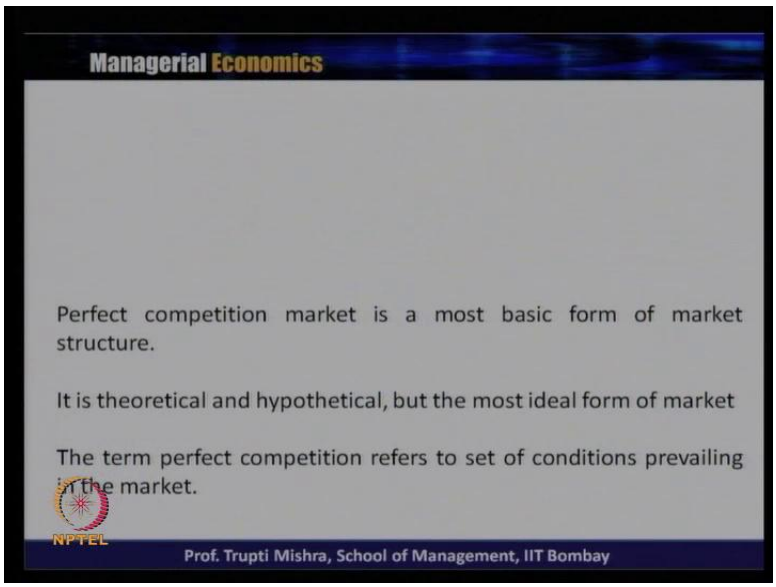

Then we will talk about the market supply and specific firm supply analysis, keeping the cost function or the cost analysis in the background. So, to start with perfect competition if we look at this is the most basic form of the market structure; it is theoretical and hypothetical, but the most ideal form of the market. So, may be this is the very basic form of market structure. It sounds theoretical, its looks hypothetical, but this is the most ideal form of the market. And why it is ideal may be when we look at the characteristic, when we look at the feature its suites both the supplier and both to the buyers and the consumer and that's why it called as the ideal form the market.

But when it comes to the implementation and applicability of the such type of market structure there is a difficulty and that is why if you look at there is no much relevance, like close relevance of this perfect competitive market structure in the real life, except in few cases the term perfect competition refers to the set of condition prevailing in the market. So, perfect competition market structure on the set of condition that prevailing in the market and this that basically how the buyers and how the sellers they behave in the market.

So, as it the name suggest and as we discussed also before couple of minute that perfect competition, if you look at the name suggest that it is a perfectly competitive market and all the come, all the firms they compete with each other, but contrary to that there is a fact that in case of perfect competitive market structure, there is complete absence of rivalry among the individual firms. So, it is not perfect competition it is about rather the absence of the rivalry or absence of competition among the individual firm.

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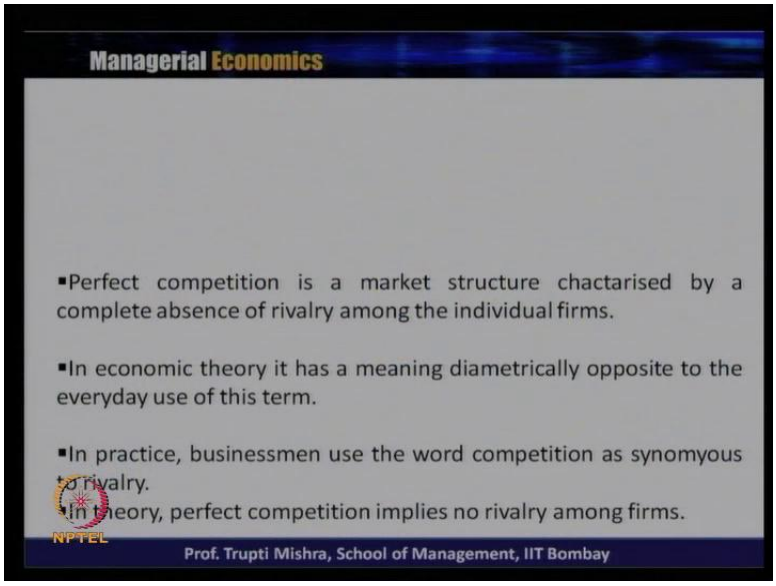

So, in economic theory it has a meaning that is diametrically opposite to the everyday use of this term. So, when you talk about perfect competition, in really if you look at, in reality this there should be the competition should be perfect, but if you look at there is complete absence of competition in the market. So, when it takes this case into the economic theory the meaning of the perfect competition is a diametrically opposite to the everyday use in this, everyday use of this term.

So, in practice businessmen use the word competition as the synonymous for the rivalry. So, competition and rivalry use as a synonym, in practice and businessmen generally use this word. But when it comes to the theory of market when you talk about the theory of the market structure perfect competition implies no rivalry among the firm, there is complete absence of competition among the firms and there is no rivalry no competition in this kind of the market structure.

So, the name if you look at that call tells perfect competition, but the reality the characteristic of the perfect competitive market says that, there is absence of the competition, there is no competition at all in this form of the market. Now, we will talk about the characteristic of a perfect competitive, what is, what are the characteristics of a perfect competitive market.

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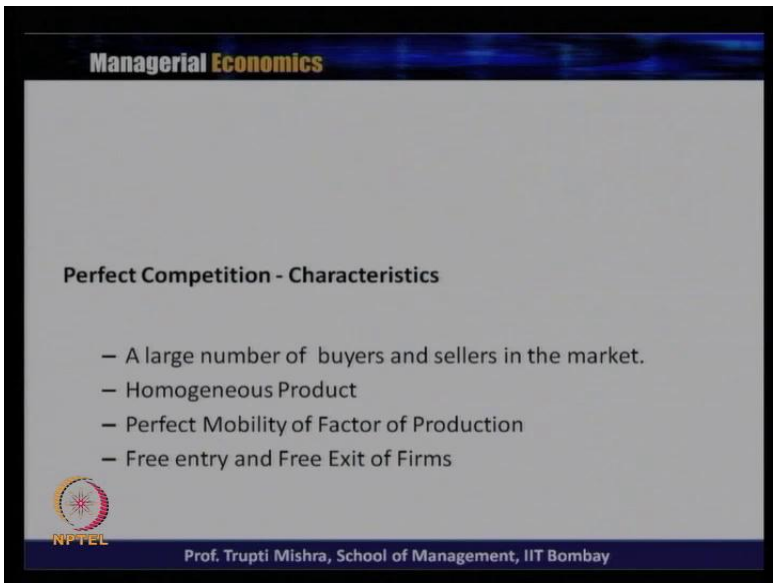

The first and the foremost characteristic of a perfect competitive market is; there are large number of buyers and sellers in the market. There are many firms who are producing the product in the market. There are many sellers, many consumers to buy the product. So, there are large numbers of buyers for the product and there is also large number of sellers of the product. So, in the background there are also large number of producer of the product because that leads to the again to the large number of sellers of the product.

So, either you call it large number of consumer or producer or you can call it large number of buyers and sellers in the market. The second characteristic of perfect competition says that, it is a homogeneous product. Its homogenous the meaning of homogeneous is that it uniform product all the firms they produce uniform. So, uniform products in case of a perfect competitive market. So, the products are not different from each other on the basis of the price, on the basis of quality or on the basis of the, may be any type of product differentiation.

So, homogeneous product is it should be an uniform product, but when you take this to the real world application whether, whether number of firms they can produce the same kind of product or may be the homogeneous product, may be the answer is somehow close to no, because that technology used by the firm is different; may be sometimes the raw material used by the firm is different, the skilled skill people involved in producing the product they are also different, may be the skill is same where the individual is different.

So, some amount of the difference is there between the one firms product to the other firm products, but as a whole it is a similar kind of product or its uniform kind of product and rather than uniform or homogeneous, we can call it that the similar product that is produced by all the firms in the market. But as theory says this is one of the characteristic of the perfect competitive market form that, it is a homogeneous product.

Then the third characteristic talks about perfect mobility of factor of production. It means there is no restriction on the factor of production, suppose you take the case in labor, the labor, they may the laborer may be one working in one firm they can move to the other firm they can move to the third firm and if possible they can again come back to the previous firm.

So, there is perfect mobility of factor of production and mainly here we talk about the labor input and they move from one firm to another firm to do the same kind of job or may be different kind of job, but the end result is again same. All the firms they are producing homogeneous product or all the firms they are producing the uniform or so called the similar product.

Then the fourth characteristic is, that is, free entry and free exit in the market. All the firms there is no entry fee, if we look at there is no entry fee, there is no restriction in entering to the market. Any one has the capability to produce and sell they will be there in the market from the supply side; anybody who has the capability to buy, they will be there in the market as the buyers. So, from the demand side if someone has the capability to buy the product, they generally there in the market there is free entry form them.

And similarly from the supply side also any producer or seller if they are ready to supply or they can ready to sell or they are ready to produce this should be there in the market because they have the capability to sell in the market, this is about the free entry.

Similarly, when it comes to free exit, there is no if you look, it is not any trapping or anything that stops the seller or the buyer to leave the market. If the sellers they feels that they are not getting profit in the market or they are or they are operating in the market, they are selling their product in the market and if they are not getting profit out of it, they will prefer to give the market and there is no restriction in exiting the market.

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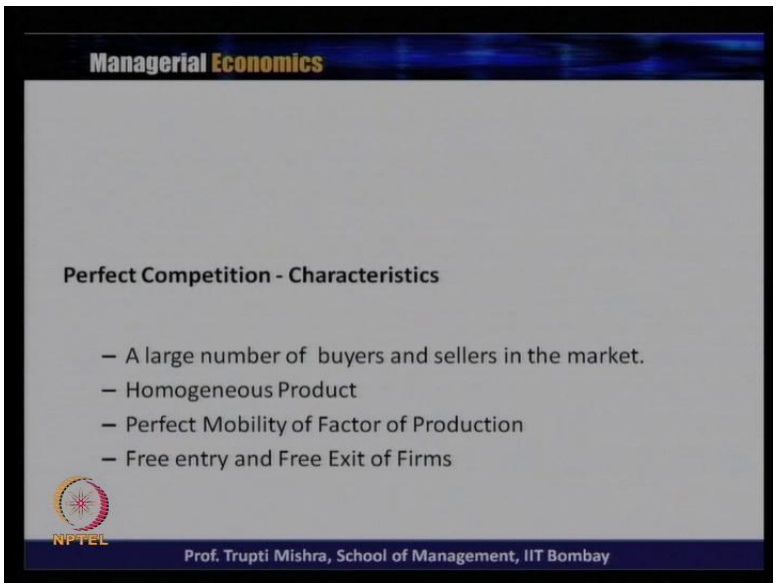

Similarly, for the buyer till the time they feel that the product is worth for them and they are getting it in a good market price. Generally, they operate in the market or they sell from the, they generally buy it from the market, but once they feel that the product is not worth buying or they do not require that product any more, they can always come out of the market of the market or they can always exit out of this market. So, if we look at there is no restriction in entering the market or there is no restriction also from coming out of this market.

