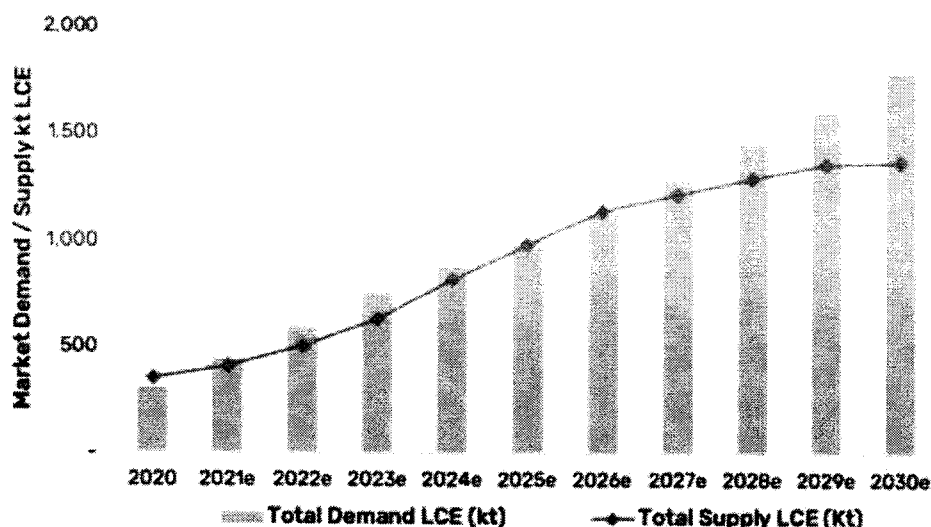


# VICTORIA

## Question 1: Australia's struggle towards a sustainable future

Figure 1: Global lithium demand and supply



Note: LCE (kt) refers to lithium carbonate equivalent (measured in kilotonnes), the industry standard terminology for lithium.

Source: Global Lithium, accessed 14 August 2022

### Extract 1: The growth of the lithium market

The lithium market is expected to triple in the next five years as the world embraces electric vehicles (EVs), according to Pilbara Minerals.

Australia is the largest lithium producer in the world, with many of the significant deposits located in Western Australia. Pilbara Minerals managing director Ken Brinsden said although the mine has been operating at about 50 per cent capacity due to weakening demand, they were well-positioned for the 'second wave' of EV production in 2025.

EV sales are expected to increase from 2 million to 28 million by 2030. This growth is only possible by the uptick in the production of lithium batteries to meet the demand for EVs.

In 2018, the lithium industry went through a period of rapid growth based on consumption principally in China, driven by subsidy support for the battery industry. However, an excess supply of the raw material saw the price decline last year. "We expect demand for EVs to significantly increase by 2024, and we will see an uptick in the need for lithium batteries to support that demand," she said.

Source: ABC News, 26 January 2020

### Extract 2: To move or not to move?

New research from The Australia Institute shows the majority of Australians support both a government policy subsidising new EVs and a ban on the sale of new petrol vehicles (which are powered by fossil fuels) by 2035.

Two in three Australians agree that the government should introduce subsidies for EVs, and over half of Australians support a ban on the sale of new petrol vehicles from 2035.

EVs lead to cleaner air, resulting in significant savings in health costs. They create new local jobs in mining and local energy, and are key to meeting global climate change targets.

“This polling shows that the Australian public across the political spectrum have a huge appetite for change. They are ready to move on from internal combustion vehicles to the future of transport,” said Warringah Member of Parliament Zali Steggall. “It is clear the community want more support to make the transition. We need to reduce the price of these vehicles and provide adequate charging infrastructure to make this change viable to Australian families.”

*Source: The Australia Institute, 18 March 2021*

### **Extract 3: Free-to-use regional EV charging stations**

Linga Network, a new Victorian-based start-up, has switched on what it describes as the state’s most remote EV charging stations – in the towns of Nhill and Rainbow – which are to be the first of 100 free EV chargers to be rolled out in regional Victoria, Australia.

Charging stations are built at locations determined by community need, rather than at locations which will drive the greatest revenue, and charging on the network is free, so as to boost regional tourism, sustainability, and the economy.

