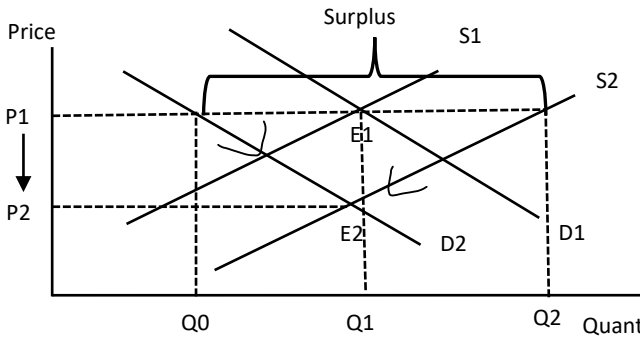


H1 CSQ1 GCE A Level Examinations 2021
Suggested Answers

(a)	(i)	With reference to Figure 1, summarise the main changes that occurred in the crude oil price during the period 2014-2018.	[3]
		- Crude oil prices generally decreased during the period 2014 to 2018. - The most significant period of decrease happened from 2014 to 2015. - After which, crude oil prices gradually increased from 2016 to 2018.	
	(ii)	Extract 1 states that 'If indeed demand for crude oil falls and supply rises, price will be bound to respond in the predicted direction.' Using a supply and demand diagram, explain the impact of these changes on the price of crude oil.	[4]
		The fall in demand due to slowdown in China and increase in supply due to agreed increase within OPEC would likely lead to a fall in the price for crude oil. The slowdown in major economies such as China and Europe would likely lead to a fall in consumers' income and hence purchasing power would decrease. With that, demand for consumer goods and services decreases. Since oil is an input to produce energy that in turn, is an input for production of goods/services, the (derived) demand for oil falls in the crude oil market from D_1 to D_2 as shown in Fig 1. Extract 1 states that "OPEC countries agreed to increase oil production". This would lead to an increase in supply of crude oil, shown by the rightward shift of supply curve from S_1 to S_2 as Fig 1 shows.  Fig 1 The fall in demand and rise in supply led to a surplus of Q_2Q_0 at the original price P_0. Producers will find that they are unable to sell all of their output at P_0 and compete to sell their excess stock by lowering prices. As price decreases, consumers seeking to maximise satisfaction will increase quantity demanded while producers reduce quantity supplied. This downward pressure on price causes a movement along the demand curve (D_2) as well as a movement along the supply curve (S_2). The process continues until the surplus is eliminated with a new market equilibrium at E_1. Thus equilibrium price for crude oil would decrease to P_1. <i>1m for <u>fully labelled</u> diagram</i>	
(b)		With reference to Extract 2 and Extract 3, explain the different causes of the changes in the price of oil in the US and the price of food in Guatemala and comment on the significance of the elasticity of demand or supply in these cases.	[6]
		In Extract 2, because of the lockdowns across the world due to the Covid-19 pandemic, it had kept people at home and severely restricted mobility. Without being able to travel out for work or leisure, there is lack of commuting between places via any form of transport and it was almost impossible to head out to consume goods and services. With the various economies suffering from the lockdowns, production in many countries will	

be affected too. Hence the (derived) demand for oil which is a major factor of production will fall. Demand shifts leftwards from D_0 to D_1 .

At original price P_0 , quantity supplied exceeds quantity demanded ($Q_0 > Q_2$) causing a surplus and downward pressure on price. Oil price thus falls until the equilibrium price P_1 , quantity demanded equals to quantity supplied again at Q_1 .

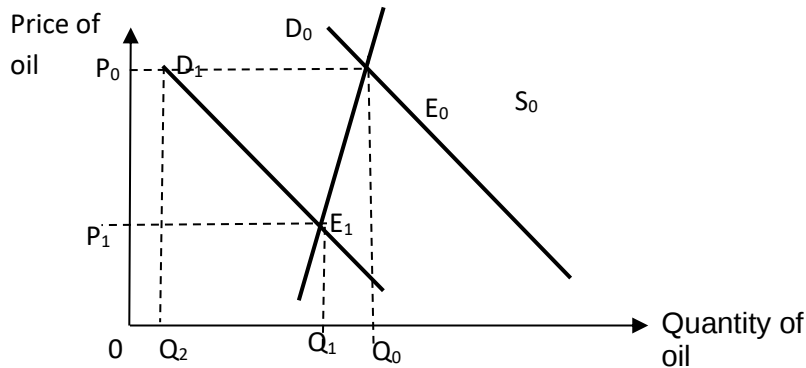


Diagram above is updated

Separately, the increase in the price of food in Guatemala is caused by other factors. As stated in Extract 3, government has been subsidising the production of biofuel, which reduces cost of production, increases profitability of biofuel production and led to increase in the supply of biofuel.