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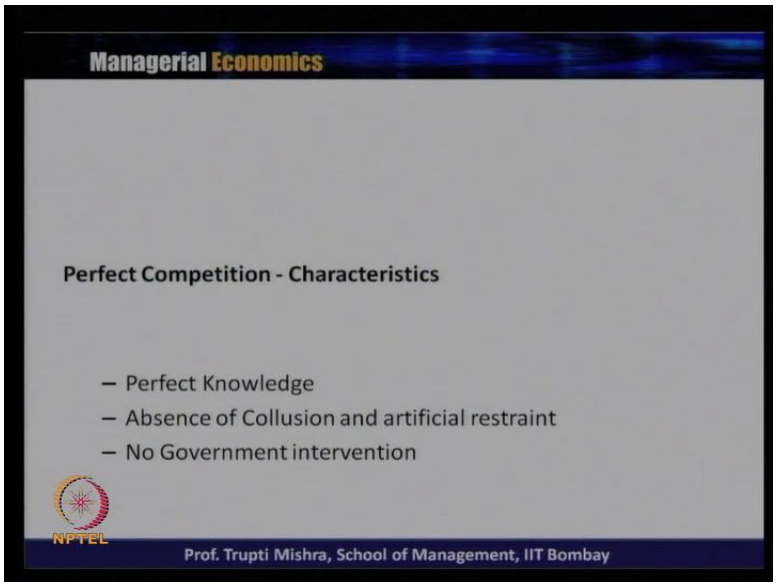

The fifth characteristic is perfect knowledge, and what is this perfect knowledge, we can reframe this as that, that all the buyers and sellers they have perfect information about the, or they have full information about the product, about the price and about the sellers from whom they are buying the product. Similarly, from the sellers from the sellers point of view also the full information about the price and they have full information about the product.

So, the one of the may be important characteristic of perfect competitive market is that, the buyers and sellers they have the full information about the price of the product, about the product, and in general what is the market condition, or what is the market how the market is doing, or as able how the what is the seller perspective, or what is the buyers perspective both the seller and buyers they have information about them.

Then there is absence of collusion and artificial restraint means, if you look at since all the firms they are producing the same product and there is absence of competition, somehow it may lead to the fact that they will collude and they will charge a higher price, which is not again a good sign for the market to grow because that way they will try to take charge a higher price and the buyer will be at the other end, and if all the firms they are producing the same product they the collusion power is also more, a strong over here.

So, there is still in case of a characteristic market even if all the firms they are producing the product, one of the characteristic of the perfect competitive market is that they will not get into the collusion or there is no form of any artificial restraint, or maybe there is no form of restraint, no form of control from the authority, or any kind of organization in the market. That is always the market forces, the supply forces and demand forces they decide as the, they decides the course of action regarding the price, regarding the product.

The last characteristic which talks about the how the market functions; whether there is a invention from the government, whether the authority gets into this or may be, whether who is who controls the demand forces and who controls the supply forces. The fact is that in case of perfect competitive market structure there is no government intervention at all. It is the demand forces, it is the supply forces; they decides the price they decides the quantity.

So, if you remember in one of our discussion when we were talking about the equilibrium, that supply and demand forces if the when the demand is equal to supply. Generally, that is the case we get the equilibrium and whenever there is a mismatch between the supply and demand, generally the buyers and the seller they among themselves, they again comes back to a situation which is again equilibrium, and how they comes back to a situation when again equilibrium either they control the demand forces or they control the supply forces.

So, in generally there is no intervention from government rather the buyers and seller among themselves, they decides the price they decides the output or may be the supply forces rather than saying buyers and seller the supply forces and demand forces they decides, what should be the price, what should be the output. And there is no form intervention it is like the invisible hand principle, as we talk about in case of a different kind of economy. So, in case of perfect competitive market structure it is a invisible hand principle that the market forces decides everything; what should be the price, what should be the product, and what should be the market condition.

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So, if you look at when you analyze or when you look at all the characteristic, perfect competition is an uncommon phenomenon in a real business world. However, the actual market that approximate to the condition of perfect competitive model; inclusive share market, securities and bond markets, local vegetable markets and agriculture of product market to name few.

So, it looks very uncommon when you talk about the characteristic that, there is free entry free exit or homogenous product, but somehow if you down the line if you can take out some of the restriction, if you can generalize some of it if you look, then in that case the actual market some of the actual market, they their feature or their characteristic closely resemble there is a resemblance with the perfect competitive market structure.

So, in case if you look the local vegetable market or the agricultural product market their product is not different from one other, not much different. Suppose, it is rice or a typical vegetable they just produce that vegetable, may be someone is of a good quality, someone is a bad quality, someone is small someone is large, but in general it is a similar kind of product. So, we will talk more about the application of the perfect competition, the real one the later part of the session, where we will see that whether a typical market fits to within the perfect competitive market.

But in general these are the market like agricultural product market, local vegetable market, share market bond and security market, they are somehow close to the, they have

some feature which is similarity with the perfect competitive market structure. And if you look at even if it is uncommon still some form of market, still they adopt it and they call it is a perfect competitive form of a market. Okay.

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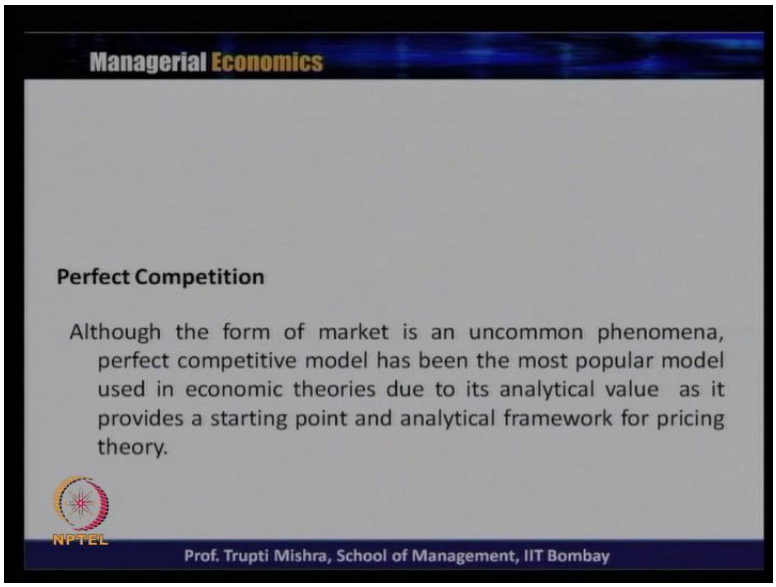

So, as we know this is a uncommon phenomena looks like from the characteristic as a whole this market form is a uncommon phenomenon, but as a whole when you talk about a perfect competitive model, that has been a popular model used in economic theory due to analytical value as it provide the starting point and analytical frame work for the pricing theory. So, if you look at may be from the characteristic point of view it is like very uncommon, but when it comes about the model that gets used in the perfect competitive market structure, that is, most popular model and sometime this serve as a base to them many of the other models and it is due to its analytical value as it provide the starting point and analytical frame work for the pricing theory.

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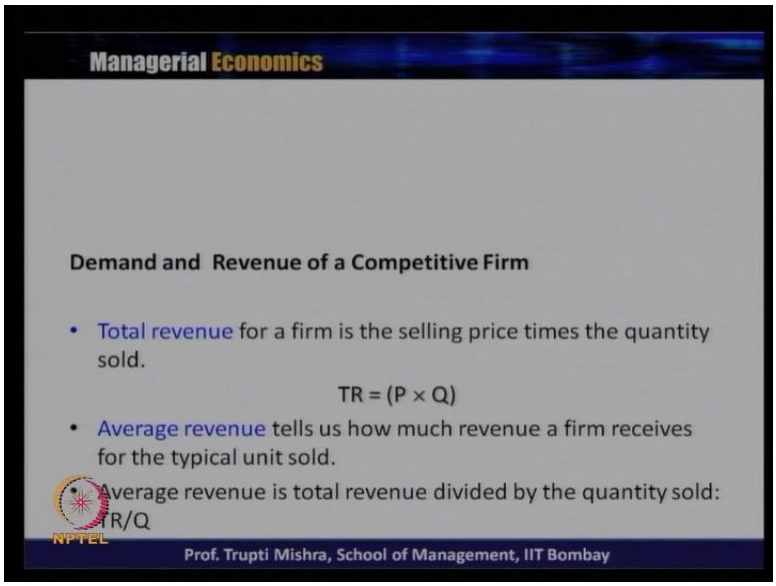

So, then we will talk about that how what is the demand and what is the revenue of a competitive firm or as a industry as a whole, or what should be the value of total revenue, how total revenue is calculated, what is the demand that will check for the typically competitive firm. So, we will take the revenue part first, and total revenue for a firm is selling price times the quantity of goods sold. So, total revenue is price multiplied by the quantity. If price is ten rupees and quantity sold that is hundred units total revenue will be thousand units because P is 10 and Q is 100.

So, total revenue is in the very simple manner its nothing but the total revenue or the total output what they total revenue, they get by selling the quantity that is produced by them or that is getting sold by them. Average revenue tells us how much revenue or firm receive for the typical unit sold. So, basically this is the average revenue that is revenue per unit of the output, and average revenue is the total revenue divided by the quantity sold, that is, total revenue divided by Q.

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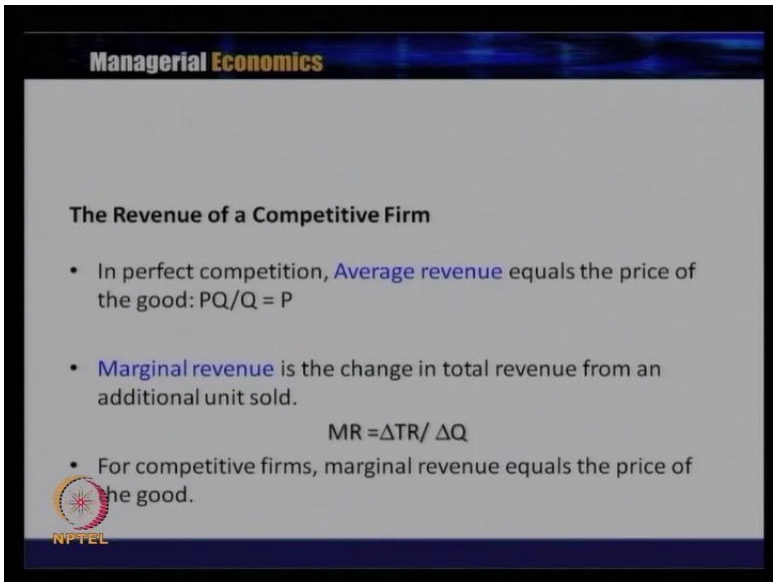

Then the revenue of the competitive firm, in perfect competition average revenue is equal to the price of the goods, that is, P Q by Q which comes to P. And marginal revenue is the change in the total revenue from when additional unit sold, and for a competitive firm the marginal revenue equals the price of the goods. So, is you look at in case of perfect competitive market structure the price is equal to the average revenue which is also equal to the marginal revenue. There is no difference between the average revenue, marginal revenue and price, that we will check later again when we will take a numerical form, but for the time being. The understanding is in case of perfect competitive market structure the price is equal to average revenue which is equal to the marginal revenue.