*Source: The Driven, 3 February 2021*

### **Extract 4: The new ‘gold rush’ for green lithium**

The commercial use for lithium in the 21st century could not be clearer. It is found not only inside smart phones and laptops, but is now vital to the clean energy transition, for the batteries that power EVs and store energy so renewable power can be released steadily and reliably.

Demand has soared in recent years as carmakers move toward EVs, as many countries including the UK, Sweden, the Netherlands, France, Norway and Canada announce a phase-out of combustion-engine cars. In fact, five times more lithium than is mined currently is going to be necessary to meet global climate targets by 2050, according to the World Bank.

But there is one big problem. Obtaining lithium by conventional means takes its own environmental toll, on carbon emissions, water and land. Lithium is currently sourced mainly from hard rock mines, such as those in Australia, or underground brine reservoirs below the surface of dried lake beds, mostly in Chile and Argentina. Hard rock mining – where the mineral is extracted from open pit mines and then roasted using fossil fuels – takes time. It also leaves scars in the landscape, requires a large amount of water and releases 15 tonnes of carbon dioxide for every tonne of lithium. The other conventional option, extracting lithium from underground reservoirs, relies on even more water to extract the lithium – and it takes place in typically very water-scarce parts of the world, leading to indigenous communities questioning their sustainability.

*Source: BBC, 25 November 2020*

**Extract 5: Australia is burning – should that signal the end of coal?**

The devastating bushfires across Australia have cemented the fact that the country is on the front lines of a major climate-linked disaster, one that will only get worse from here. The fires have already destroyed 2,000 homes and killed at least 26 people since igniting in September 2019. The blazes clouded the skies above cities like Canberra and Sydney, creating some of the worst air pollution in the world.

While some parts of Australia have become among the world's most advanced regions for clean technologies such as renewable energy generation, Australia accounts for 1.3 per cent of global greenhouse gas emissions and is the fourth-largest coal producer, behind China, India, and the United States. But it is the world's largest exporter of coal, which is now Australia's most valuable export. Australia is one of the world's biggest profiteers from fossil fuels, and it continues to increase its mining and sales, making it one of the highest per capita carbon-emitting countries among major economies.

Australia is contributing to a global problem that in turn has devastating local consequences. The Australian Bureau of Meteorology's 2018 State of the Climate report showed that Australia is in the midst of a long-term warming trend as well as changes in rainfall that are raising the risks of wildfires near the country's most populated regions.

The economic damage from the bushfires has been devastating. Damage to fresh produce will put upward pressure on consumer prices, given that most fresh fruit and vegetables consumed at home are sourced locally. Tourism had also taken a "significant hit" during what is normally peak season, as smoke haze and uncertainty about safety keep travellers away.

Broader effects included air pollution, which has affected 30 per cent of the population, and would cause reduced worker productivity, increased health spending, and lower crop yields, as well as road closures. The devastating social impacts of the fires mean that already-fragile consumer confidence will take an added hit.

So the long-term threat of more and more extreme weather in Australia demands more aggressive cuts to emissions or more drastic measures to move people out of harm's way. The longer the country waits to take action on either front, the worse the situation will get. The move towards EV usage is but one step that can be made in the right direction. Transitioning to a sustainable economy on more fronts will deliver not just financial and social benefits, but also positive environmental outcomes.

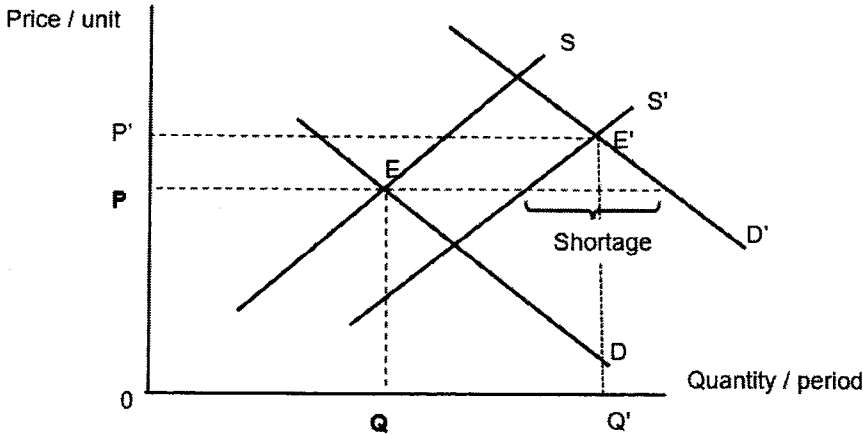
*Sources: Vox, 8 January 2020 and The Guardian, 8 January 2020*