Biofuel and food are both made from crops. Hence biofuel and food are goods in competitive supply, competing for crops. Since it is more profitable to produce biofuel, the increase in supply of biofuel diverts crops away from food production into biofuel production. This leads to a fall in the supply of food, shown by the leftward shift of the supply curve from S_0 to S_1 .

At original price P_1 , quantity demanded exceeds quantity supplied ($Q_d > Q_s$) causing a shortage and upward pressure on price to develop. Hence, food prices rose until the new equilibrium price P_2 , quantity demanded equals to quantity supplied again at Q_2 .



Diagram above is updated

The concept of price elasticity of demand is relevant in the case for food. The demand for food is price inelastic ($PED < 1$) because food is necessary for survival and there are no close substitutes for food. Hence when supply falls and there is a shortage, the price of food has to increase significantly to remove the shortage, as given an increase in the price of food, there will be a less than proportionate fall in quantity demanded for food. This explains why Extract 3 states that "growing crops for biofuel has caused big increases in food prices globally".

		The concept of price elasticity of supply is also relevant in the case for oil. The supply of oil is price inelastic ($PES < 1$) because it is not easy to store oil which requires massive storage space and it is already filling fast on land and at sea as mentioned in Extract 2. Hence there is limited space to store the surplus of oil, making the supply of oil price inelastic. Thus when there is a fall in demand for oil and fall in prices, producers are less responsive to the price fall – quantity supplied falls less than proportionately to remove the surplus, hence prices fall significantly to remove the surplus, “forcing the price of US oil into negative territory”. Hence price elasticity of demand and price elasticity of supply are significant in explaining the “big increase” in the price of food in Guatemala and the large fall in the price of oil in the US respectively.	
(c)		Using <u>one</u> example from Extract 3 and <u>one</u> other example of your choice, explain 'an unintended consequence' of an economic decision in each case.	[4]
		Subsidising the production of biofuel, to reduce the use of crude oil, has led to an unintended consequence of shortage of food and rise in food prices. When governments decide to subsidise biofuel production, they wanted to reduce the use of diesel and petrol fuel, which is harmful to the environment. However, it has led to an increase in the price of food, making it unaffordable especially to the lower-income, increasing inequity. One common policy that governments use to control food prices is through a price ceiling, which is set below the market equilibrium price. A price ceiling on food would immediately reduce its price and help make it more affordable and increase equity. However, a price ceiling would lead to a shortage and could lead to an unintended consequence of the emergence of a black market where food is sold at an even higher price, making it even more unaffordable.	
(d)		With reference to Extract 4:	
	(i)	Explain the meanings of both non-rivalry and non-excludability, and comment on the extent to which a healthy natural environment has these characteristics.	[6]
		Public goods are goods that are non-excludable and non-rivalrous in consumption. Non-excludability in consumption means that it is technically impossible or extremely costly to exclude any individual from the benefits of a good once it is provided. Non-rivalrous in consumption means the consumption of the good by any individual does not reduce the amount of the good available for consumption by other individuals. A healthy natural environment such as the sea or mountains is non-rivalrous in consumption because a person taking in the view of the natural environment allows the next person to still enjoy the same benefits of the beauty of nature and clean air and environment without reducing the amount of clean air and view of the sea or mountains. A healthy natural environment is also non-excludable. This means that it is impossible to exclude the non-payers from benefiting mainly because of the vastness of the sea and it is impossible to set up checkpoints and exclude non payers from enjoying the view. However, some of these natural environments are popular tourist attractions and do not possess the characteristics of non-rivalry and non-excludability. For example the Great Barrier Reef in Australia is opened to tourism and through the years, there is physical damage to the reefs and corals from boats and other tourist activities such as snorkelling. As the number of visitors increase and there is more damage to the natural ecosystem and its rich biodiversity, the experience for subsequent visitors is reduced, making it	