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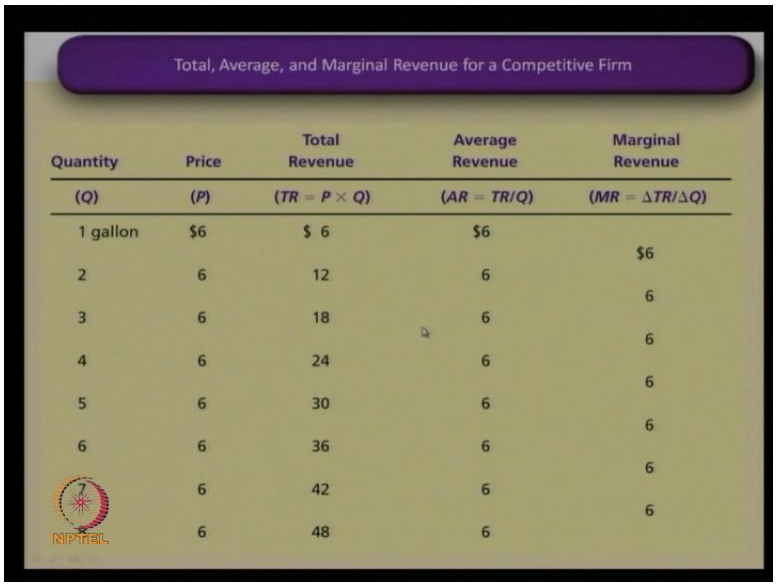

So, this is the typical example that how we get the total revenue, average revenue and marginal revenue. Q is the quantity, the number of unit sold, P is the price and total revenue is nothing, but the price multiplied by quantity average revenue is, that is total revenue divided by Q they because this is the per unit revenue and marginal revenue is the change in the total revenue with respect to change in the Q.

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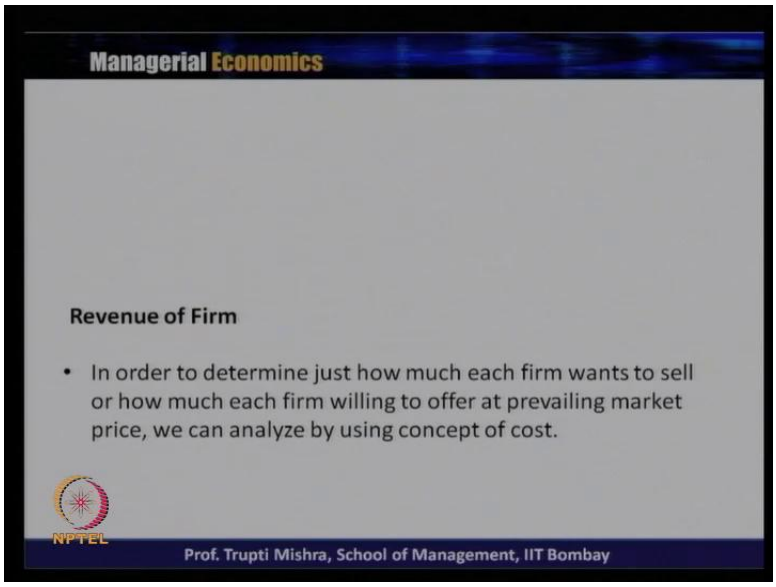

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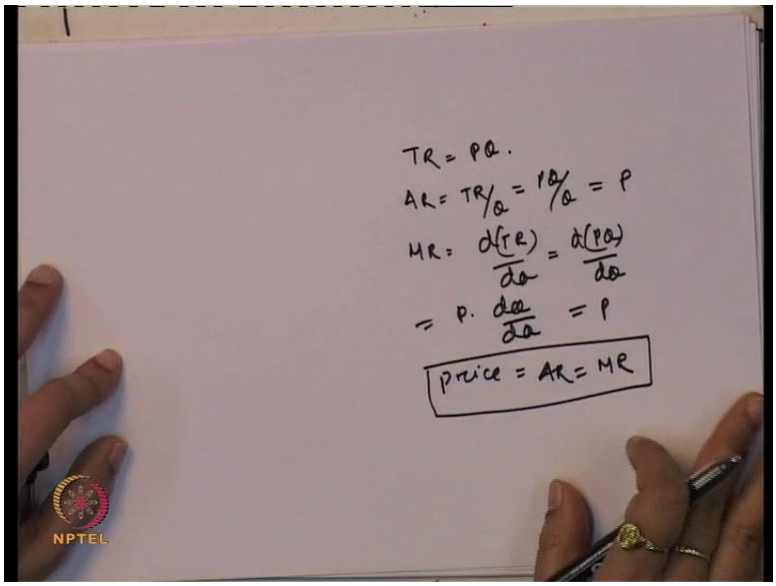

So, if you take that why this P is equal to average, P is equal to average revenue which is equal to marginal revenue. Suppose, total revenue is equal to P Q, then average revenue is total revenue by Q. So, this is P Q by Q and this comes as P, and similarly marginal revenue is D T R that is by d Q, then this is d P Q with respect to Q and again if you simplify this, then this is d Q d Q which is equal to p. So, price is equal to the average revenue which is equal to the marginal revenue in case of the perfect competitive market structure.

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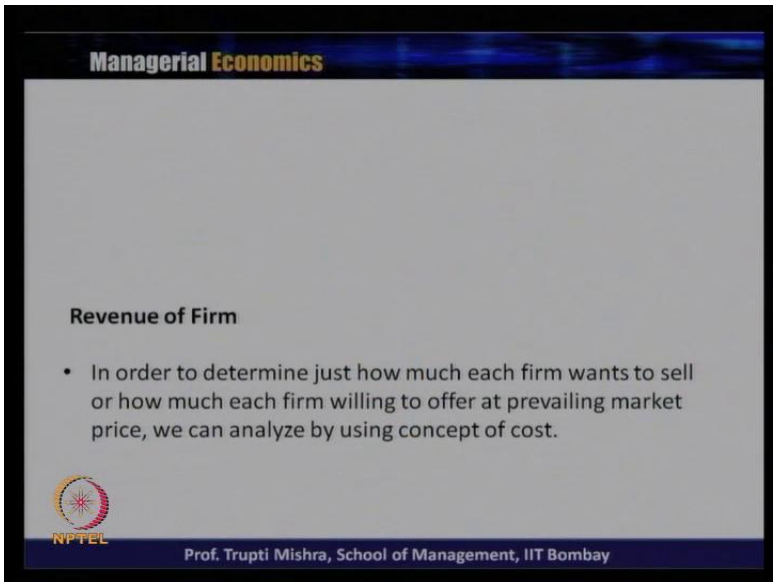

So, in order to determine that just how much each firm wants to sell or how much each firm is willing to offer at prevailing market price, we can analyze using the concept of cost. So, how much the firm is willing to sell or how much the each firm want to sell that can be decided on the basis of the cost function, or that can be decided on the basis of the prevailing price.

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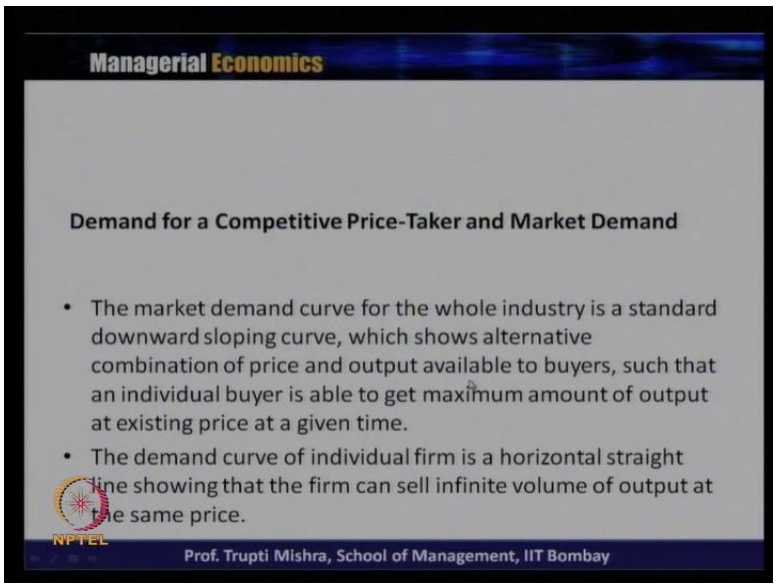

So, we will analyze that using the concept of the cost. Then the market demand curve for the whole industry and if you remember in the previous class, like when we were talking about that how much they want to sell or how much that depend always, depends on the profit of the whatever the profit they are getting. So, what is the profit over here, the profit is the difference between the total revenue and total cost. So, if you remember the point at which the profit is maximum, that is, the point the firm generally they want to operate because they want to sell that much amount of output where they get the maximum profit.

Then we will talk about the demand for the competitive price taker, that is, for the individual firm and for the market demand as a whole. So, the market demand curve if you look at the market demand curve, this is the sum total of the demand from the all the firms and it is generally a standard downward sloping demand curve, because we know that the demand curve is downward sloping. So, market demand curve is always downward sloping this is the summation of the individual demand curve from the all the firms.

The downward sloping curve gives the price and quantity combination that is available to buyer, such that the individual buyer is able to get the maximum amount of output at the existing price. And the demand curve of the individual firm is horizontal straight line showing that the firm can sell infinite volume of output at the same price. So, in case of a competitive price taker the demand curve for the firm is, the demand for the firm is straight line that is horizontal and parallel to the x axis, that is horizontal axis, and what is the significance of that the significance for that is that whatever amount the firm wants to sell the can sell at the same price.

