

## Y6 H1 Prelim 2 Q3

**(a) Explain why a government would provide the following services directly:**

**(i) street lighting;**

**(ii) education.**

**[10]**

### **(i) Street lighting**

Street lighting is a public good. A public good is a good / service that has the characteristics of non-excludability and non-rivalry in consumption. Non-excludability means it is impossible or prohibitively expensive to exclude any non-payers from using the good / service. Non-rivalry means the consumption of the good by one does not diminish the amount available for consumption by others.

Due to the non-excludable nature of street lighting, people who do not pay for it also get to enjoy it. This gives rise to the problem of free-ridership, where no one is willing to pay for street lighting since non-payers can also consume the good. And since no profit-seeking producer will be willing to produce a good that nobody is willing to pay for, the free market will not produce street lighting, though consumers want the good.

On the other hand, due to the non-rival nature of street lighting, the marginal cost of serving an additional road user is zero. With zero marginal cost, the principle of optimal resource allocation calls for provision of street lighting to anyone who wants it at no charge. Any non-zero price would discourage some users from consuming the good, thereby causing a reduction in society's total welfare. Therefore, from the point of view of allocative efficiency, street lighting should be provided at zero price to all road users.

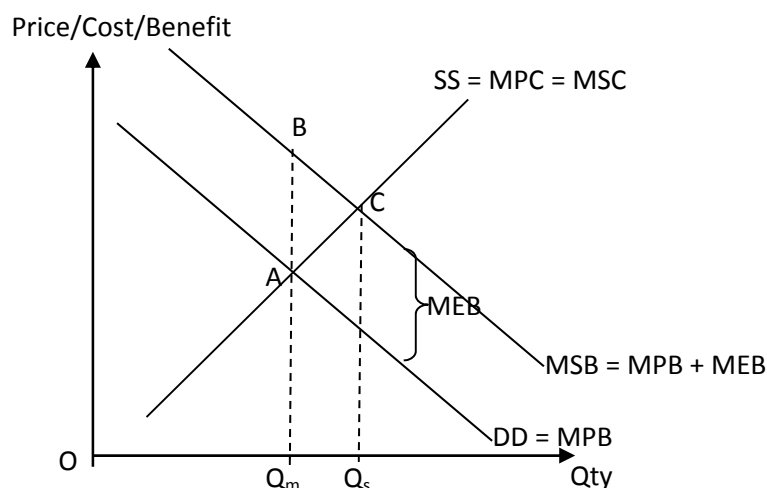
To sum up, allocative efficiency requires street lighting to be provided to all who want the good at zero price. However, the free market fails to provide street lighting due to the problem of free-ridership. This means allocative inefficiency in the free market and welfare loss to society.

Hence, to restore allocative efficiency, the government needs to intervene by directly providing street lighting for free.

### **(ii) Education**

Education is a merit good. A merit good is a good that is deemed socially desirable by the government and yet perceived by the government to be under-consumed. This under-consumption can be attributed to individuals disregarding positive externalities (external benefits).

External benefits are beneficial side-effects of producing / consuming a good on third parties who are not involved in the production / consumption of the good. The external benefits of education include higher productivity for future co-workers and employers, and a steady supply of skilled labour which contributes to economic growth that brings about higher standard of living for all including the less educated. When external benefits are ignored by consumers and producers of education, under-consumption results.



**Figure 1 Under-consumption of education due to positive externalities**

Refer to Figure 1. The existence of external benefits cause the marginal social benefit (MSB) to be higher than the marginal private benefit (MPB) of education. The market output of education is  $Q_m$ , given by the intersection of demand and supply (or marginal private benefit MPB, and marginal private cost MPC). The external benefits on third parties (i.e., marginal external benefits, MEB) are not considered when consumers and producers decide how much education to consume and produce. However, the socially optimal level of education is  $Q_s$ , given by the intersection of marginal social benefit (MSB) and marginal social cost (MSC), since society's welfare is maximised when  $MSB=MSC$ . Since  $Q_m < Q_s$ , there is under-consumption of education. The welfare loss to society (i.e. deadweight loss) is given by Area ABC.