	rivalrous in consumption. Payment is also necessary to enter the Great Barrier Reef and hence it is excludable. Natural environments that are not tourist attractions may also not possess the characteristic of non-rivalry in consumption. This is because the enjoyment of clean water and unspoilt landscapes could be reduced for the next individual if these environments are exposed to human actions such as pollution or improper disposal of waste and oil. Hence a healthy natural environment is more likely to possess the characteristic of non-excludability but not non-rivalry in consumption. If it is a tourist attraction, then it is likely not to possess both characteristics.	
(ii)	Discuss whether imposing a tax on oil is the best way to 'reduce the negative effects of oil consumption on the natural environment.'	[10]
	In Extract 4, there are various negative externalities of oil consumption on the natural environment. Examples include oil contamination making water unsuitable for people to drink, farmers to use for irrigation as well as deaths of plants and animals that live in the natural environment. In Extract 3, the use of diesel and petrol in vehicles also release harmful emissions into the atmosphere. To reduce deadweight loss that arose from such negative externalities, there can be an imposition of a tax on oil. P1: Imposition of a tax is a good way to reduce the negative externalities. Cost/Benefit H: If the government imposes a tax per unit of output that is equal to the marginal external cost at Q_s, it forces producers who use oil as a factor of production to internalise the negative externality and reduce the usage of oil in their production due to the higher cost of production. The MPC shifts upwards to 'MPC + tax'. This leads to a fall in the usage of oil, eliminating the deadweight loss of area B. The socially efficient level of oil usage at Q_s will thus be attained. A: When taxes are used to address negative externalities, firms become motivated to find a cleaner method of production as pollution and/or contamination taxes add to their cost of production and reduce profits. They will innovate and source for production methods that pollute less so that they can avoid paying the tax. Hence taxes act as an incentive over the longer run to reduce contamination to the water sources. Another advantage of tax is that the revenue collected could be channelled to fund projects that help to conserve the natural environment. L: However, there is difficulty in assessing the monetary value of the external costs like the destruction of the natural environment. For instance, due to a lack of knowledge, it may not always be known how severe the negative externalities are. This can lead to over-taxation at MPC + over-tax, which will reduce production to below Q_s at Q_1, and can	

lead to an even greater deadweight loss (Area A > Area B which is the deadweight loss without government intervention) as shown in the diagram. Moreover, the health problems suffered by the local communities from contaminated water and pollution may only manifest in the long run and thus, it would be difficult for government to estimate it accurately in the short run.

P2: Another way would be to provide more public education on the harmful effects of oil on the natural environment.

H: This can be done by providing education through disseminating information on multiple platforms, such as print media, social media, TV and radio programmes as well as campaigns. It is crucial that the Government provides clear and accurate information about the harmful effects of production and consumption of oil on the environment and the consequence to themselves. With more information, the consumers and producers will be more aware of the actual private costs and decrease the consumption and production of crude oil closer to the socially optimal level.

A: The advantage of public education is that it helps to increase awareness of the problem thereby changing behaviour which addresses the root cause of the problem and by correcting the source of the problem, it can prevent further environmental damage in the future.

L: However, the information provided may not change their views as it takes time and effort to change mindset and hence the outcome of public education is uncertain. With prolonged publicity, it would be using scarce resources which perhaps could be channelled elsewhere such as providing subsidies for production of biofuel, which is an alternative of oil.

Evaluation:

A pollution tax is more effective than provision of information as it can be implemented quickly and with ease and thus might be sought to limit harm to the environment in the short run while ensuring that there is sufficient oil produced and consumed too.

In terms of certainty of outcome, public education may be uncertain depending on how convinced the people are as they may not “see” the harmful effects immediately. Compared to taxes where the outcome is relatively quick in showing the impact as the consumers would be more compelled, if not they would have to incur a higher cost.

A tax generates revenue for the government which can in turn be used as subsidies to the production of biofuel whereas public education may strain the government budget especially for countries with high government debt.

However, provision of information does not require very accurate and precise information on MEC to be effective, unlike the use of taxes as mentioned earlier, which require more precise information on the MEC to determine the correct amount of tax to charge in order to reach the socially optimal level.

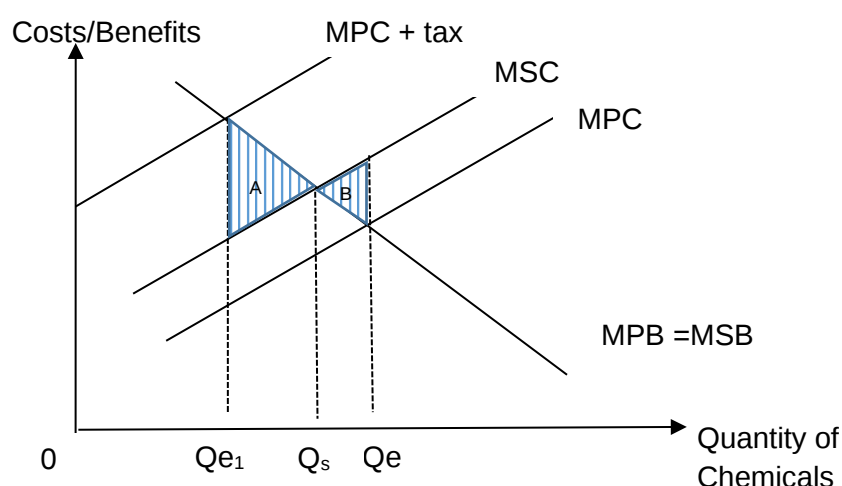
Hence, the choice of which is the best measure also depends on the severity of the environmental degradation affecting the livelihoods of the people in the country. For developing countries, where farming is still a core business for them and thus heavy reliance on water for irrigation, taxes may be more effective as the less developed countries may also not have the resources to educate the masses. However, for some other countries such as UK, where the westerners tend to be more concerned about environmental issues and more receptive to changes, perhaps education would be a better solution to address the root cause.