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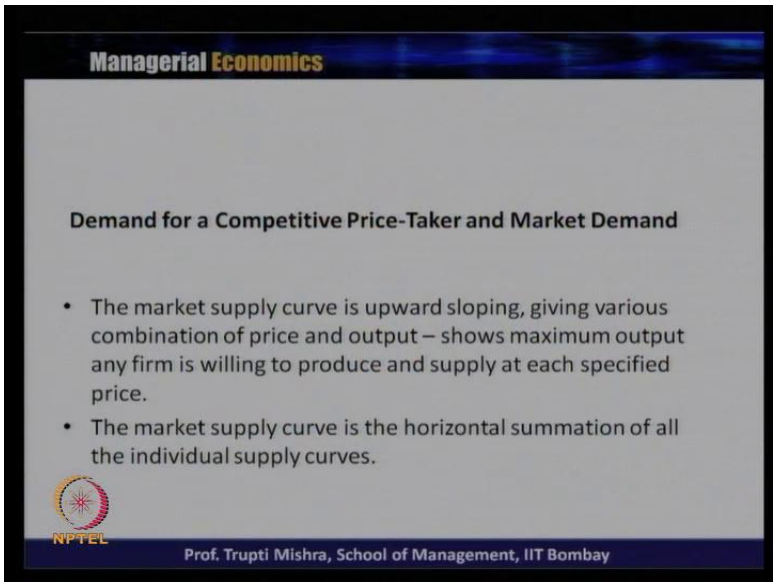

There is no restriction on the amount what they are going to sell because price has to be constant at that point. Any firms any amount they would like to sell they sell at that typical market, is typical market and typical price. Now, what is market supply market supply is upward sloping giving various combinations of price and output shows the maximum output any firm is willing to produce and supply at each specified price.

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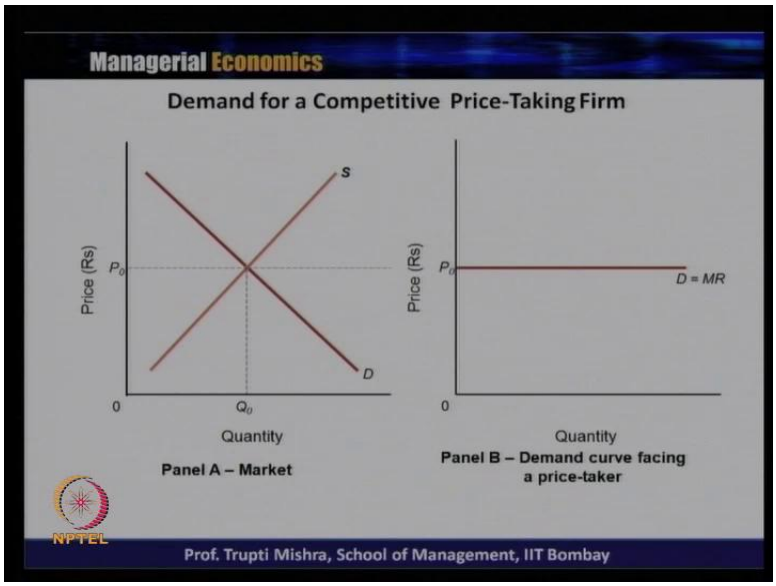

Market supply curve is the horizontal summation of the individual supply curve. So, this is the demand for the competitive price taking firm. In the market panel a talks about the market industry as a whole, panel two talks about the demand curve facing the price taker. So, supply is upward slopping, demand is downward slopping the point at which demand and supply intersect each other, that is, the equilibrium point and corresponding to that we get the equilibrium quantity, that is, Q 0 and equilibrium price is P 0.

Panel B is the demand curve facing generally facing a price taker or a for a individual firm, and as we know that the price is equal to marginal revenue and also average revenue, here the demand curve is just a straight line. The price comes from a because individual firm not in a position to influence the price, that is, the reason the generally all the firms they are the price taker firm because not a single buyer or not a single seller they generally influence the price.

So, whatever the price set by the market, that is, generally accepted by all the firms. So, none of the seller they fix up their price rather they accept whatever the price fixed by the market supply and market demand and they accept that as the market price. So, here we get from the market supply and market demand curve we got the price, and if you look at the demand curve for the, and at that price the firm can sell any amount. So, that is the reason a price is fixed and the quantity is changing, the quantity is just moving from one point to another point and the here, that is d is equal to M R.

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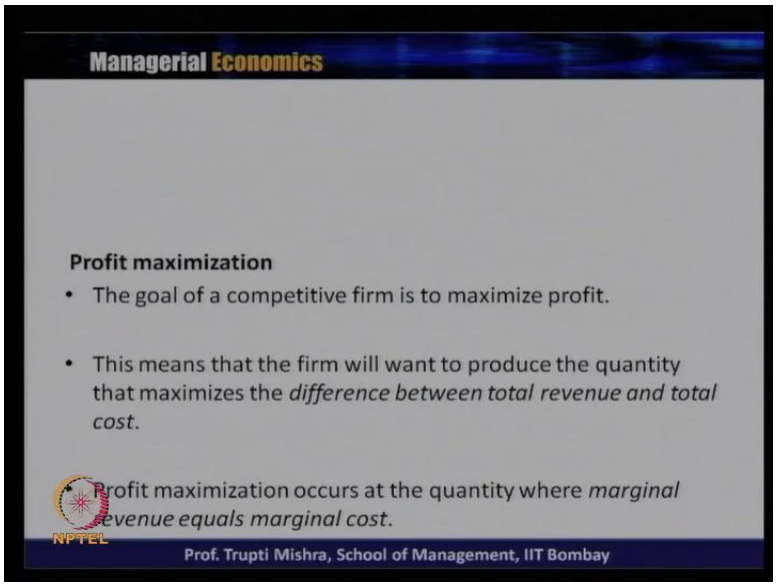

Then we will talk about the profit maximization. Now, why this profit maximization comes into picture; because the goal of the competitive firm is to maximize profit, the optimization problem for a firm is to always they maximize the profit with a minimum of cost. This means that the firm will want to produce the quantity that maximize the difference between the total revenue and total cost or may be the profit maximization occurs at the quantity where marginal revenue equal to marginal cost.

So, in the previous class if you remember we talked about two way, how the equilibrium can be achieved with the total cost and total revenue; or how the profit maximization can takes place with the help of total cost, total revenue, marginal cost and marginal revenue. And using the total cost and total revenue approach, the maximum at which the difference is total cost and total revenue, that is, maximum that is the point the level of output the producer or the firm should produce. And secondly, the marginal cost and marginal revenue where it is equalization of the marginal cost and marginal revenue that is the point the profit maximization should take place.

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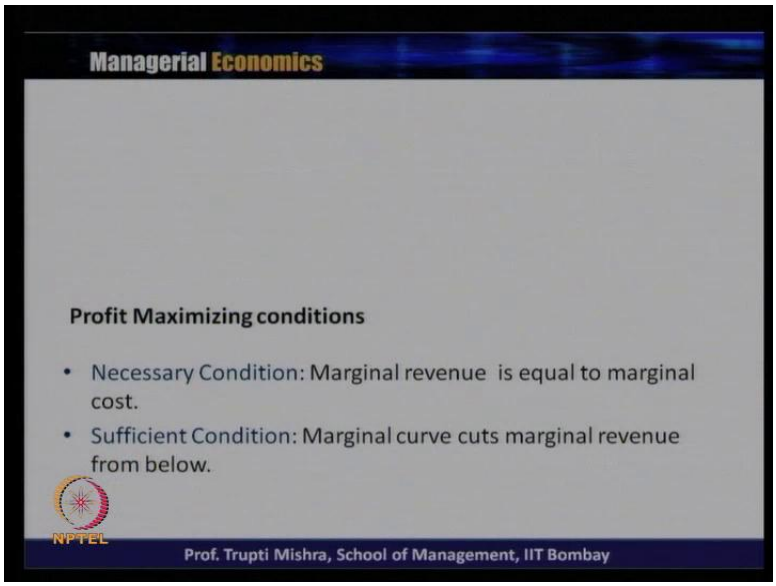

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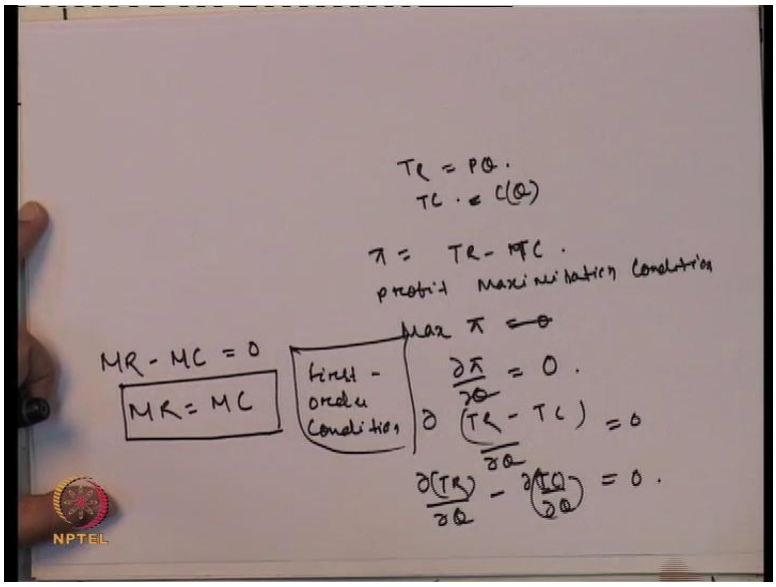

Now, from there actually two condition comes from the profit maximization condition; one that is necessary condition, marginal revenue is equal to marginal cost; and two is the sufficient condition, that is marginal curve cuts the marginal revenue from the below. So, we will look for the detail that how we get this equation marginal cost equal to marginal revenue and marginal cost should cut from the below at the point of equilibrium. So, if you look at now, what is our total revenue total revenue is P Q and total cost is maybe that is again it is a function of Q.

Now, how to, what is the profit; profit is total revenue minus total cost. Now, what is the

profit maximization condition, the profit maximization condition is when you maximize P, maximize the profit it has to be equal to 0 or may when you, to maximize the profit this derivative has to be equal to 0 first order derivative. So, in this case this is T R by T C has to be equal to 0. So, this is del T R del Q minus del T C del Q has to be equal to 0, and what is the first order derivative of the total revenue function, that gives us the marginal revenue. What is the first order derivative of the total cost function, that gives us the marginal cost.

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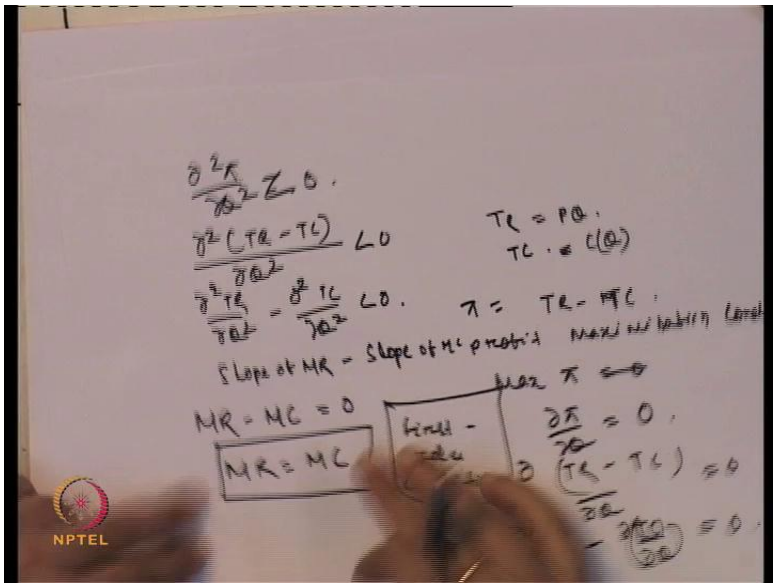

So, this has to be equal to 0 or marginal revenue has to be equal to 0, if marginal revenue is equal to marginal cost that is the first order condition. This is the first order condition for the profit maximization. Similarly, how we derive the second order condition this, that is first order or the necessary condition and second order condition is the marginal curve cuts should, marginal curve cuts marginal revenue from below. So, if you took that in a algebraically solution than it should be that the slope of the marginal cost should be greater than the slope of the marginal revenue curve at the point of the equilibrium or at the point of profit maximization. To check this how we have to do we have to take a second order derivative of the profit function. So, that has to be less than 0.

