

Q) What is Market Failure?

Market Failure is a situation where the market forces fail to allocate resources efficiently & then there arises a case of over/under prodⁿ or over/under consumption. Thus in other words market failure is a situation when the social cost or benefit curve stay away from the private cost or benefit curve. It can also be defined as ~~the~~ a situation of divergence between social opt optimum & private optimum.

Externalities & its types

Externalities are the external effects of production or ~~consumption~~ or by one agent (or decision making units like producer or consumer) on the production or consumption of other agent. Externalities exist when production or consumption decision of 1 agent affects the production & consumption opportunities of another agent directly rather than through prices.

he or she produces.

Externalities may be positive or negative. If production or consumption by one person renders benefit for others, it is called positive externality. On the other hand production & consumption decision by one person causes cost for others, it is called negative externalities.

Externalities can be classified into 2 following groups → 1) Positive externality in consumption

For ex → When one person is vaccinated it helps not only the person who is vaccinated but also his entire neighbourhood by preventing the spread of the infectious disease. But taking vaccines by 1 person renders benefit (externality) for the entire neighbourhood.

2) Negative externalities in consumption

Let us suppose 1 person of our neighbour is playing music in full volume. Also suppose that you have an examination on the examination day. It will be a great disturbance for us. This is an example of negative externality.

3) Positive externality in production

A firm farmer is producing mustard. The field is producing mustard with flower of mustard & again there stays a

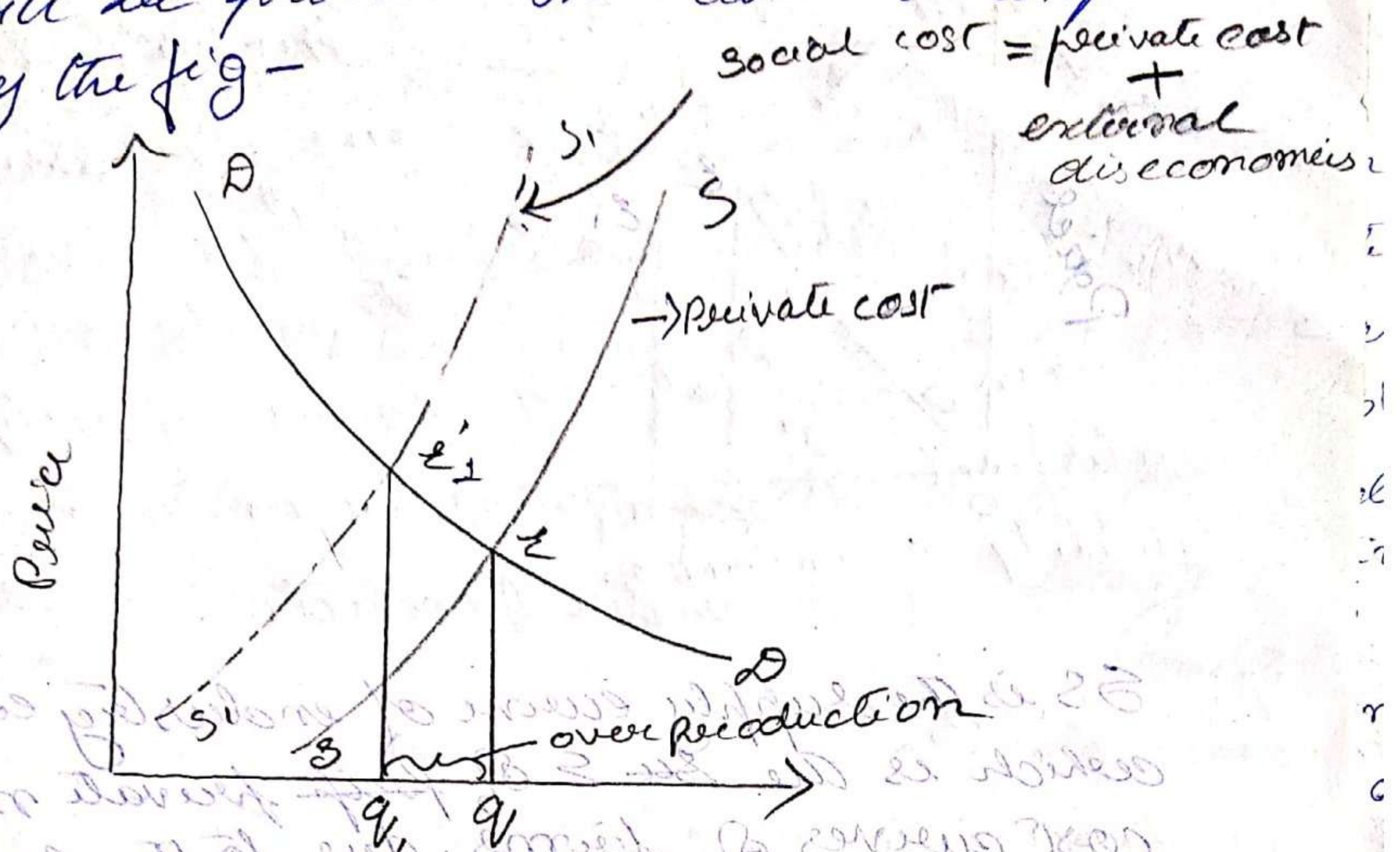
be kept aside. Therefore the ~~net~~ net
return from plants increases the production
of honey. That means increase in prodn
of musture leads to +ve increase
in prodn of honey.

4) Neg externalities in production:- The paper
mill produces the paper & the waste is
dumped into the river, thus affecting
the fishermen & the dwellers on riverside

Q) Show how externalities in prodn can lead to over & under production.