Mark scheme

Level	Knowledge, Application, Understanding and Analysis	Marks
L3	An answer that explains how tax and 1 other policy in detail and linking them to both their advantages and limitations, aimed to work to improve resource allocation when negative externalities exist.	5-7
L2	An answer that describes tax and 1 other policy without linking them to the advantages and limitations OR where there is a lack of analytical rigour.	3-4
L1	An answer that merely defines the meaning of taxes and/or state that imposing a tax would reduce oil production and consumption without explaining how and why.	1-2
E2	For an evaluation that is adequately supported	2 - 3
E1	For an evaluative statement that is unsupported	1

- (e) **Some people argue that any intervention in markets by government involves so much danger of making the allocation of resources less efficient that non-intervention is the best policy in all circumstances. Discuss the extent to which you agree with this view.** [12]

Government failure is a situation where government intervention results in greater market inefficiencies that would otherwise occur without government intervention. Such failure is likely due to a lack of information and costs of government intervention.



There is difficulty in assessing the monetary value of the external costs. For instance, due to a lack of knowledge, the extent of the damage suffered by the third parties, or how severe the negative externalities are. For example, global warming is caused by release of greenhouse gases from burning of fossil fuels and farming methods. It might be hard to quantify the long term effect of global warming and part of the greenhouse gases could also be reduced naturally over time. For example, agricultural products might adapt to become more tolerant of high temperature over time and the effect of global warming at reducing farmer's yield might be overestimated. Hence it is also not always known the extent of the damage suffered by the third parties. This can lead to over-taxation, which will reduce consumption/production to Q_{e1} (below Q_s), and can lead to even greater deadweight loss (Area A due to over-taxation is bigger than Area B which is the deadweight loss without government intervention) as shown in Figure 5.

All forms of government intervention use scarce resources and hence there are costs to the society carrying out these measures; costs to the government as well as to affected parties such as the firms. For example, in the case of tradable permits, there are high

administrative costs associated with monitoring pollution emissions as the number of firms involved is large and there is a need for tough systems in each country to verify and report emissions.

Hence in such instance of government failure, it is agreed that non-intervention would be a better choice.

In addition, the price mechanism in the free market may also help to achieve efficient allocation of resources without intervention required. In the absence of any source of market failure, the interaction of demand and supply forces in the market will lead to an efficient allocation of scarce resources. The market is in equilibrium when quantity demanded is equal to quantity supplied at price P and quantity Q . The marginal benefit for the last unit of good bought as reflected by the price that consumers are willing to pay exactly equals the marginal cost incurred in producing that last unit of good. Thus when the market produces at $P = MC$, allocative efficiency is achieved, which is when society produces a combination of goods and services that maximises its welfare.

Anti-thesis: However, non-intervention is not the best policy for all circumstances, because in reality, there are various sources of market failure, one of which is the case of public goods.

Due to the characteristics of a public good, private firms cannot profitably produce a public good. Thus, public goods are not produced by the free market even though the production of these goods will lead to higher societal welfare. For example, the provision of street lights benefits the society in terms of reducing accidents and providing a safer environment for all. Thus, in this case, there would be zero production of public goods if the government did not intervene.

Another example would be when the negative externalities are very significant, then a total ban by the government may be justifiable to protect society's welfare. In the case of Singapore, the consumption of drugs is banned as the negative externalities such as higher crime rates are deemed by the government to be too high. Thus with a ban, it is effective in removing the deadweight loss given the large negative externality and hence achieve allocative efficiency.

In addition, in many countries, governments intervene in the market for education. As they see significant positive externalities especially from having a basic level of education, it is thus provided for heavily subsidised in order to reach the socially optimal level.

In conclusion, the view of non-intervention in all circumstances is not agreeable because in instances where the free market fails to achieve efficiency, it calls for government intervention. However, we have also seen that government intervention has its own limitations, and in some cases, government intervention may even result in greater deadweight loss. Thus, it depends on the type of good that we are looking at and also weighing the costs and benefits of the government intervention to make a sound decision.

Levels	Descriptors	Marks
L3	For an answer that explains the cases for and against government intervention.	6 - 9
L2	For an answer that explains the cases for intervention	3 - 5
L1	For an answer that is largely descriptive and lacking in economic analysis	1 - 2
E2	For an evaluation that is adequately supported	2 - 3
E1	For an evaluative statement that is unsupported	1