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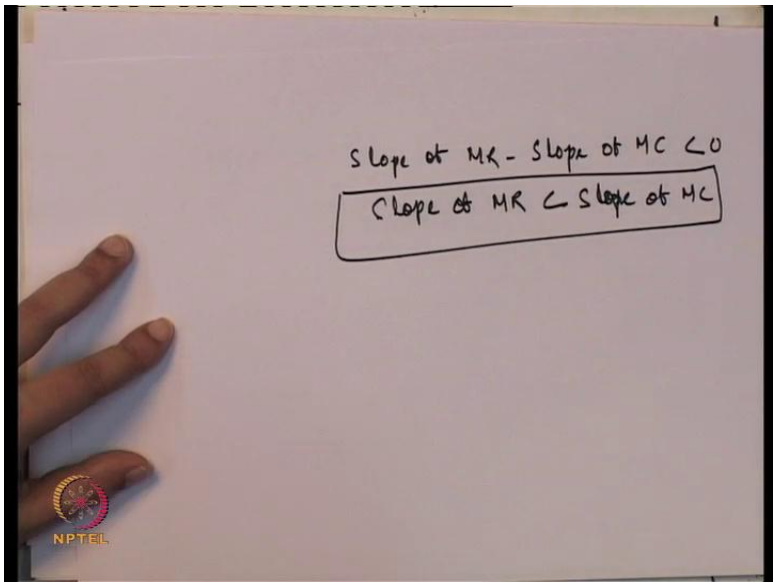

So, this is total revenue minus total cost. So, this is del Q square has to be less than 0, then del square TR by del Q square and del square TC by del Q square has to be less than 0. So, this gives us the slope of marginal revenue, this gives us the slope of M C marginal cost. So, if you look at then the slope of marginal revenue minus slope of marginal cost has to be less than 0. And slope of if you simplify again, this slope of marginal revenue has to be the slope of marginal cost. Slope of marginal revenue is equal to less than the slope of marginal cost.

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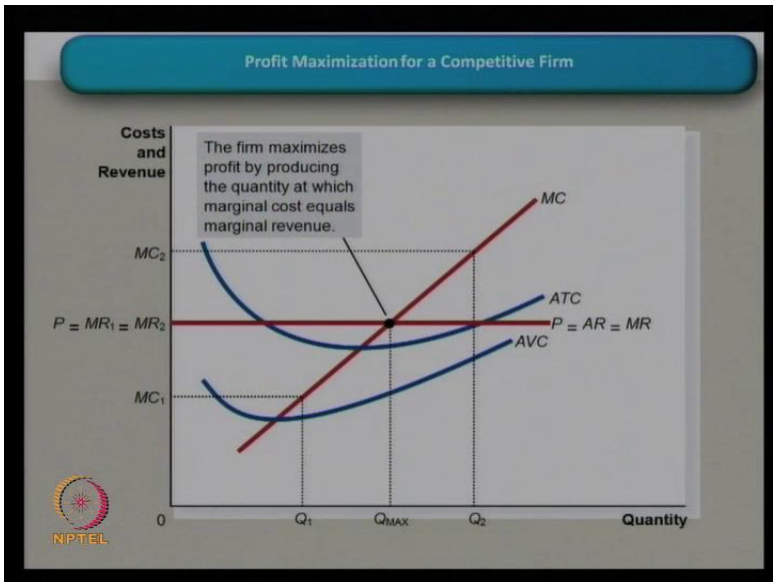

So, the necessary conditions talks about the marginal revenue has to be equal to the

marginal cost and sufficient condition says that the marginal curve cuts the marginal revenue from the below. So, graphically if you look at than here; P is equal to A R is equal to MR, this is the demand curve, than ATC is the average total cost, AVC is the average variable cost and marginal cost curve intersect the average total cost curve and average variable cost at its minimum point. The firm maximizes the profit by producing the quantity at which the marginal cost is equal to the marginal revenue.

So, corresponding to that if you look at the both the condition gets fulfilled, that is, condition one the marginal revenue is equal to marginal cost, and condition two that this point the slope of the M C is greater than the slope of M R. Now, we will just take a numerical function in order to understand how the profit maximization is done using this both this condition. So, we will take a TR function, we will take a TC function and then from there we will try to maximize the profit using the sufficient condition and the necessity condition and see what is the profit level.

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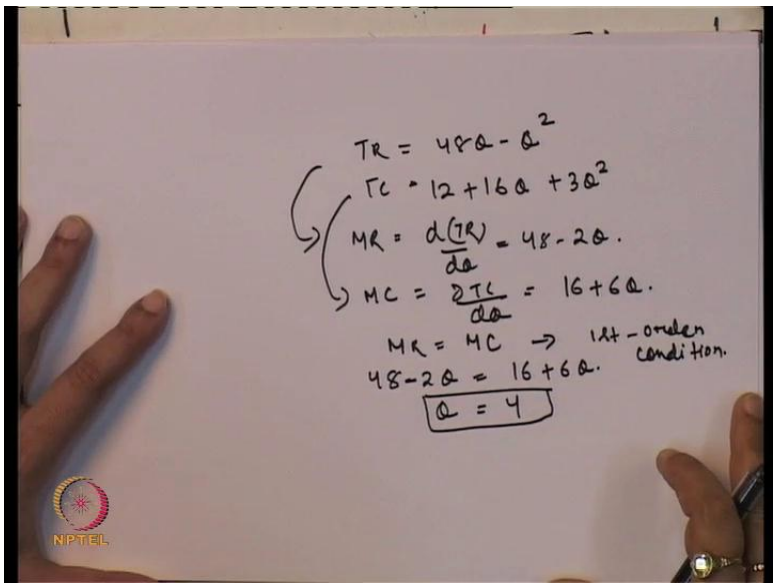

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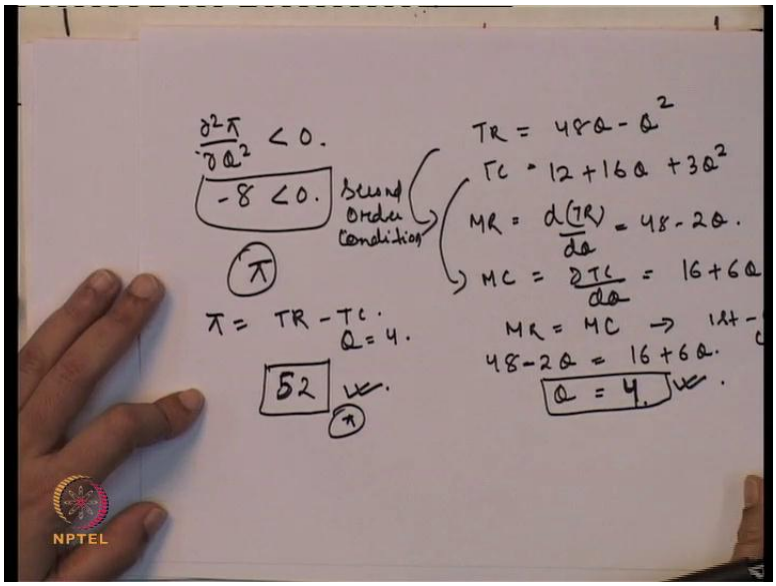

So, if you look at this total revenue and total cost. So, total revenue is 48 Q minus Q square, total cost is 12 plus 16 Q plus 3 Q square, we need to calculate the output that maximize the profit and the amount of maximum profit. What we require now, we require the marginal revenue. So, marginal revenue is d TR by d Q. So, that comes to 48 minus 2 Q and from total cost we will find out the marginal cost, that is d TC with respect to Q. So, that is 16 plus 6 Q. First order condition says that marginal revenue should be equal to the marginal cost.

So, marginal revenue if it is equal to marginal cost than 48 minus 2 Q should be equal to 16 plus 6 Q and if you simplify this then it comes to so, this comes to Q is equal to 4. So, this is the quantity of output where the profit level is maximum. Now, in this case only the first to till now we have only checked about the first order condition for the profit maximization. Then we will check for the second order condition for the profit maximization, and what the second order condition says, the second order condition says that the del square pi by del Q square has to be less than 0.

So, if you take this del square by with respect to Q then that comes to -8 and which is less than 0, so the second order condition also gets fulfilled. Here the next task is once we fulfill both the profit maximization condition, the next task is to find out what is the amount of profit when the output level is this, and how we will find out, that as we know that profit is equal to total revenue minus total cost we will find out the value of the total

revenue. So, total revenue is substituting the value which is Q is equal to 4 and there we get a value that is profit that is equal to 52.

So, 52 is the profit, if Q is equal to 4 and in this case both the first order and the second order condition get fulfilled. So, for profit maximizing level at any point of time, we need to first check whether the profit maximization condition has been made fulfilled or not and after doing that then we need to find out that, what is the level of output, what is the total revenue, what is the total cost, and hence for the what is the total profit, or what is the profit the firm is getting.

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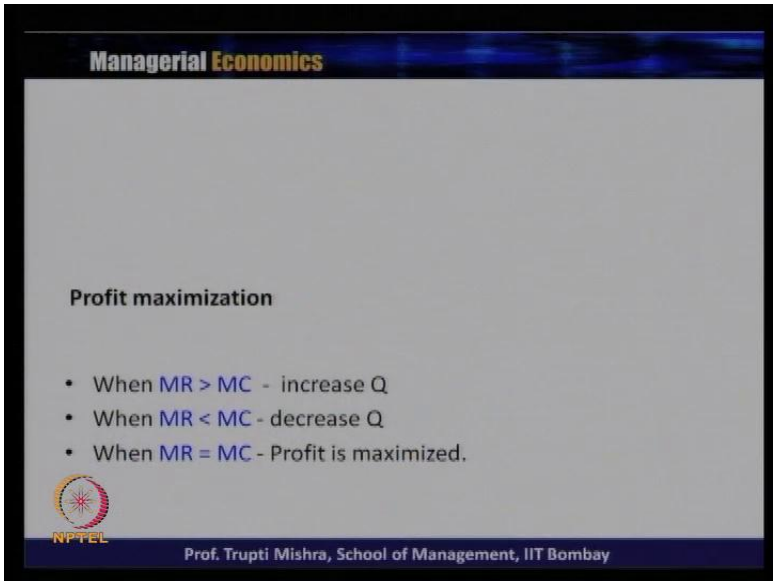

So, what is the thumb rule for this profit maximization, if marginal revenue is greater than marginal cost we have to increase the quantity because the per unit increase in the Q brings more revenue than the cost. When marginal revenue is less than marginal cost, there should be decrease in the quantity because the per unit increase in the revenue is less than per unit increase in the cost when one more unit of output is added. And if marginal revenue is equal to marginal cost then the profit is maximized.