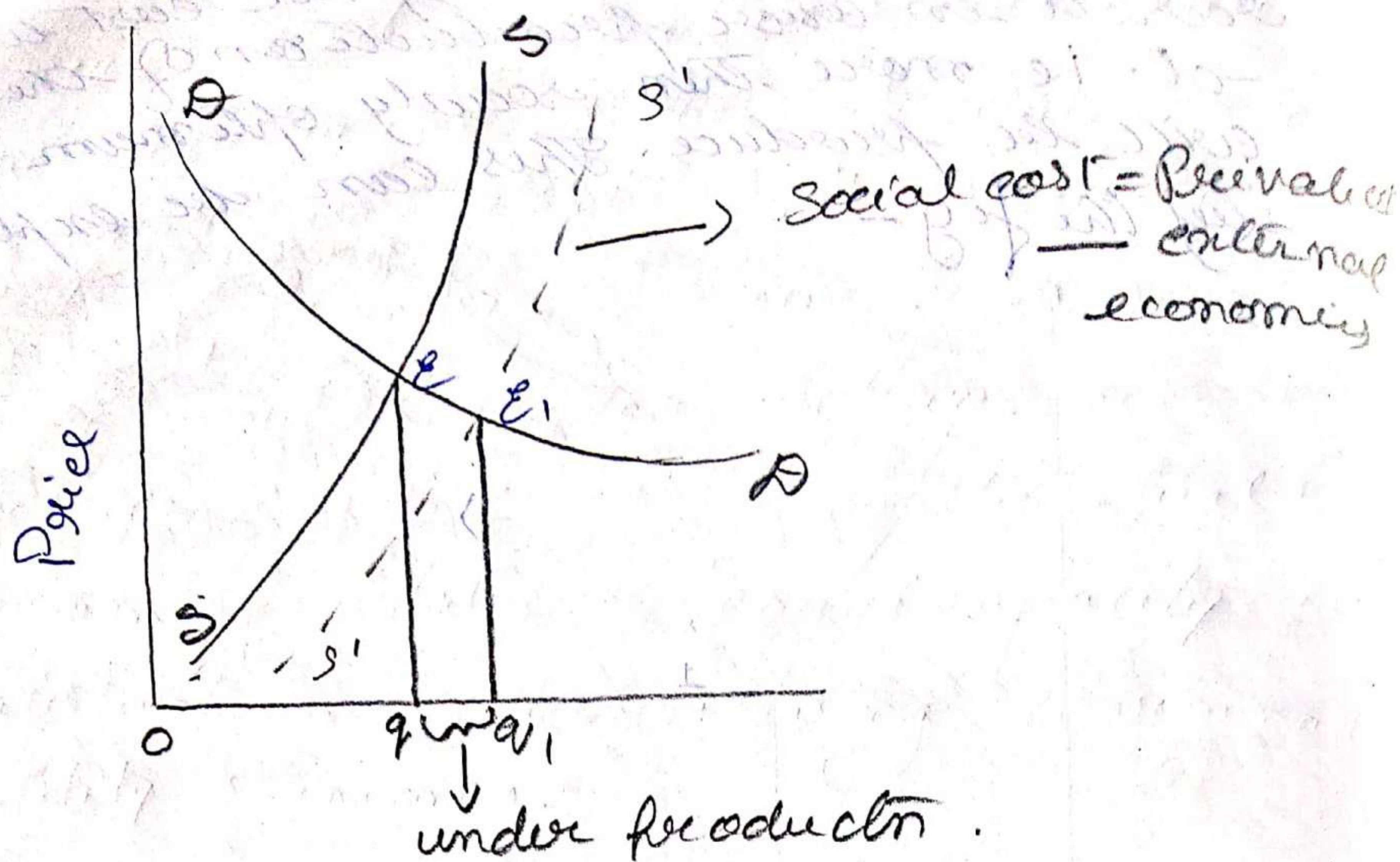
Ans) When there exist negative externalities or external diseconomies in production, private marginal cost will be lower than the social marginal cost, since the former will not take into account cost or harms imposed on others. Therefore when external diseconomies are present

equating price with marginal cost will result in over production of the product - i.e. more than socially optimum output will be produced. This can be explained by the fig -



In the figure the supply curve SS based on private marginal cost intersects the demand curve at point E & thus determines OQ amount of output. Supply SS' which takes into account external diseconomies reflect social cost lies at a higher level & intersects the demand curve E_1 $\therefore$ socially optimum output will be OQ_1 . Thus it follows when external diseconomies are present equating price with private marginal cost result in over production.

On the other hand when there exist external economies, private marginal cost will be higher than social marginal cost. Since the private cause doesn't take into account the positive externalities economies. when external economies are present this will result in under production of product.



SS is the supply curve of industry which is the ~~sum~~ Σ of firm private marginal cost curves of firms. Due to the existence of external economy, social cost will be smaller than private cost. See how by $S'S'$ in the fig. The supply curve representing reflecting the social cost is lower because it takes into account externalities. When the demand curve & supply curve, based upon the private cost of production, intersect at point E & thus determines OQ as the actual level of output produced. But the socially optimum output OQ_1 . Thus the product is being produced in smaller quantity than the socially optimum output OQ_1 . Thus OQ_1 reflects under production which occurs due to existence of external economies.