**Questions**

- (a) (i) With reference to Figure 1, describe the expected trend in the global price of lithium from 2021 to 2030. [2]
- (ii) Using a supply and demand diagram, explain reasons for the above trend. [5]
- (b) Using information from Extracts 1 and 2, distinguish between the concepts of 'joint demand' and 'derived demand'. [4]
- (c) There is support from the Australian public for the government to introduce subsidies for the purchase of EVs.
- Explain the likely impact of such a subsidy on Australians' expenditure on EVs, and comment on whether this is likely to change in the future. [6]
- (d) Identify and explain the characteristics of a public good, and comment on whether 'free-to-use regional EV charging stations' (Extract 3) has these characteristics. [6]
- (e) In the light of the externalities associated with lithium and EVs, discuss whether, on balance, the Australian government should support the transition from petrol vehicles to EVs. [10]
- (f) Discuss the extent to which you agree that the Australian government is 'transitioning to a sustainable economy'. [12]

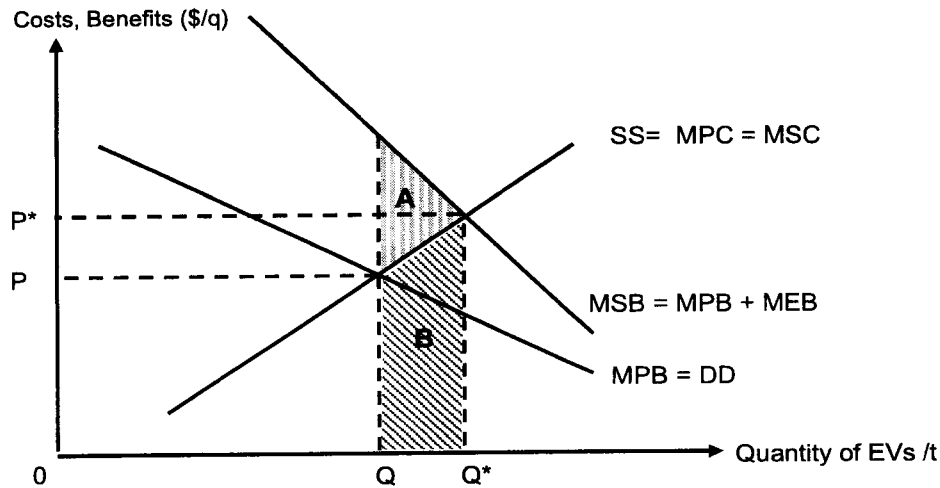
[Total: 45]

## CSQ1 Suggested Answers and Mark Schemes

(a)	(i)	<b>With reference to Figure 1, describe the expected trend in the global price of lithium from 2021 to 2030.</b>	[2]
		Global price of lithium will rise [1] at a generally increasing rate [1].	
	(ii)	<b>Using a supply and demand diagram, explain reasons for the above trend.</b>	[5]
		<p>From Extract 1, “we expect demand for EVs to significantly increase by 2024, and we will see an uptick in the need for lithium batteries to support that demand”. With the rise in the demand for electric vehicles (EVs) as mentioned in Extract 1, derived demand for lithium will also rise, since lithium is a factor input for lithium batteries, which are used alongside EVs. There is a rightward shift in demand from D to D'. [1]</p> <p>The subsidy support for the battery industry in China mentioned in Extract 1 will lower the marginal cost of battery production, incentivising firms to increase the supply of batteries. The supply of lithium globally will then rise in response (rightward shift of supply curve from S to S'), as it is a factor input for EV production. [1]</p>  <p style="text-align: center;"><b>Figure 1: Market for lithium Diagram [1]</b></p> <p>We know from a(i) that the global price of lithium is expected to rise. As shown in Figure 1, this means that the rise in demand is likely to exceed the rise in supply, [1] leading to a shortage at the initial price P. This causes an upward pressure on the price of lithium. As price rises, quantity demanded falls while quantity supplied increases until a new equilibrium is reached, where the price of lithium rises to P'. [1]</p>	
(b)		<b>Using information from Extracts 1 and 2, distinguish between the concepts of ‘joint demand’ and ‘derived demand’.</b>	[4]
		<b>Derived demand</b> is the demand for a good that results from the demand for another good that it helps to produce. In essence, the demand for a factor input like lithium is derived from the demand for lithium batteries, which are used in the production of lithium batteries (which in turn are used with EVs), as mentioned in <u>Extract 1</u> . [2]	