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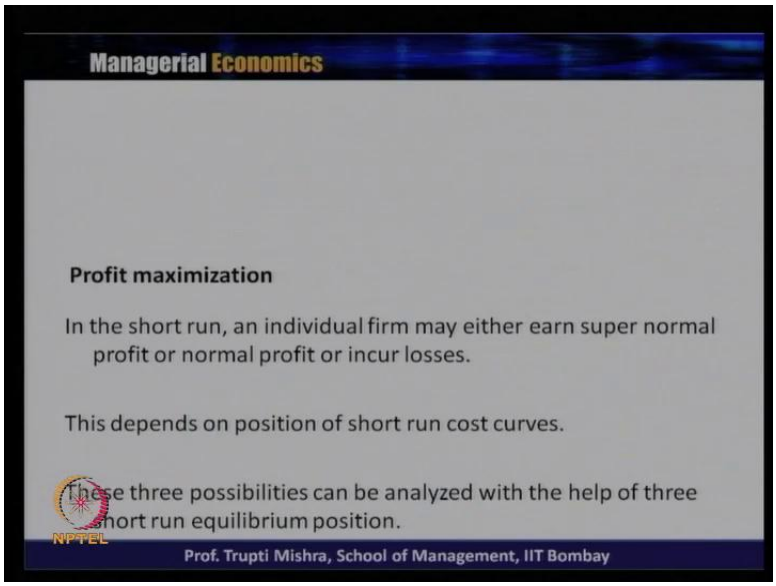

So, profit maximization in the short run if you are coming specifically to the short turn case an individual firm, may either earn super normal profit or earn normal profit or incur loss. So, either of these three situations can happen in case of short run individual firm, can either earn super normal profit. Let me tell you the super normal profit here is to the profit above the normal profit or just the normal profit or incur losses.

This depends on the position of the short run cost curve because what is the cost curve, on that basis it is going to be decided whether the individual firm is going to get the super normal profit going to get the normal profit or just incur the loss by producing that level of output. So, these three possibilities whether super normal profit, normal profit or loss that can be analyzed with the help of three short run equilibrium positions.

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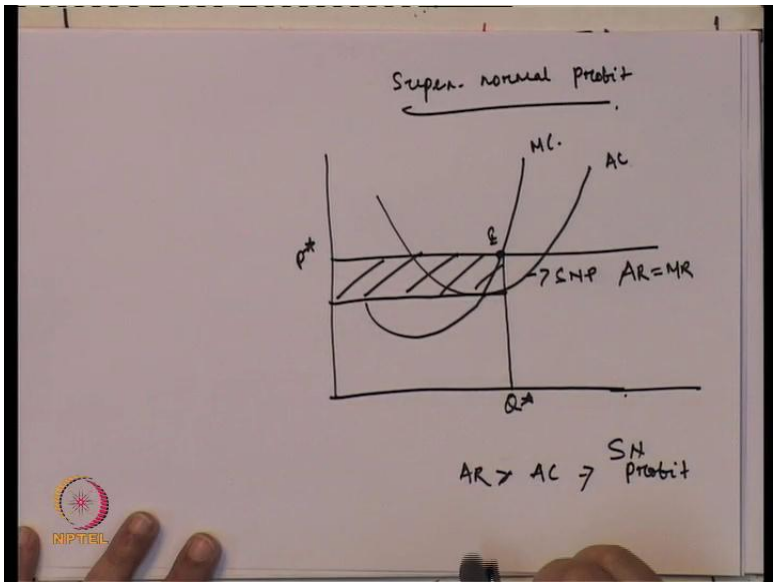

We will now see for all this three cases on the basis of the cost curve, how we can say which one is the super normal profit and which one is the normal profit. To start with we do with a super normal profit we will see in which case, generally the in the short run the individual firm gets the super normal profit. This is the demand curve, average revenue is equal to the marginal revenue, this is the average cost and this is the marginal cost. So, this is our price.

Now, how we will find whether in this case it is the super normal profit, normal profit or the loss. Now, what is the profit maximizing condition, the marginal revenue should be equal to the marginal cost and second the slope of M C should be greater than slope of marginal revenue curve. So, if we look at this point E, both the condition gets fulfilled and this is the profit maximizing level of the typical firm. Now, when this output is produced, suppose this is Q star now we need to check at Q star level of output what the firm is getting.

So, now how to find out that corresponding to this level of output, we will find out what is the average cost and what is the average revenue. So, this is the average cost and this is the average revenue. Since, average revenue is greater than average cost the firm is getting profit, that is, super normal profit and what is the amount of the super normal profit the area between the average revenue and the average cost. So, this is the super normal profit the firm is getting, and how to reach to this super normal profit loss or the

normal profit. First we need to look at the equilibrium point, the profit maximization condition where it gets fulfilled, corresponding to that we need to look for the average revenue, we need to look for the average cost and the difference between the average revenue and average cost that gives us the profit loss or the super normal profit.

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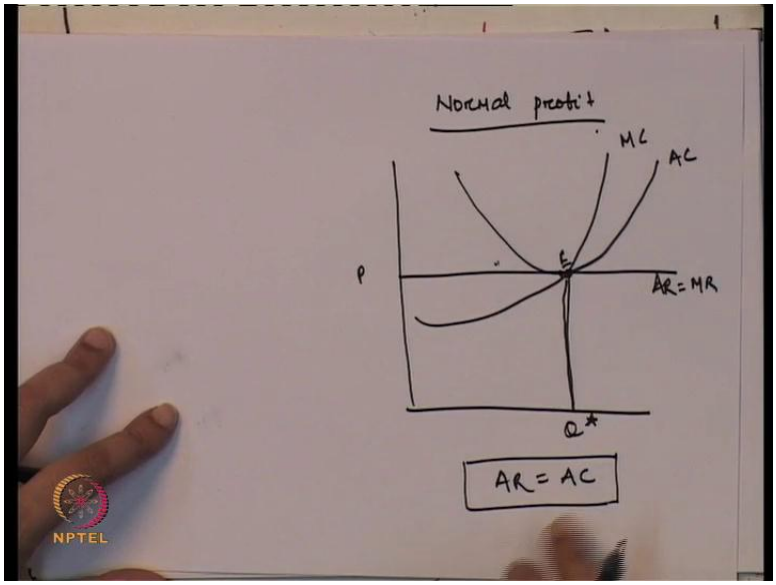

So, in this specific case since the average revenue is higher than the average cost the firm is getting the super normal profit. Then we will see the case of the normal profit and ideally normal profit is what, the revenue is just equal to the cost. So, this is the our P which is also equal to the average revenue and the marginal revenue, this is our average cost, this is our marginal cost, this is point E where both the condition gets fulfilled; marginal revenue is equal to the marginal cost and the slope of the M C is greater than the slope of the M R curve, this is the equilibrium point or the profit maximization point Q star is the level of output.

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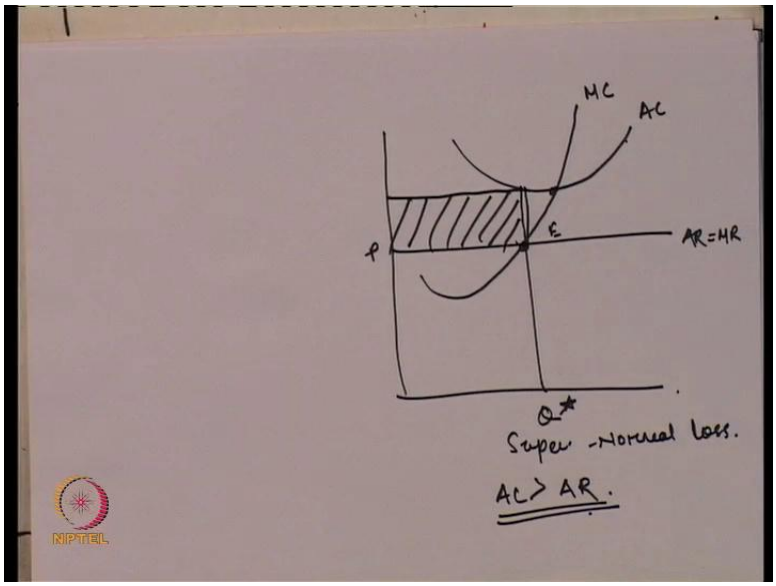

And now we need to check whether it is normal profit, super normal profit or loss. Corresponding to this if you find our average revenue is just equal to the average cost. So, there is no super nominal profit no loss rather this is the normal profit because average revenue is just equal to the average cost.

Then, we will see the third case that is the case of the loss, and in case of the loss ideally how it should happen, the loss should be where the cost is higher than the revenue. So, again we will follow the same process; we will identify the demand curve, that is average revenue is equal to the marginal revenue, we will take the average cost we will take the marginal cost, we will find the equilibrium point, that is point E where marginal revenue is equal to the marginal cost and the slope of the mc is greater than the slope of the M R curve, corresponding to that we will find the level of output and corresponding to that level of level of output now we will find out what is the profit loss or what is the outcome over here

So, corresponding to this if we look at our average cost is greater than the average revenue. So, this is and the difference between the average cost is average revenue is this much, that is between corresponding to the profit maximizing level of output and in this case, since the average cost is greater than average revenue the firm is incurring super normal loss. Okay!

Now, these are three situations where we think that either the firm is getting super normal profit or the firm is getting the normal profit or they are incurring loss. Is there any way where it all happens if the firm is producing, but there are some situations where the firm just gets the sub normal profit and they shut down the operation. Now, we will see and that generally happen in case of the short run when the shut down takes place because the firm is not able to cover the variable cost of production. Also now, we will take a special case where the firm is getting sub normal profit and they are getting into a shut down condition because the price is not getting price is the, variable cost is also not getting covered by the market price of the product.