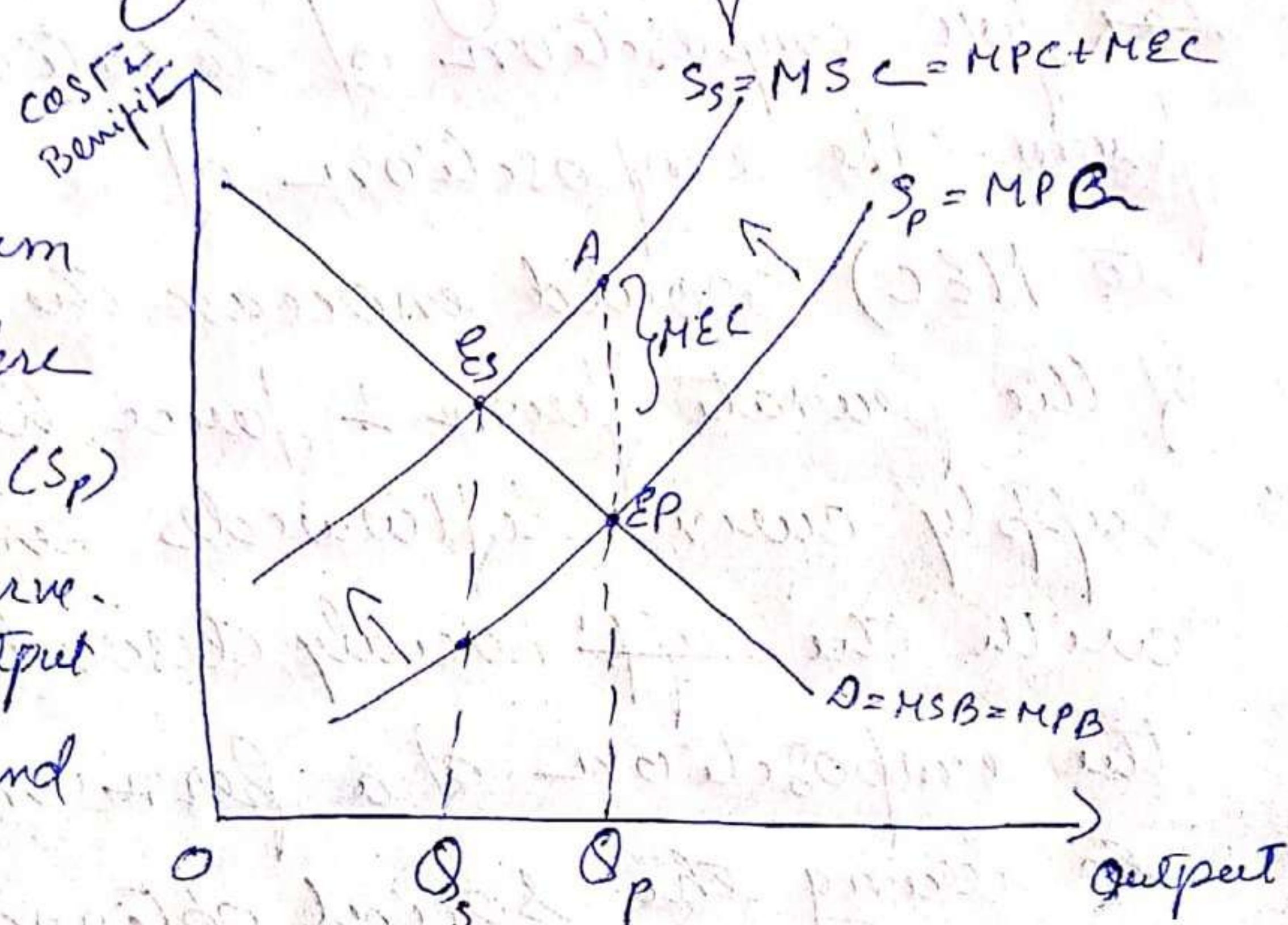
Pigouvian Solution to Market Failure

Prof. Pigou, suggested that, a market failure, caused due to the existence of externalities, can be corrected by the application of government tax & subsidy policy. This solution to market failure ~~is~~ known as Pigouvian solution & this can be explained as follows with the help of a diagram as follows

In the diagram,

the ~~socio~~ private optimum is determined at E_p where the private supply curve (S_p) intersects the demand curve. The private optimum output is Q_p . On the other hand,

the social optimum is determined at point E_s where the social supply curve (S_s) intersects the demand



Market failure due to neg prodⁿ Externalities

curve. The social optimum output is Q_s . The divergence between the social optimum & the private optimum is due to presence of negative production externality. The distance/gap between MSC curve & MPC curve is ~~eq~~ equal to MEC, which shows the per unit cost that the society has to bear due the prodⁿ of the commodity. The presence of a positive MEC (Marginal External Cost)/negative externality cause the social marginal cost to remain higher than private marginal cost as $MSC = MPC + MEC$. The divergence between the

social & private cost is further inflated as divergence between social & private optimum which is nothing but a case of market failure. Due to presence of neg prodⁿ externality, the private firm output tends to ~~be more~~ produce more output than the social desired quantity & thus creates a situation of over production.

Under such situation Pigou suggest the intervention by the government in form of tax for imposition of taxation upon the producer firm. The imposition of a per unit tax t (equal to MEC) would increase the cost of production of the private firm & force him to shift his supply curve leftwards ~~until~~ until it merges with the ~~supp~~ socially desired supply curve. Thus the imposition of a per unit tax, ~~will help us~~ ^{will help us} to bring the social optimum & private optimum at the same point & do away with the problem of over production & market failure.

Similarly, in case of market failure caused due to presence of positive production externalities, Pigou suggest the use of subsidization policy by the government. Providing subsidy would help the private firm to reduce its cost of prodⁿ & induce him to produce more & match the social desirable quantity.

Public Good — {cause of Market failure}

Para 1 A pure public good is a good having the property of non rivalry & non excludability. Non excludability means it is technically impossible or ^{it is} extremely costly to exclude any individual from the benefit of a good. Nonrivalry means there is no rivalry among the consumers because the consumption of the good by 1 doesn't reduce the availability of the good for the others.

Para 2 The private market economy does not do well at providing public goods. If no one can be excluded from ^{its} consumption, there is no way to charge a price for the good & therefore no incentive for private entrepreneurs to produce and sell it. Even if people could be selectively excluded from consuming it, the nonrivalry in consumption means that

it is inefficient to exclude anyone. Every individual wants to ^{be} get a free rider and doesn't want to pay for the provision of the good because it is possible to get it free once someone else pays for its provision.