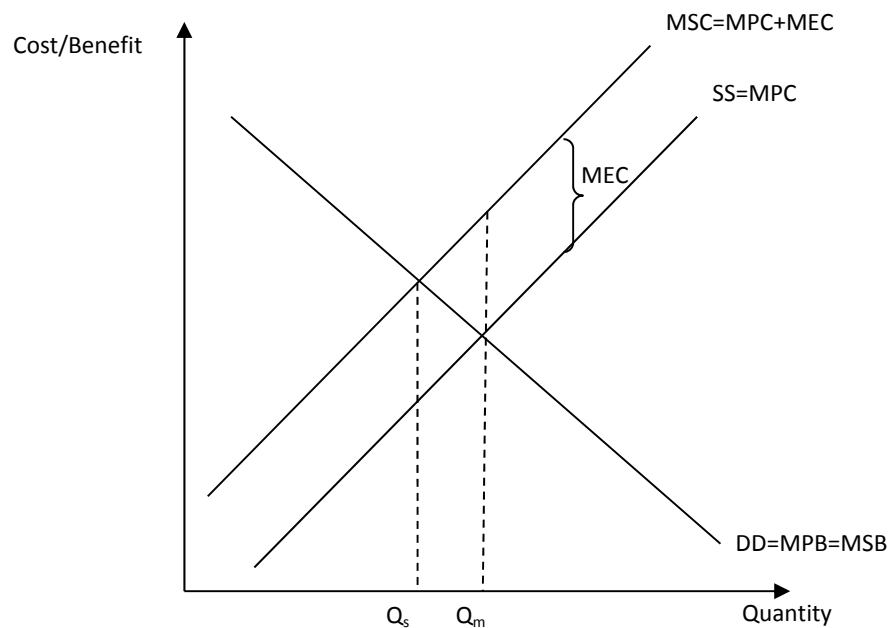
To increase the level of consumption and restore allocative efficiency, the government could increase the supply of education through direct provision (e.g., setting up government schools) to bring  $Q_m$  closer to  $Q_s$ .

L3	Developed explanation why govt provides the two goods directly	8-10
L2	Undeveloped explanation why govt provides the two goods directly	4-7
L1	Smattering of valid points	1-3

**(b) Discuss the view that government policies to deal with negative externalities can be potentially damaging and ineffective. [15]**

Negative externalities refer to harmful side effects of production or consumption on third parties who are not involved in the production and consumption of a good. One example is harmful pollutants emitted in the process of industrial production. The air pollution generated has adverse health effects on the general population, especially residents living in the vicinity of the industrial hubs. Pollutants such as greenhouse gases also contribute to global warming, which have severe negative impact on the environment we live in.

The existence of negative externalities (or external costs) causes the divergence between social costs and private costs, since social costs is the sum of private costs and external costs.



**Fig. 2: Over-consumption / production due to negative externalities**

Refer to Fig.2. Marginal social cost (MSC) is higher than marginal private cost (MPC) due to the existence of marginal external cost (MEC). Actual market output is  $Q_m$  where demand = supply (or marginal private benefit MPB = marginal private cost MPC), as external costs such as pollution are ignored by producers and consumers when they decide how much to produce / consume. However, the socially optimal level of output is  $Q_s$  where marginal social cost MSC = Marginal social benefit MSB, as society's welfare is maximized when MSB = MSC. Since  $Q_m > Q_s$ , there is over production / consumption of the good, which leads to welfare loss to society (as given by the shaded area). This means that the free market fails to allocate resources in a way that maximizes society's welfare (i.e., allocative inefficiency). Thus, market failure results.

To deal with negative externalities such as industrial emissions, the government could implement a cap-and-trade system. Under this scheme, the government sets a cap on the total amount of a pollutant that can be emitted by all factories. This limit is allocated to the firms in the form of emissions permits. Firms are allowed to trade their emission permits.

However, this policy can be potentially ineffective in correcting market failure. It is usually difficult for the government to determine the optimal cap on total pollution, or the 'correct' number of permits to be issued. Too much or too little would not bring about allocative efficiency.

Moreover, a cap-and-trade system can be potentially damaging. If the government issues too few permits, the permits could become overpriced, which will unnecessarily undermine the cost competitiveness of the industry in the international market. Also, volatility in permit price may discourage investment in green technology, as firms cannot know for certain whether or not the future payoff from the sale of permits justifies the adoption of emissions-reducing technologies. Lastly, high costs could be incurred by the government in administering and enforcing the scheme.

An alternative policy the government could adopt is indirect taxation, which increases the MPC of the producers, causing them to internalise the external costs. When the size of the tax is set to be equal to the MEC, the MPC would increase to coincide with the MSC, bringing market output  $Q_m$  down to the socially optimal level  $Q_s$ .

However, the policy can be potentially ineffective due to government failure. As the true monetary costs of negative externalities (e.g., pollution) are hard to estimate, the government may not be able to impose the correct amount of tax to bring about allocative efficiency.

Also, indirect taxation can be potentially damaging for consumers and producers. As indirect taxation raises cost of production (MPC) and reduces supply, consumers would have to pay a higher price yet enjoy a lower quantity of the good, leading to lower consumer welfare (or consumer surplus). For producers, indirect taxation means additional costs which lower their profitability and reduce their international competitiveness (especially against rival firms in other countries where indirect taxation is not implemented).

### **Conclusion**

As shown above, it is true that government policies to deal with negative externalities can be potentially damaging and ineffective under specific circumstances.

L3	Developed discussion on at least two policies – how they are effective / ineffective / damaging	8-11
L2	Undeveloped discussion	4-7
L1	Smattering of valid points	1-3

E2	Substantiated evaluative comments	3-4
E1	Evaluative statements with no substantiation	1-2