	<p>When goods are in <b>joint demand</b>, they are complementary goods i.e. they are consumed together to satisfy a specific need or want. An example of complementary goods from <u>Extract 2</u> are EVs and the charging infrastructure – a user would require the use of both the EV and a charging point to be able to fulfill the need of driving a vehicle for transport purposes. [2]</p>	
(c)	<p><b>There is support from the Australian public for the government to introduce subsidies for the purchase of EVs.</b></p> <p><b>Explain the likely impact of such a subsidy on Australians' expenditure on EVs, and comment on whether this is likely to change in the future.</b></p>	[6]
	<p><b>Explain likely impact of subsidy on Australian's TE on EVs [4]</b>  A production subsidy is a payment made by the government to producers to encourage the production of certain goods or services, but not made in exchange for any goods or services.</p> <div data-bbox="438 761 1189 1131" data-label="Figure"> <p>The graph shows a downward-sloping demand curve (D) and two upward-sloping supply curves, S1 and S2. S2 is to the right of S1, representing a rightward shift in supply. The initial equilibrium is at the intersection of S1 and D, with price P1 and quantity Q1. The new equilibrium after the subsidy is at the intersection of S2 and D, with a lower price P2 and a higher quantity Q2. The vertical axis is labeled 'Price / Unit' and the horizontal axis is labeled 'Quantity/period'. The origin is marked '0'.</p> </div> <p style="text-align: center;"><b>Figure 2: Impact of subsidy on EVs</b></p> <p>When a subsidy is implemented, the marginal cost of production for EV-producing firms falls, thus EV producers are more willing and able to produce EVs for sale, causing supply for EVs to increase and shift right from S1 to S2, resulting in a fall in price from P1 to P2 via the market adjustment process. [1]</p> <p>Given that there are not many close substitutes to EVs in the market, the demand for EVs is likely to be price inelastic [1], which means that a fall in price leads to a less than proportionate rise in its quantity demanded, ceteris paribus. [1] The rise in TE from the rise in quantity demanded is less than the fall in TE from the fall in price and so, Australians' TE on EVs will fall overall. [1]</p> <p><i>Note: Judgement that <math> PED  &gt; 1</math> with valid substantiation can also be accepted. Subsequent evaluation can then consider the possibility of demand becoming more price inelastic over time, using a relevant factor.</i></p> <p><b>Comment on whether this is likely to change in the future [2]</b>  However, with more alternatives to EVs being introduced in the market such as biodiesel cars, the demand for EVs may become more price elastic over time. As such, with a more price elastic demand, a fall in price from the production subsidy of EVs could lead to a rise in TE in the future.</p>	