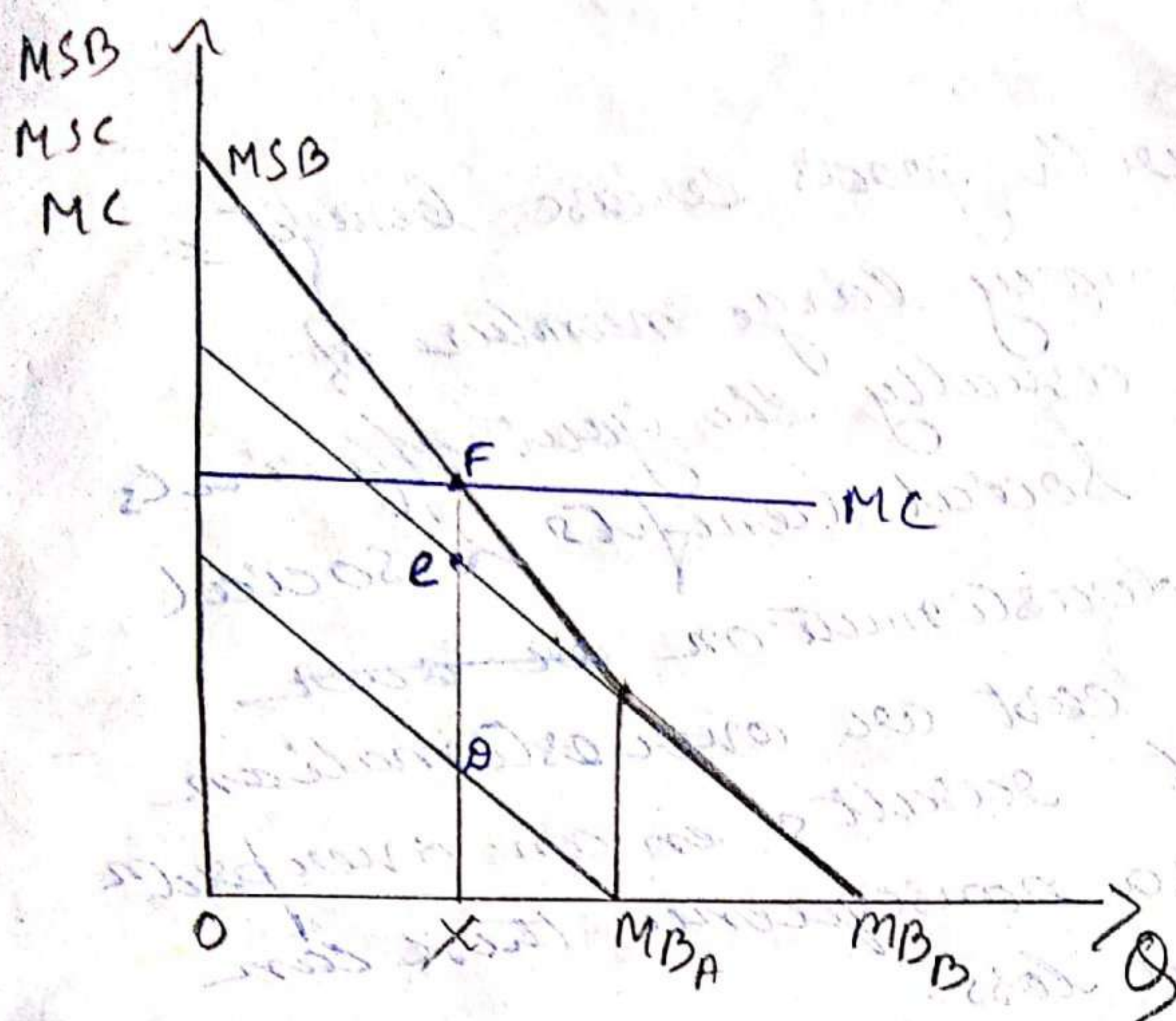
Para 3 Thus as the market fails to provide make efficient provision for the public goods, many economists suggest the policy of Govt intervention to deal with such situation. (Example of Public good - light house, national defence, flood control project etc.)

Para 2 * as everyone ^{intends} wants to become a free rider, the it is impossible to find out the demand curve for the public good. Thus this leads to indeterminacy of the eqn & 2 price ^{solution} for public goods which are necessary for making efficient provision for such goods.

Optimum Condition for the provision of the public goods / Pareto optimal level of Public Good production -

In case of public good, output should be produced to the point where $MSB = MSC$. The MSB curve, which reflects the demand of the society for a public good is derived by vertical summation of individual demand curve. In case of public good, horizontal Σ of individual demand curve can't be used to derive the market demand curve as all individuals simultaneously benefit from each unit of the

Public good.



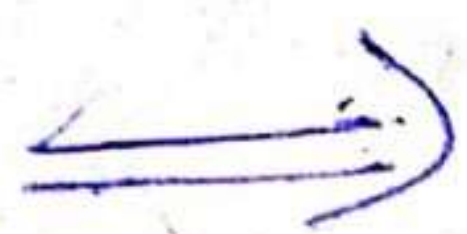
$$P_A X_A + \left(\frac{2}{3}\right) P_A X_B = 10$$

$$P_A X_B (1 + \frac{2}{3}) = 10$$

$$P_A X_B = \frac{10}{\frac{5}{3}} = 6$$

$$P_A X_B \cdot \frac{1}{3} = 2$$

The above fig shows the derivation of the MSB curve, which M_{BA} & M_{BB} are the marginal benefit curve of 2 individual A & B. Vertical summation of the 2 individual demand curve gives us the market demand curve i.e. MSB curve. ~~such that~~ ^{on the fig} the X^{th} unit of good provides XD benefit to A & XE benefit to B & the MSB is thus equivalent to $XD + XE$ which is equal to XF . ~~Thus the MSB~~ For the non-rivalry in consumption with the public goods, the MSB curve is derived by vertical summation. The optimal output is now given by the intersection of the MSB curve with the marginal cost curve. The optimal output is thus OX unit of public good. Both the curve intersect at point F & this point F is the equilibrium point for the given public good. The corresponding level of eqm output is X which tend to maximize social welfare. Thus OX is the Pareto-efficient level of output of the Public good.