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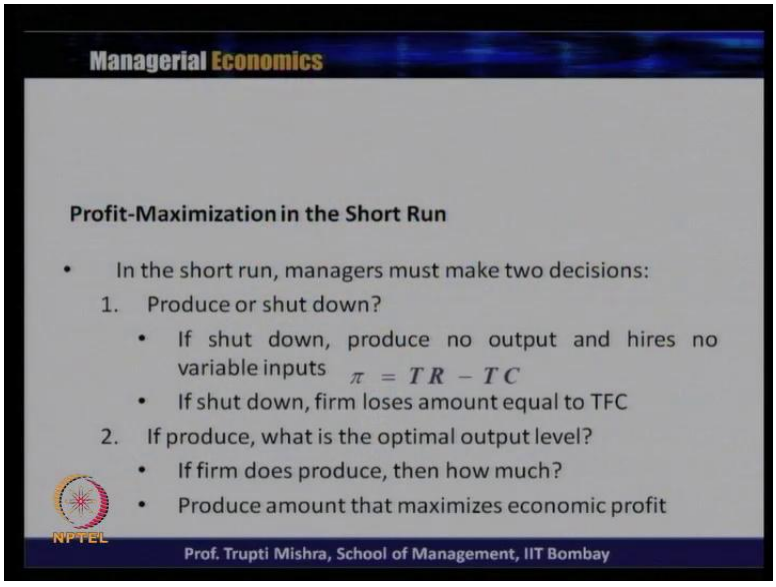

So, in the case of the profit maximizing in the short run, manager must take two decisions whether to produce or to shut down. If shut down, produce no output hires no variable inputs, and if shut down firm loosed the amount which is equal to the total fixed cost. If produce what is the optimal level of output and then if firm dose produce then how much and produce the amount that maximize the profit.

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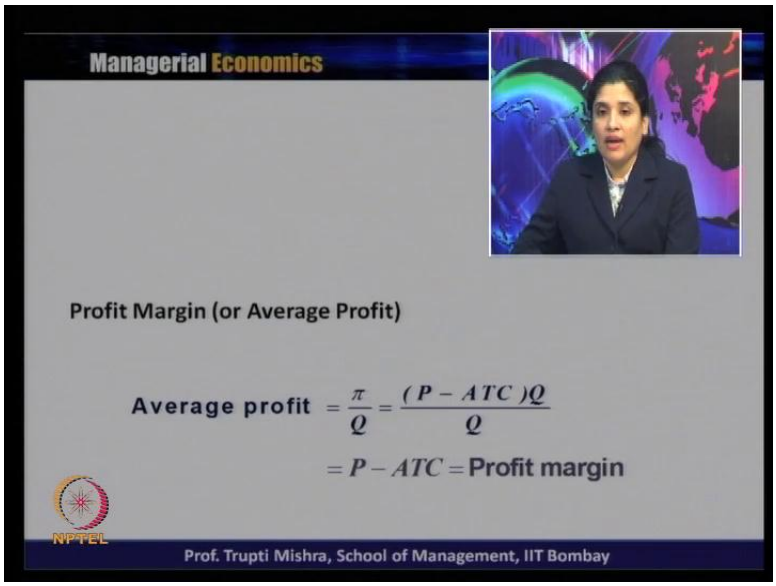

Now, here focus is more when the firm should shut down because we have already checked when they produce either they get profit loss or super normal profit. Now, if they shut then in this case we need to check how much they should produce, in which level they should just shut down the operation. Now, what is profit margin, we need to understand this concept in order to understand the shut down condition. So, profit margin or the average profit is the pi divided by Q, that is, P minus average total cost Q divided by Q, or we can say P minus A T C is the profit margin.

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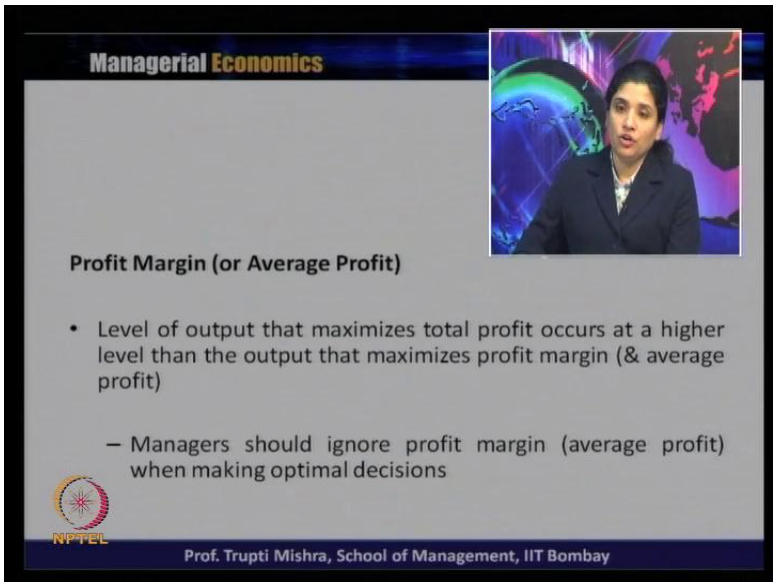

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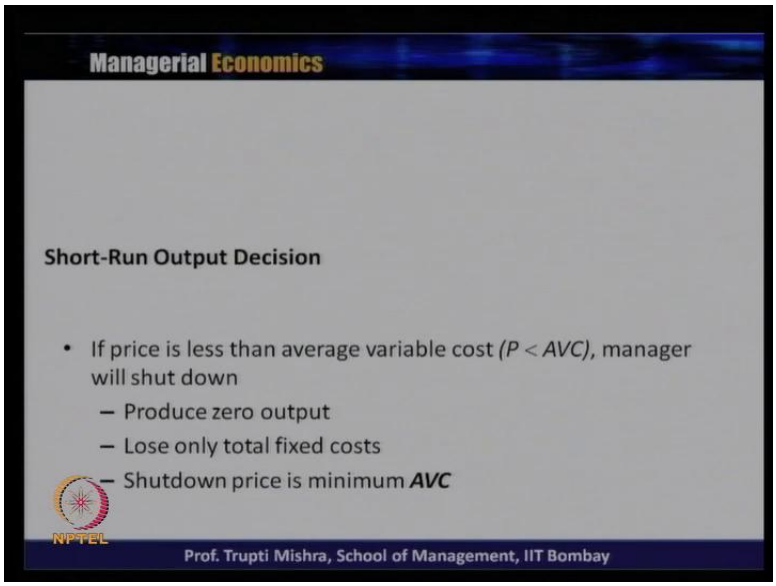

Level of output that maximize the total profit occurs at a higher level than the output that maximize the profit margin, and generally manager should ignore profit margin when making the optimal decision, and what is the short run output decision. If price less than average variable cost; manager will shut down, they produce 0 output, loose only total fixed cost and shut down price is generally the minimum of AVC. So, till the time the price is equal to or greater than minimum of average variable cost the firm will continue the production. The logic here is that at least they are covering the variable cost of production and if they continue in the same manner in the long run the possibility is there are they can they will get some amount of profit.

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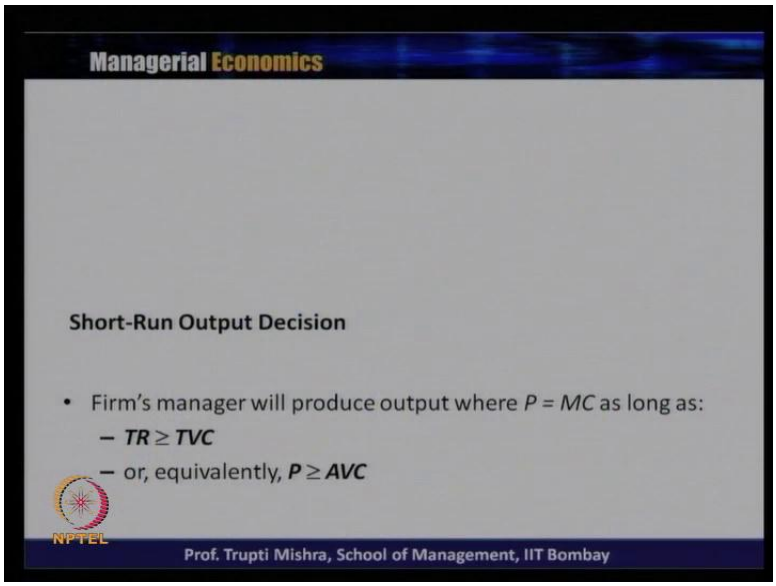

But in case of price if it is less than minimum AVC even they are not covering the variable cost for them, its profitable to shut down the production operation as a whole, and they will produce the output if they are producing, they will produce the output where P is equal to M C as long as total revenue is greater than total variable cost or P is greater than the average variable cost. So, this P greater than average variable cost generally this is known as the shut down point or this is known as the shut down condition for the firm in the short run.

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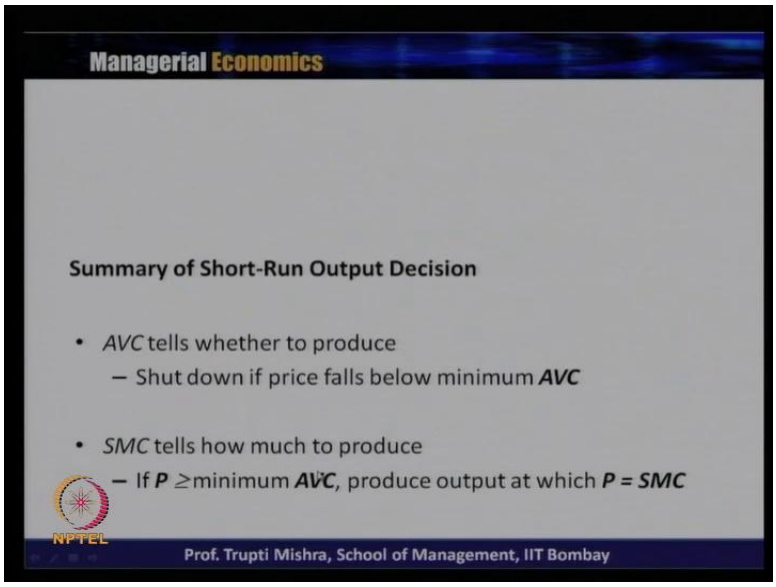

Now, if you summarize this short run output decision or may be before summarizing this let us take a look on the graphical analysis of this specific situation or the special case, where the firm is not producing they are evaluating the option, whether to produce if they are covering the just variable cost and not when not covering the variable cost of production they are thinking to shut down the operation.