(d)	<p><b>Identify and explain the characteristics of a public good, and comment on whether 'free-to-use regional EV charging stations' (Extract 3) has these characteristics.</b></p>	[6]
	<p><b>Identify and explain the characteristics of a public good [4]</b> Public goods are goods that are non-excludable and non-rivalrous in consumption.</p> <p><b>Non-excludability</b> in consumption means that once the good has been made available, it is impossible or prohibitively costly/difficult to exclude non-payers from consuming it. This may give rise to a free-rider problem, such that no consumer would be willing to pay for public goods. [2]</p> <p><b>Non-rivalry</b> in consumption means that the consumption of the good by one person does not reduce the quantity available to others or does not reduce the quality of the good consumed. This means that the marginal cost of <u>providing</u> for an additional user is zero. [2]</p> <p><b>Comment on... [2]</b> Free-to-use regional EV charging stations are both excludable and rivalrous. Even though these stations are provided for free i.e. free-of-charge (Extract 3), it is <b>possible</b> to ensure that only people who pay for their use have access to it and to restrict those that do not pay for it from using the station – thus the charging stations are <b>excludable</b>. These charging stations are also <b>rivalrous</b> as one individual's usage of the charging station at any point in time will reduce the availability of the charging service to other users. [2]</p>	
(e)	<p><b>In the light of the externalities associated with lithium and EVs, discuss whether, on balance, the Australian government should support the transition from petrol vehicles to EVs.</b></p>	[10]
	<p><b>Introduction</b></p> <p>From Extract 2, there is strong backing by Australians for the government to support the transition from petrol vehicles to EVs. There are both positive and negative externalities associated with the consumption of EVs and production of lithium respectively. Whether the Australian government should indeed support the transition depends on which has a greater effect on society's welfare.</p> <p><b>Thesis: The Australian government should support the transition from petrol vehicles to EVs due to the positive externalities from EV consumption.</b></p> <p>From Extract 2, "EVs lead to cleaner air, resulting in significant savings in health costs." The consumption of EVs not only benefits individuals using the EVs due to the comfort and convenience that driving a vehicle brings (versus public transport), but also third parties not involved in the consumption of EVs. In comparison to petrol vehicles, the usage of EVs lead to less air pollution since they do not rely on coal, and therefore contributes towards slowing the negative effects of climate change. As such, third parties enjoy a positive externality from EV consumption by individuals, as they fall ill less often (e.g. respiratory issues from air pollution), even though they did not consume EVs. This leads to lower healthcare costs and a healthier society overall, which could lead to higher labour productivity.</p>	



**Figure 3: Positive externalities from EV consumption**

The positive externality causes the marginal social benefit (MSB) to be greater than the marginal private benefit (MPB) of consuming EVs, since the additional benefits to society (MSB) includes both the additional private benefits to individuals using EVs (MPB) as well as the additional benefits to third parties not involved in its usage (MEB). Graphically, the existence of the MEB causes the MSB curve to be higher than the MPB curve, where MEB is the vertical distance between the MSB and MPB curves.

Under the free market, consumers will base their decisions on their MPB, and disregard the external benefits. Assuming there are no negative externalities,  $MPC = MSC$ . Left to market forces, the market equilibrium output will be at  $Q$  where demand equals supply (which is also where  $MPB = MPC$ ).

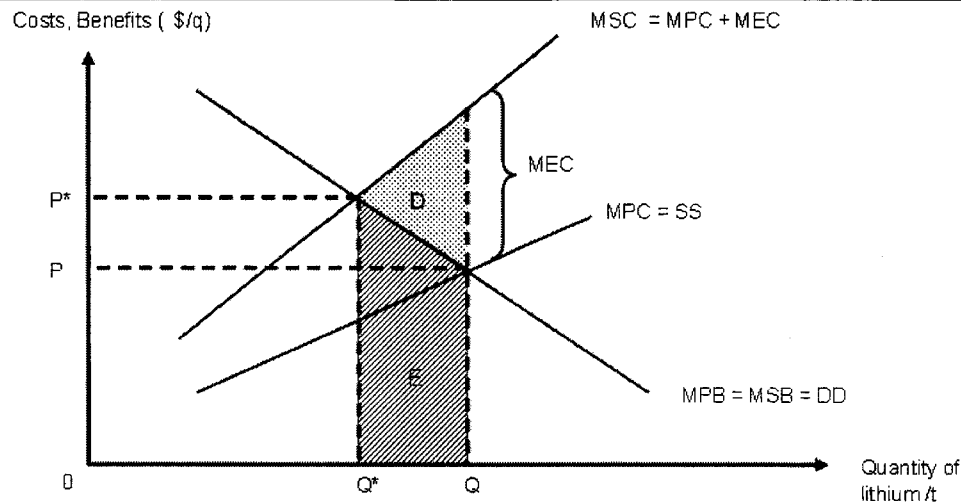
However, the socially optimal output is at  $Q^*$ , where  $MSB = MSC$  and society's welfare is maximised. Hence, under the free market, there is an underconsumption of EVs by  $Q^* - Q$  units, resulting in welfare loss to society (also known as the deadweight loss). This is because for  $Q$  to  $Q^*$ , the MSB is greater than the MSC, i.e. there is a gain to society's welfare if  $Q^* - Q$  more units of EVs are consumed. The deadweight loss of consuming at the market equilibrium output  $Q$  is represented by area A given that the total social benefits of consuming  $Q$  to  $Q^*$  units (areas A+B) is greater than the total social costs (area B).