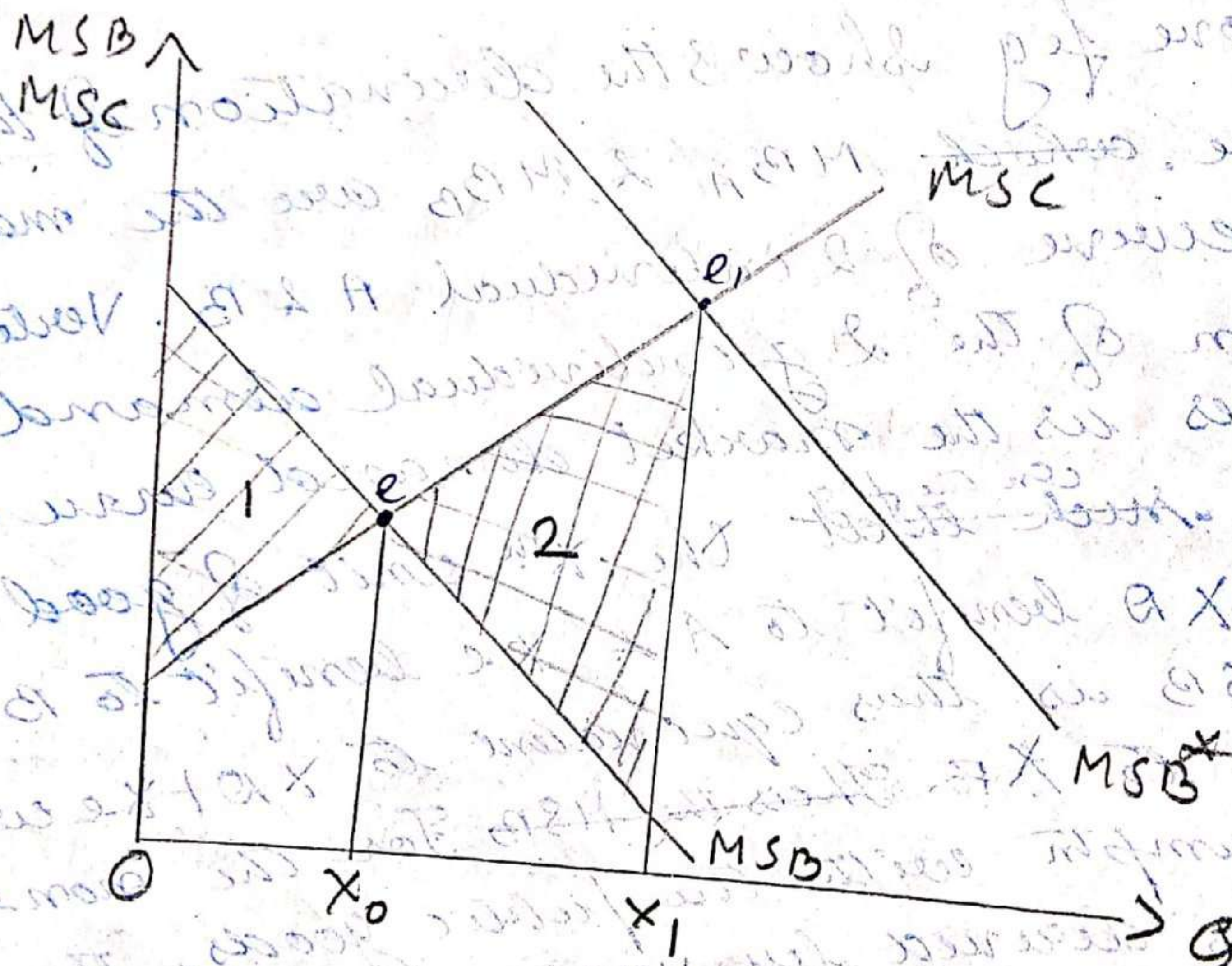


However, ~~the~~ a private firm will produce this or amount of ~~common~~ the public good, if each individual pays a price equal to ~~its~~ the marginal benefit. Only then the private firms will be able to cover their cost of production.

But in case of a public good, due to inability of the producer of a public good to exclude those who do not pay & want to be a free rider, the optimal production cost cannot be covered by a private producer. Therefore, in this situation too little or even none of the public good will be produced. ~~through~~ Thus in case of Public good private firm fails to achieve the Pareto optimal efficiency in production. This is a glaring example of the market failure. Since private firms are not interested in the prodⁿ & supply of public goods, their prodⁿ is undertaken by government.

Problem relating to derivation of MSB curve in reality.

"In reality with goods whose benefits ~~curve~~ accrue to a very large number of individuals, it is usually the govt officials who estimate the social benefits & social ~~curve~~ costs. An underestimation ~~or over~~ ~~estimate~~ of social cost or over estimation of social benefit results in an overprodⁿ of public good. As a consequence there can lead to net social loss.