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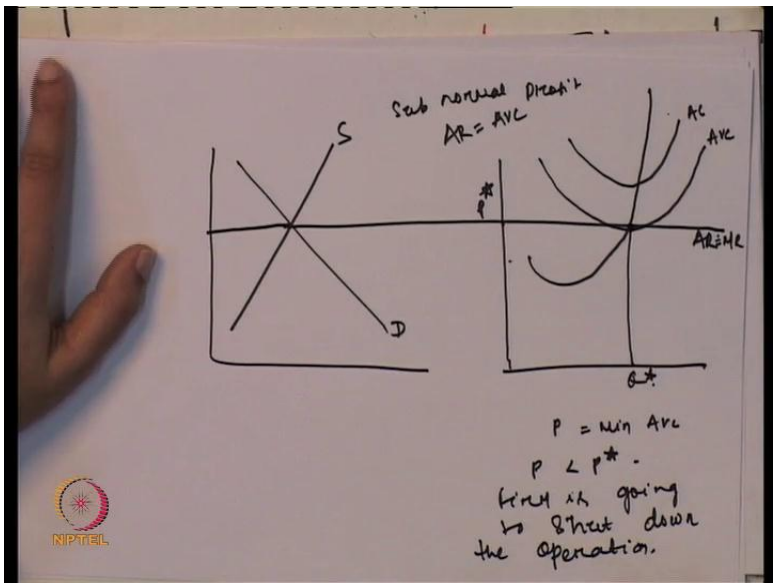

So, before that we will see what is the exit what is the shut down point, graphically we will just take a numerical to understand; what the price is, or how the price is decided to find out the shut down point, or to find out the level of output whether firm should go for the shut down. So, generally we call this is the case of a sub normal profit. So, the first part is; that is supply, this is demand, this from demand supply equation we get the price and that is generally accepted by the firm, and this is P star here the cost functions are bit different. Here we will, so we are representing the average variable cost we are representing the average cost and marginal cost curve intersect the average variable cost and average cost at its minimum point, this is the level of output. Okay.

Now, what is this P star. So, if we look at here P is equal to minimum point of average variable cost. This is the level of output and here if you look at they are not getting any profit, any profit rather you can call it a sub normal profit because here the average revenue just equal to the average variable cost not the entire average total cost. So, here the average revenue is equal to the average variable cost. So, this is average revenue, this is marginal revenue and at this point. So, any price if it is less than P star then the firm is

going to shut down the operation, because after this it will not also cover the variable cost. So, any price which is less than P star the firm is going to shut down the operation.

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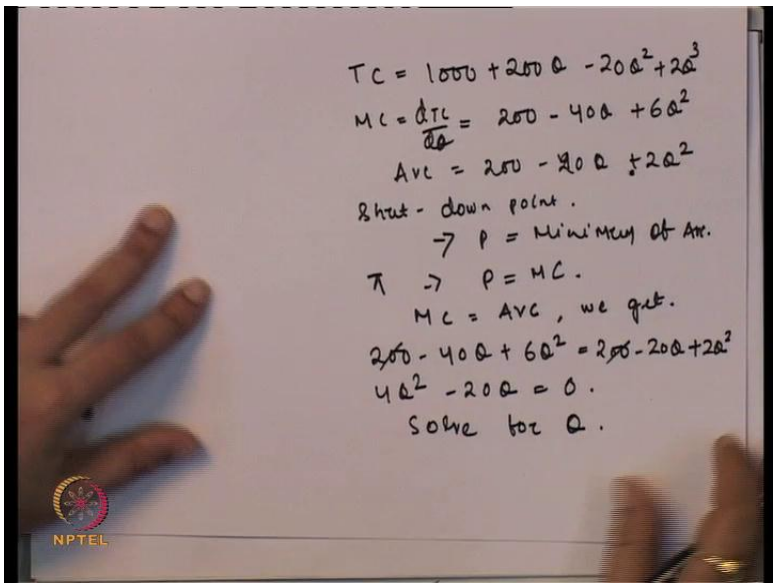

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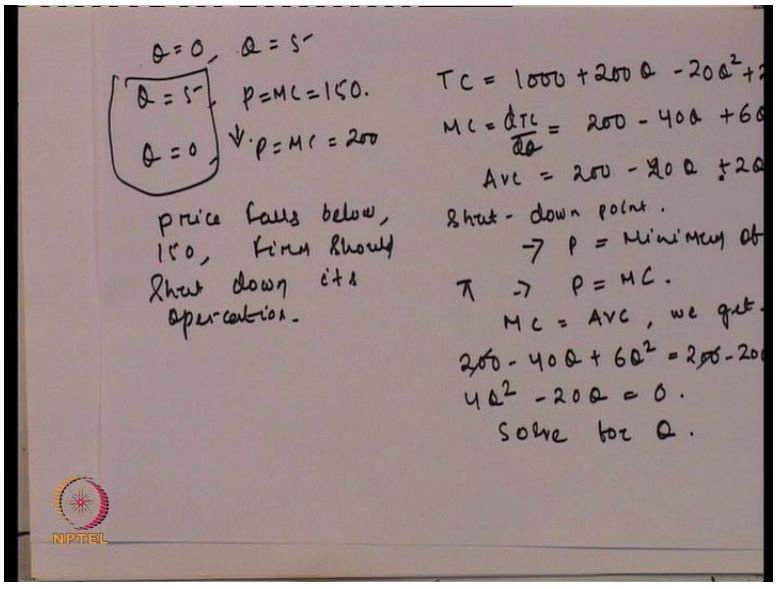

Now, we will just take a numerical to understand this short run condition. So, here we will take a cost function that is total cost which is equal to 1000 plus 200 Q minus 20 Q square plus 2 Q. Now, we need to find out below what price the produce the product may the, or may be the firm decide to shut down its operation. Now, what is the marginal cost marginal cost will take a first order derivative of total cost with respective to Q. So, that comes to 200 minus 40 Q plus 6 Q square, average variable cost is 200 minus 20 Q plus

2 Q square, and to find out the shut down point, and what is the shut down point, we have to find out the price where it is equal to the minimum of average variable cost.

But before that if you know the profit maximization always requires the equality of price is equal to the marginal cost. So, in this case what we can do we can set the marginal cost which is equal to the AVC, and we get if we set the marginal cost equal to the average variable cost we get that, that is, marginal cost is 200 minus 40 Q plus 6 Q square that is equal to 200 minus 20 Q plus 2 Q square. So, that comes to 4 Q square because this get cancelled, 4 Q square minus 20 Q which is equal to 0. And if you solve for Q solve for Q we will get 2 value of Q may be that, Q is equal to 0 and Q is equal to 5 and if we find if you take Q is equal to 5. Then what is the profit maximizing condition say, the profit maximizing condition say P is equal to marginal cost which is equal to 150 because if you put the value of P in the marginal cost equation and that gives you the 150.

Now, what is the interpretation here or when you put the Q is equal to 0 then P is equal to M C which equal to two hundred. Now, how we can interpret from this two value of Q, if price falls below 150, firm should shut down its operation. So, any price if it is less than 150, than the firm should shut down the operation. So, this is not a specific case where we are talking about the normal profits, super normal profit or loss. This is the point where we talk about the case where till the time the firm is at least covering their variable cost or the variable expenses from the market price, they will continue the production, but once they are not covering that they will prefer to shut down the operation, in that case at least they are just taking care of the fixed cost not the variable cost.

So, whatever we have discussed today like whether it is the equilibrium of the firm, the equilibrium condition the different kind of situation what the firm generally gets in case of short run, that is profit loss, or super normal profit loss, or normal profit. And this typical case where the shut down condition, where we have analyzed the shut down condition if you summarize this short run output decision. Then generally if you look at the average variable cost always tell us whether to produce and it tells us that if we can shut down if price falls below the minimum of the average variable cost.

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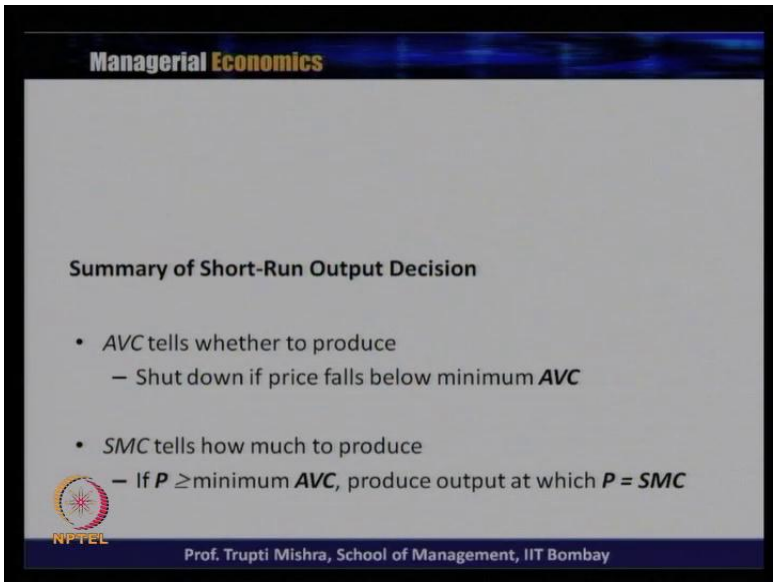

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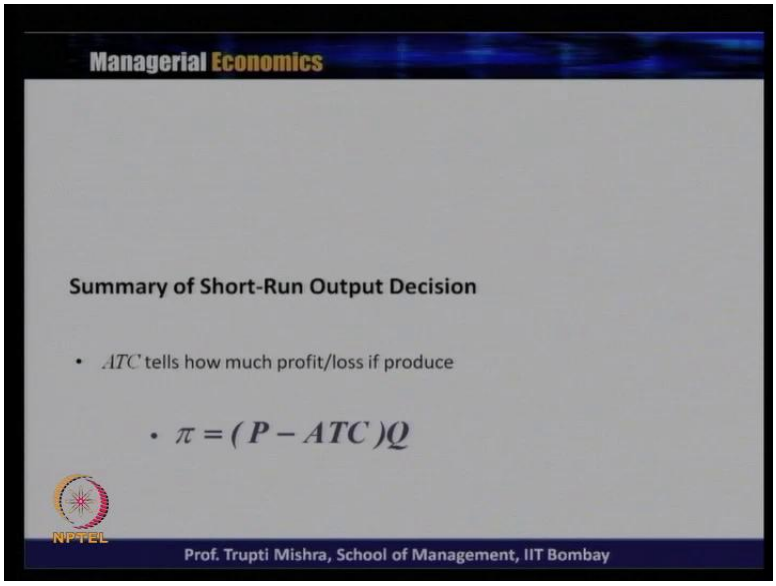

Short run marginal cost tells how much to produce and that tells us if P is greater than minimum of AVC produce the output where P is equal to S M C because that is the equilibrium condition, and the or the profit maximizing condition. And average total cost tells how much profit or loss it produce, because that depends upon that profit margin, and if P minus ATC by Q if it is generally positive, then we get it a profit and if it is negative generally we get it a loss.

So, today basically we covered about the characteristic of the perfect competition and what is their applicability in the real world in a brief. Then we talked about the demand

and revenue of a competitive firm in the short run, their equilibrium position, their profit maximization situation in the different cases and finally, the shut down condition. So, in the next class we will talk about the supply curve and the supply behavior of the firm in the short run. We will talk about the price and output decision in the long run typical by a competitive firm and also we will talk about the long run supply in case of a cost and cost industry, in case of decreasing cost industry, and in case of a increasing cost industry.

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