Therefore, the free market has failed to achieve allocative efficiency as society's welfare is not maximised, and the Australian government can improve society's welfare by providing support to encourage EV consumption.

**Anti-thesis: The Australian government should not support the transition from petrol vehicles to EVs due to the negative externalities from lithium production.**

However, Extract 4 also recognises that the production of lithium "takes its own environmental toll, on carbon emissions, water and land". In the case of Australia, where lithium is sourced from hard rock mining, production of lithium requires a large amount of water and releases significant amounts of carbon dioxide into the atmosphere. As such, opposite to the above case, third parties who are not involved in the production of lithium suffer due to the negative health effects and healthcare costs they incur from the land and air pollution. The immense usage of water in the production process also depletes resources, leaving less available for future generations.





**Figure 4: Negative externalities from lithium production**

The negative externality causes the MSC to be greater than the MPC of producing lithium, since the MSC includes both the MPC and the marginal external cost (MEC) to third parties in society. Graphically, the existence of the MEC causes the MSC curve to be higher than the MPC curve, where MEC is reflected in the vertical distance between the MSC and MPC curves.

Under the free market, producers will base their decisions on their MPC and disregard the external costs. Assuming there are no positive externalities,  $MPB = MSB$ . Left to market forces, the market equilibrium output will be at  $Q$  where demand equals supply (which is also where  $MPB = MPC$ ).

However, the socially optimal output is at  $Q^*$ , where  $MSB = MSC$  and society's welfare is maximised. Hence, under the free market, there is an overproduction of lithium of  $Q - Q^*$  units, resulting in welfare loss to society. This is because for  $Q^*$  to  $Q$  units, MSC is greater than MSB, i.e. there is a loss to society's welfare from these additional units produced. The deadweight loss of consuming at the market equilibrium output of  $Q$  is represented by area  $D$  given that the total social costs incurred by producing  $Q^*$  to  $Q$  units (areas  $D+E$ ) is greater than the total social benefits (area  $E$ ).

Therefore, the free market has failed to achieve allocative efficiency as society's welfare is not maximised, and the Australian government can actually improve society's welfare by cutting down on its production of lithium.

### Evaluative Conclusion

[Stand] Weighing the opposing impacts of EV consumption and lithium production on society's welfare, I agree that, on balance, the Australian government should go ahead and support the transition from petrol vehicles to EVs.

[Substantiation] While the production of lithium generates negative externalities which imposes a cost on society due to the welfare loss generated, it could be argued that the cost incurred is one-off, at the production stage. On the other hand, as cars are used for transport over a longer time period, the positive externalities generated from EV consumption are prolonged and sustained. This means that, **in the long run**, the net benefit to society that could be gained from increased EV consumption is likely to outweigh the net costs to society from lithium production. As such, the Australian

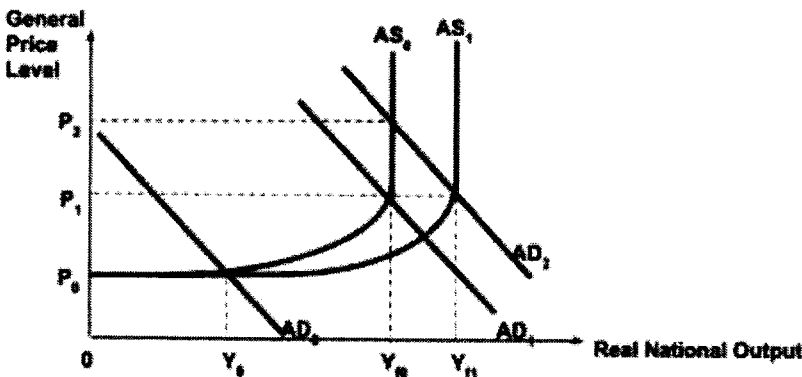
government should implement measures to support EV usage to improve society's welfare in the long haul.