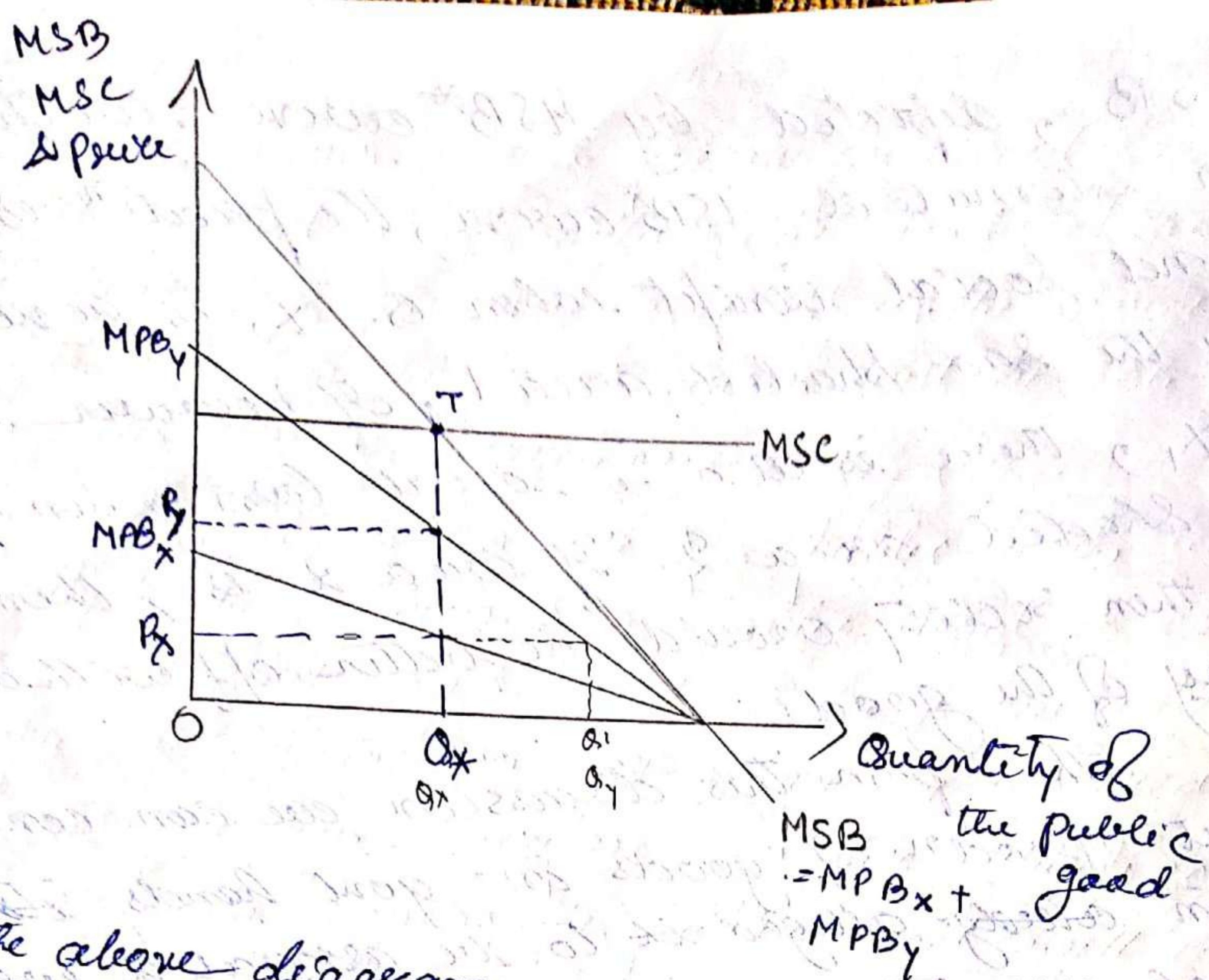
In the above diagram, MSB & MSC is the actual marginal social benefit & cost curves & the optimal prodⁿ of public good is reached at X_0 amount at which ~~where~~ the actual MSB & MSC are equal. Now if the govt officials for their own interest over estimate the

MSB, depicted by MSB* curve. with the over estimated MSB* curve, the prodⁿ is x_1 . The net social benefit when $Q = x_0$ is given by the ~~the~~ shaded area 1. However if $Q = x_1$, there is also a social loss given by the shaded area 2. If area 2 is $>$ than area 1, then society would be better off without any of the good.

Thus from this discussion we can conclude that prodⁿ of goods in govt hands is often ~~alleged~~ alleged to be associated with high cost. Thus many economist suggest that except of pure public goods such as defense & law, the govt should not enter into the area of direct prodⁿ or provision of public goods.

Problem of Uniform Pricing of Public Good.

The problem relating to the charging of ~~price~~ uniform price of a public good is that a uniform price may result in over or under consumption. In other words charging a uniform price of a public good would ~~disturb~~ create a gap betw the available amount of public good & desired amount of the same. This can be explained with the help of the ~~same~~ diagram



On the above diagram, we measure MSC , MSB & price on the vertical axis & quantity demanded of public good along x axis. MSB is the marginal social curve of the derived by adding up the MPB curve of both X & Y . The point T is the social optimum/ eq^m point which is derived by the intersection of both MSB & MSC at point T , $MSB = MSC$. Corresponding to point T , the eq^m quantity is Q^* .

Now if we consider the policy of differentiated price is adopted, then for consuming Q^* amount of the public good, consumer Y has to pay P_y price & consumer X needs to pay P_x (depending upon their demand curve). However it is to be noted that under the policy of differentiated price, the supply of the public good is equal to the demand for it.

However, if we consider a policy of uniform price ~~at~~ such that both X & Y for consuming Q^* amount of commodity faces the lowest possible price i.e. P_x . Faced with P_x amount of price, X will continue to consume Q^* amount of the commodity but Y would increased his ~~consum~~ consumption to Q_1 amount. Thus there would be a over consumption of the public good by $Q^* + Q_1$ amount if the policy of uniform price is followed.

This situation of over consumption can although be solved by following a pricing system in which P_x is the price for X & P_y is the price for Y . Faced by these differentiated price then the individuals will freely choose to consume Q^* unit of the output & further more, the prodⁿ costs are completely covered because $P_x + P_y = OA$. Such a situation, where

- ① the socially optimal amount of the public good is provided by $MSB = MSC$ condition
 - ② Each individual is charged a price equal to the Marginal value for the individual
 - ③ Prodⁿ cost are covered,
- is called a Lindahl eqⁿ.
- Govt intervention - solution of Market Failure...

