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Paper- 1
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Since there is a single firm in the industry, the firm's demand curve is the industry demand curve the demand equation (linear demand function) , ceteris paribus, is

$$X = bo - b1.P$$

The clause ceteris paribus implies that all the other factors (such as income, tastes, other price which affect demand are assumed constant). Changes in these factors will shift the demand curve.

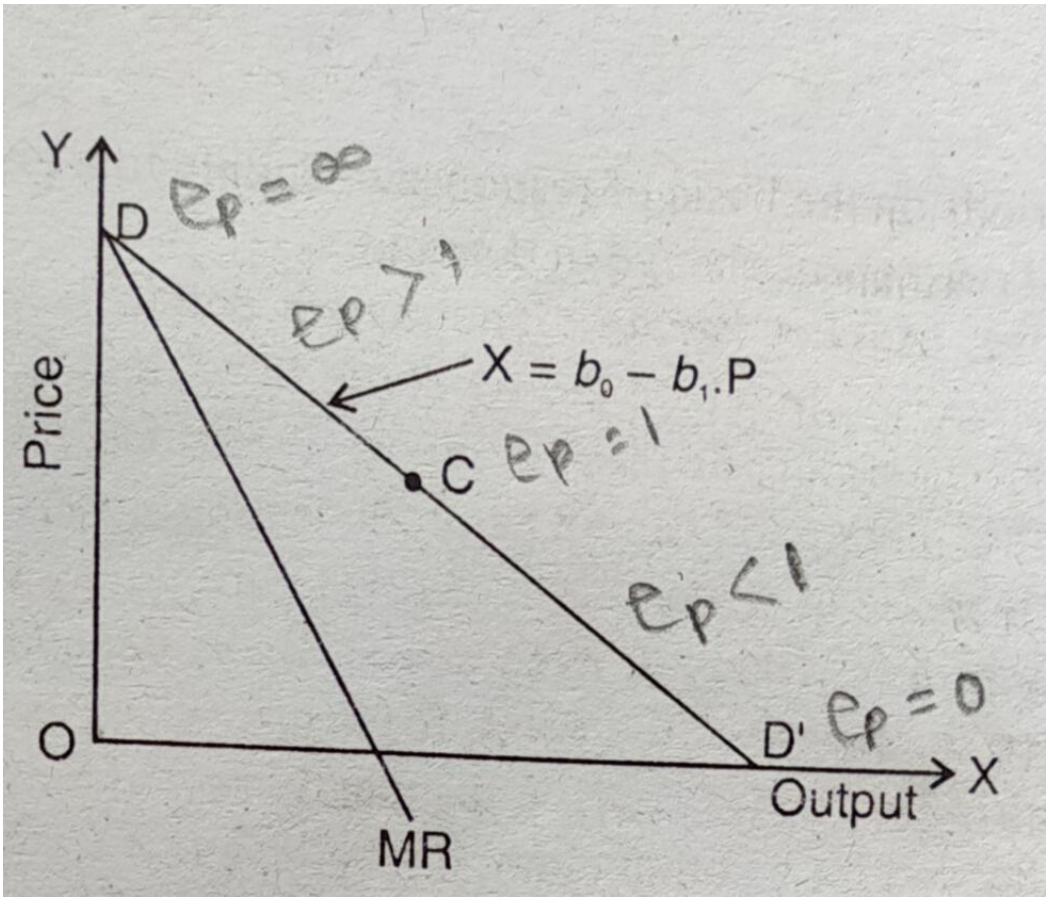
The slopes of the demand curve (DD') is

$$dx/ dp = d(bo - b1.P)$$

$$= -b1$$

The price elasticity of demand is

$$ep = dx/ dp . p/ x$$



= -b1 . p/x

That is, elasticity changes at any one point of the demand curve.

a) At point D the elasticity approaches infinity.

ep = - b1 . p/ x tends to infinity

b) At point D' on the demand curve DD' , the elasticity is zero.

ep = -b1 . p/x

= -b1. 0/ x = 0

c) At the mid point C the price elasticity is unity.

ep = -1

The total revenue of the Monopolist is

TR = P. X

Solving the demand equation for P we find

$$P = bo/b1 - 1/b1 . X$$

Setting $(bo/b1) = a$ and $(1/b1) = b$
We may rewrite the price equation as

$$P = a - b . X$$

Substituting into the revenue equation we find

$$TR = P.X$$
$$TR = (a - b.X)X$$
$$TR = a.X - b.X^2$$

The average revenue is equal to the price:

$$AR = TR/X$$

$$= P.X/X = P = a - b.X$$

Thus the demand curve is also the AR curve of the Monopolist

The Marginal Revenue is ;

$$MR = dTR / dX$$

$$= d(a.X - b.X^2)$$

$$= a-2b.X$$

That is , the MR is a straight line with the same intercept as the demand curve , but twice as steep.

The general relation between P and MR is found as follows. Given

$$TR = P.X$$

$$MR = dTR/dX$$

$$MR = d(P.X)/ dX$$

$$MR = P. dX/dX + X.dP/dX$$

$$MR = P + X. dP/dX$$

$$MR = P + X . dP/dX$$

The Marginal Revenue is at all levels of output smaller than P, given that

$$P = MR - X.dP/dX$$

And the term (X. dP/dX) is positive (since the slope of the demand curve, dP/dX >0.

Hence,. $P > MR$