Furthermore, to more fully reap the benefits of EV consumption on net, the Australian government could support the consumption of EVs while at the same time invest in more sustainable methods of lithium production that are less harmful to the environment. In doing so, it could minimise the costs to society from lithium production while maximising the benefits to society that EV consumption brings.

#### Mark Scheme

Level	Descriptor	Marks
L3	Well-developed answer that uses the case material to clearly explain how the consumption of EVs <b>and</b> the production of lithium generate positive and negative externalities respectively.	5-7
L2	Undeveloped or underdeveloped answer that explains how the consumption of EVs <b>and</b> the production of lithium generate positive and negative externalities respectively.  OR  One-sided well-developed answer that only considers either how the consumption of EVs generates positive externalities <b>or</b> how the production of lithium generates negative externalities.	3-4
L1	Answer shows some knowledge about externalities and describes how the consumption of EVs and/or production of lithium involves externalities or their impact on society, without economic analysis. Answer contains major theoretical errors.	1-2

**Up to 3 marks** can be awarded for a valid evaluative conclusion that makes a judgement on whether the Australian government should, on balance, support the transition from petrol vehicles to EVs. This can be done by applying angles of evaluation such as cost-benefit analysis and/or time period to compare the opposing effects of the two economic activities.

(f)	<p><b>Discuss the extent to which you agree that the Australian government is 'transitioning to a sustainable economy'.</b></p>	[12]
	<p><b>Introduction</b></p> <p>In 'transitioning to a sustainable economy', the Australian government is in pursuit of <b>sustainable economic growth</b>, which refers to a rate of growth that can be maintained without creating significant problems such as environmental problems, especially for future generations. It implies a positive and stable growth rate over an extended period (i.e. sustained economic growth), i.e. actual and potential growth must happen such that inflationary pressures are avoided.</p> <p>Based on the case material, there are several competing factors that both contribute to and hamper Australia's transition. Ultimately, the extent to the Australian government is indeed transitioning to a sustainable economy depends on whether the positive effects outweigh the negatives.</p> <p><b>Thesis: The Australian government is transitioning towards a sustainable economy</b></p> <p>The Australian government can be said to be transitioning towards a sustainable economy as there are some moves towards spending more on green/sustainable economic activities.</p> <p>Some parts of Australia have been making the move towards a sustainable economy. Extract 5 mentions that "some parts of Australia have become the world's most advanced regions for clean technologies such as renewable energy generation". Assuming this has been backed by government spending, the increase in government expenditure (G) on clean energy infrastructure leads to an increase in aggregate demand (AD), since G is a component of AD. The increase in AD (depicted by a rightward shift of the AD curve from AD<sub>0</sub> to AD<sub>1</sub> in Figure 5) will lead to an unplanned fall in inventories, and firms respond by increasing production to restore inventories to the planned level. As production increases, firms hire more factors of production, including labour, and pay households more factor income. Real national income increases. As household incomes increase, there will increase their induced consumption, hence triggering another round of unplanned fall in inventories. The multiplier process will continue until a new equilibrium is reached with a multiplied increase in real GDP from Y<sub>0</sub> to Y<sub>f0</sub>), thereby generating <b>actual growth</b>.</p>  <p>The graph shows the AD-AS model. The vertical axis is labeled 'General Price Level' and the horizontal axis is 'Real National Output'. The initial equilibrium is at the intersection of AD<sub>0</sub> and AS<sub>0</sub>, corresponding to price level P<sub>0</sub> and output Y<sub>0</sub>. A rightward shift in aggregate demand moves the AD curve to AD<sub>1</sub>. The new short-run equilibrium is at the intersection of AD<sub>1</sub> and AS<sub>0</sub>, corresponding to a higher price level P<sub>1</sub> and higher output Y<sub>f0</sub>. A second aggregate demand curve, AD<sub>2</sub>, is shown to the right of AD<sub>1</sub>. The long-run equilibrium is at the intersection of AD<sub>2</sub> and AS<sub>1</sub>, corresponding to price level P<sub>2</sub> and output Y<sub>n</sub>. The shift from AS<sub>0</sub> to AS<sub>1</sub> represents an increase in the productive capacity of the economy.</p> <p><b>Figure 5: Sustained economic growth</b></p> <p>At the same time, government spending on clean technologies increases the quantity and quality of capital in Australia. This increases the productive capacity in the</p>	

economy, thereby leading to an increase in the full employment level of national output from Yf0 to Yf1, as a result of the rightward shift of the AS curve from AS0 to AS1. This means there is **potential growth**.