Public goods VS Private Goods -

Distinction betⁿ public & Private goods -

- 1) Public goods are supplied by the public sector whereas private goods are supplied by the private sector.
- 2) Public goods are supplied through the budget whereas private goods are supplied through the market system or price mechanism.
- 3) Public goods are indivisible in nature & are therefore consumed in bulk on the other hand private goods are divisible & can be consumed by a fraction.
- 4) Public goods are non-exclusive but in case of private good people who are not willing to pay the price charged for the consumption of good can be excluded. Thus the principle of exclusion is applied in case of public goods while in case of private good the principle of non-exclusion is applied.
- 5) Public goods are neutral & non-rival in consumption whereas private goods are competitive & rival in consumption.

6) For the consumption of private goods price has to be paid, while the consumption of public good is free of direct charges.

law & order etc.

Characteristics of Public goods -

- 1) Equal consumption by all.
- 2) Non rival in consumption i.e. consumption of the good by one ^{person} ~~percent~~ doesn't reduce the amount ~~also~~ available to others.
- 3) Inapplicability of exclusion principle (non excludibility) often gives rise to free rider problem.
- 4) Absence of revealed preference (less than the optimal amount of these goods will be ~~free~~ provided without the govt raising money to pay for them through general taxation)

- 5) Public goods cannot easily be brought by once income (non affordable on own income).
- 6) Demand schedule of public good ~~are~~ is obtain by the vertical summation of the demand curve for all those who consume the public good.
- 7) The Marginal cost of supply of public good is close to zero.
- 8) Budgetary provisions are made to supply public goods.

Economics of Imperfect Information

Asymmetric Information & Market of Lemons:

Asymmetric information refers to the confusion in information sharing. It arises due to lack of communication among buyers & sellers. Asymmetric information ~~can~~ create a major information problem in the insurance market. The problem arises due to the fact that one party (i.e. the insurance company) has less information than the other party (i.e. the customer) about the risks involved. The customer would have a better knowledge than the insurance company about the probability of getting ill. Thus this is a case of asymmetric information.

Let us discuss the problem created in the 2nd hand market (also called market of lemons) due to the presence of asymmetric information & how it ultimately leads to the break down of the lemon market. For instance in a market of used cars, some are of good quality and others are just lemons, i.e. they break down constantly & require frequent numbers of repairs. However ~~both~~ the owner of both good & worse quality car claim the same price as that of good quality cars & also claim their car to be of the same standard. The buyer, having less of information cannot differentiate ~~between~~ betw the best & worse quality cars. As a result the market price of used cars depends upon the average quality of the used car available for sale.

In this case the seller of lemon will get more than what their cars available are worth, & seller of good quality cars will get less than what their cars are worth. Since the buyer will not pay any price above the average price, the owner of the high quality car would move out from the market. Due to the withdrawal of the high quality cars, the average quality of the cars in the market falls further down & so does the average price. Again cars with better quality - than-average quality go off the market & the process goes on until no transaction take place. This phenomenon is known as "adverse selection", where only bad quality cars product are left in the market & good quality product are not offered.

Solution However in practice, many institutions or tool have cropped up for dealing with the problem of adverse selection / quality uncertainty suggested by the lemon model. One such counter acting institution is the case of guarantees or warranties on the used product. By providing guarantee or warranty, the seller is able to signal about his the buyer about the better quality of his product. ~~thus~~ Thus providing the used guarantee or warranty, enables the ^{seller} buyer to enjoy the trust & confidence of the buyer & it also increases the probability ~~for the~~ of selling his product. There are also automobile service center than that can check the quality of used car & customers can get some information on quality at a cost.

Some other institutions that counteract the effect of quality uncertainty are brand name, chain stores & licensing practices. In all these cases there are certain assurance of quality. The consumer in being provided by such institutions, end up paying a higher price for the product, but there is an assurance of some standard of quality.

Thus we can conclude that lack of information in the lemon market leads to it being the doom of the market, leaving only the inferior quality products in the market. However the prob of asymmetric info can be tackled by the ~~pro~~ providing guarantee, licensing, brand names, which act as a signal to the consumer about the superior quality of the product.

Insurance Market & Adverse Selection

The insurance market is characterised by asymmetric information. The insurance company has less info about the risk of the insured individual than they themselves.

Let us consider that there are 2 sets of people, the high risk group (H) & the low risk group (L). The probability of illness for high income & low risk group are given as P_H & P_L respectively ($P_H > P_L$). Both group participate in the insurance program & the company is unable to differentiate between them. The weighted/expected avg probability of illness for the whole group is

$$\bar{P} = P_H \cdot \frac{H}{H+L} + P_L \cdot \frac{L}{H+L}$$

It is to be noted that $P_H > \bar{P} > P_L$. If the insurance cost of illness is c , the insurance premium should be given as

$$I \geq c\bar{P}$$

If however $I < c\bar{P}$, then ~~it will be~~ the insurance company would incur losses & being a rational π seeking company it will move out of the market.

If the individual know their own risk, since $\bar{P} > P_L$, the individual low risk group may be unwilling to buy insurance policy where as the high risk individuals would be willing to accept it. If the low-risk group move out, the insurance company has to raise the premium & only the high risk individuals will buy the insurance. As with the successive increase in premium, the comparatively less risky persons would drop out & this will ultimately lead to the break down of the market. In this way the insurance market may fail due to the prevalence of asymmetric information.

Solution

The insurance companies thus uses different sets of policy policies for identifying the riskiness of the people. The insurance companies may put forward different set of choices with diff rates of co-insurance, length of contract & amount of deductibility, so on. Depending upon the selection of policies by the individuals, the companies identify them as high risk or low risk.

individual & thus accordingly set the premium. For instance, in case of co insurance, the burden of the accident/illness is shared both by individual as well as the company & not only & thus promoting the individual to be more careful & responsible. In this case the owner becomes the co insurer of the company. As cent percent coverage leads to increase in the incidence of accidents/illness causing loss to the company. Thus a policy of co insurance can be ~~used~~ used to bring down such incidence, as the policy seek to with a change in the careful attitude of the ~~customer~~ customer by imposing burden upon him.

