Second Degree Price Discrimination

- Second Degree price discrimination means that monopolist sells different units of output at different prices but if same amount is bought by different buyers same price is paid.
- Price differs across different units and not across consumers. Price per unit of output is not same but depends on the amount one buys.
- Example: Price of per unit of electricity depends on the amount used. Discounts on bulk purchase etc.
- The monopolist cannot distinguish between different types of buyers. The monopolist has the information that there are different types of buyers.

- For example:An airline operator knows that business travellers are willing to pay more than the tourist.
- But the airline operator cannot distinguish between business travellers and tourist.
- The business traveller can pretend to be tourist. If tourist are charged less.
- In simplest terms, there are two types of consumers, one whose willingness to pay is low and the other whose willingness to pay is high. The consumer whose willingness to pay is high can pretend to have low willingness to pay.
- So, the monopolist package the product that is a combination of price and quantity such that high willingness to pay consumer will choose the combination of price and quantity meant for him/her. And the low willingness to pay consumer will buy that combination of price and quantity which is meant for him/her.

- Monopolist design the package of price and quantity combination in such way that consumers have incentive to self select the package meant for them.
- In case of two types of consumer, there will be two package one for consumers with high willingness to pay and the other for the consumers with low willingness to pay.

- Suppose there are two types of consumers 1 and 2.
- The demand curve of consumer 1 and 2 is given in figure.
- The demand curve of consumer 1 depicts low willingness to pay.
- The demand curve of consumer 2 depicts high willingness to pay.
- The output is same and marginal cost is zero for simplicity and fixed cost is also zero.
- See class notes

Third Degree Price Discrimination

- Third degree price discrimination means that the monopolist sells to different people at different price but same price for every unit of output sold to a given buyer.
- Example: Student discounts, Senior citizen concessions etc.
- The monopolist can distinguish the types of consumers.

- Suppose there are two types of consumer 1 and 2.
- The demand curve of consumer 1 is $p_1(q_1)$. It is downward sloping demand curve. The output for type 1 consumers is denoted by q_1.
- The demand curve of consumer 2 is $p_2(q_2)$. It is downward sloping demand curve. The output for type 2 consumers is denoted by q_2.
- The cost function of the monopolist is $c(q_1 + q_2)$. Suppose the $c'(q_1 + q_2) > 0$ and $c''(q_1 + q_2) \geq 0$.
- It means that the cost function is strictly increasing. The second derivative gives that the cost function may be CRS or DRS.

- The profit of the monopolist is $p_1(y_1)y_1 + p_2(y_2)y_2 - c(y_1 + y_2)$.
- The monopolist optimizes it with respect to y_1 and y_2.
- The two first order conditions are
  $p_1(y_1) + p_1'(y_1)y_1 - c'(y_1 + y_2) = 0$
  $p_2(y_2) + p_2'(y_2)y_2 - c'(y_1 + y_2) = 0$
- $MR_1(y_1) = MC(y_1 + y_2)$
  $MR_2(y_2) = MC(y_1 + y_2)$
- Marginal revenue in each market must be equal to marginal cost.

- So, we get that
  $MR_1(y_1) = MR_2(y_2)$.
- It implies that $p_1(y_1) + p_1'(y_1)y_1 = p_2(y_2) + p_2'(y_2)y_2$.
  $\Rightarrow p_1(y_1)\left(1 - \frac{1}{|\xi_{d1}|}\right) = p_2(y_2)\left(1 - \frac{1}{|\xi_{d2}|}\right)$.
- If $|\xi_{d1}| > |\xi_{d2}|$ that is market 1 (type 1 consumers) is more elastic than market 2 (type 2 consumers).
- It implies that $\left(1 - \frac{1}{|\xi_{d1}|}\right) > \left(1 - \frac{1}{|\xi_{d2}|}\right)$
- It implies that $p_1(y_1) < p_2(y_2)$.
- It implies that market with lower price elasticity of demand is charged higher price. The market with higher price elasticity of demand is charged lower price.