Thus for 2 group of individuals with different probabilities of disaster there cannot ~~be~~ theoretically speaking, be a single insurance policy. If at all, there have to be 2 insurance policies, & it can be shown that the high risk individual obtain complete insurance & the low risk group obtain (insurance with large deductible / or a partial insurance).

The Problem of Moral Hazard

The Moral Hazard in the case of insurance arises whenever an individual's behaviour that affects the expected loss is altered by the quantity of insurance obtained. For instance, it is seen that the probability of an accident/illness ~~to~~ gets higher with insurance than without insurance. This is because, when the individual is insured, he becomes more careless and reluctant & thus the probability of getting into a accident ~~or~~ falling ill gets increases.

Similarly if a individual buys insurance against sickness, there are 2 forms of moral hazard. First the individual will spend less on health care & thus the probability of getting sick rises. Secondly, the purchase of insurance induces an individual to spend more resources on the treatment of the illness than would otherwise be the case. In fact the probability of disaster can be so much higher with insurance than without that a mutually beneficial insurance policy may fail to exist, or complete insurance may fail to exist. Moral hazard occurs in all economic activities where economic agent do not bear full consequences of their action. Thus the problem of moral hazard should be treated by the policies of coinsurance or deductible.

Signalling & Screening

The solution to the problem of moral hazards is given by signalling & screening. Prof. Spence who suggested such solution argued that if sellers of a high quality product could find some activity that was less costly for them than ^{from} sellers of a lower quality product, then it might pay them to undertake this activity as a signal of higher quality. The buyer too would learn that the signal was associated with higher quality.

One application of signalling, is in insurance. An individual with low risk is willing to co-insure than an individual with high risk. Thus the level of co-insurance is a potential signal of risk level. Another application that Spencer ~~may~~ himself considered is in education. Education increases productivity but more importantly it can act as a signal of high productivity if workers with high productivity can acquire it at a lower cost than a worker with low productivity.

For instance, consider 2 workers —

① worker with high productivity — P_H

② worker with low

"

P_L

2 $P_H > P_L$

Then average productivity is

$$\bar{P} = P_H \left(\frac{H}{H+L} \right) + P_L \left(\frac{L}{H+L} \right)$$

Given $\bar{P}$ being the average productivity, if the employer cannot distinguish between workers, they may pay each worker a wage $w = \bar{P}$. However one way in which worker with higher productivity can distinguish themselves is by acquiring a signal such as education. Education, thus serving as a signal will enable the employer to identify the high productivity workers differently & pay them wage $w_H \geq P_H$

I pay a wage $w_L = P_L$ for the low productive workers. Thus there will be an equilibrium & it will be stable-sustainable.

The question is that under what condition it could take place —

Suppose that cost of education for high productive labours are C_H & for low productive labours are C_L .

Then we need to have

$C_H < C_L$. Further more, we should have —

$$C_L > P_H - P_L$$

so that it is not worthwhile for the low productivity worker to invest in education.

we also should have

$$C_H < P_H - P_L \left(\frac{1}{1+H} \right) + \left(\frac{H}{1+H} \right) HP = \bar{P}$$

so that a worker with high productive find it profitable to invest in education

$$C_H < P_H - P_L < C_L$$

The above equilibrium where the wage of high productive labour is given as $w_H = P_H$ & for low p. worker $w_L = P_L$, is known as separating equilibrium where

2 group of workers separate themselves by getting & not getting education.

However, other equilibria are also possible. Suppose $C_L > P_H - P_L$, which make investment in education ~~un~~ irrational for low productive of labours. And again if $C_H > P_H - P_L$, then high productive workers will ~~be~~ also be not intending to invest in education to earn a differential status. Thus in such a situation the eqm wage will be given as $w = \bar{P}$ and thus the eqm will be established without anyone getting education. Thus in the presence of differential information multiple equilibria are possible.

Here education is viewed as ~~not~~ merely as a signal that doesn't increase the productive but is used to identify the pre-existing difference in productivity. Before 1973, education was associated with increased productivity & ^{can be regarded as investment in human capital.} However in this signalling model ~~education~~ education is viewed merely as a signal which do not have anything to do with the productivity. Further more if some individual have education, other who are more talented have to acquire even more edu just to signal their superior talent. This leads to overinvestment in education which in turn leads to a ~~was~~ burdens the society with

a wasteful social cost for hike.

Screening

Riley suggested an alternative method of testing the signalling model, based on the fact that some occupations need screening and others do not. The job where screening is used are those where employers cannot infer the individual's productivity by direct observation. In his Riley's model, individual either attains minimum education for an unscreened job or continue in school and later accept a screened job. It follows that the discounted life time earning of those individual choosing screened jobs, for a given level of education, is less than life time earning of those in unscreened jobs. Riley claims that his result confirms this & thus there is ~~so~~ evidence in favour of the signalling hypothesis.

Lee & Wong also confirm the screening hypothesis of education. They find that firms offer higher wage to individuals with educational certificates in the absence of better information on productivity of new employees.

They also found that after a period of service provided by the new employee, the employer no longer pays individual on the basis of educational certificates. They also found evidence in favour of 2 conjectures:

- ① The role of educational screening is more important for high skilled jobs than for low skilled jobs.
- ② Educational screening is performed by firms each time a new employee is hired regardless of whether the employee has previously worked in the labour market.

Thus There is some evidence to show that education is indeed used as a signal by which employer screen prospective jobs applicants. Its role is not merely to improve skills of individuals but also to provide information on individuals abilities.