With both actual and potential growth in Australia, further increases in AD in the future will not lead to inflationary pressures – if productive capacity did not increase, further increase in AD from AD1 to AD2 would lead to a rise in the GPL from P1 to P2, causing demand-pull inflation. However, the outward shift of the vertical AS would help to ease inflationary pressures as GPL falls back to P1. Economic growth can thus be **sustained**.

On top of that, given that the government spending was on environmentally friendly clean technologies, there would be less depletion of non-renewable resources and less environmental degradation. Putting them all together, Australia can be said to be on the direction towards **sustainable growth**.

Further, given that the Australian community is seeking more support to make the transition towards EVs, **if** the Australian government does indeed support the switch from petrol vehicles towards EVs via the provision of subsidies, such government spending would contribute to a fall in environmental degradation, hence contributing towards sustainable growth.

[Ev] However, vehicles are only one form of energy use. Even if the government were to support the transition to EVs, it might not create a large enough positive impact on sustainable growth.

**Anti-thesis: The Australian government is not transitioning towards a sustainable economy**

However, it may also be argued that the Australian government is not transitioning towards a sustainable economy, given its huge focus on coal mining and its negative impacts on sustainable growth.

Extract 5 talks about Australia accounting for 1.3 per cent of global greenhouse gas emissions, and it being the fourth-largest coal producer in the world, and the world's largest coal exporter. This means that Australia is still heavily reliant on the production of heavy polluting commodities as drivers for its export revenue and hence growth. The negative impacts of Australia's coal industry on sustainable growth are significant, as the mining of coal has led to huge carbon emissions and contributed to warming temperatures in the country, which have at least in part resulted in the 2019 bushfires. Further, Extract 1 states that "Australia is the largest lithium producer in the world". As explained in (e), the production of lithium (which is used as a factor input in many products) generates negative externalities, which harms the environment.

Using the bushfires as an example, the negative impacts of coal mining do not just extend to damage to the environment, where effects include air pollution and depletion of natural resources, both of which are counterproductive to achieving sustainable growth. The bushfires that resulted from excessive coal production had also led to a fall in tourism – this led to a fall in export revenue received by Australia as tourists are less willing to travel there due to the potential negative health effects. "Already-fragile consumer confidence will (also) take an added hit", which means that households might, in view that the economy would be adversely affected by the bushfires, decide to increase precautionary savings and hence consume less, so consumption expenditure falls. The fall in C and X would lead to a fall in AD, and via the reverse multiplier process lead to a fall in real GDP and hence negative actual growth.

In addition, the lower crop yields and reduced worker productivity could also lead to inflation, as the unit cost of production (uCOP) would increase, and AS would fall. Producers would pass on the higher uCOP in the form of higher prices, so the GPL would increase, resulting in cost-push inflation. Real GDP would also fall via the wealth, interest rate and international substitution effects, hampering economic growth.

### Evaluative Conclusion

[Stand] In all, it seems that the Australian government is not effectively transitioning towards a sustainable economy, as it is largely not on the path to achieving sustainable growth.

[Substantiation] While there have been efforts in some Australian states to strengthen their capabilities in clean technologies, most of the Australian economy is still **highly dependent on coal** – and now lithium too – as drivers for economic growth. As such, the net effect of the governments' key industries on the environment is likely still to be very negative. While economic growth can be generated and even sustained from these key industries, the growth is unlikely to be sustainable.

In the long run, in order for the Australian government to more decisively transition towards a sustainable economy, it would not only need to increase government spending on clean infrastructure across a larger number of states (or even in a nationwide push), but it would also need to reduce its reliance on coal especially for export revenue and hence economic growth, to reduce its negative impact on the environment.

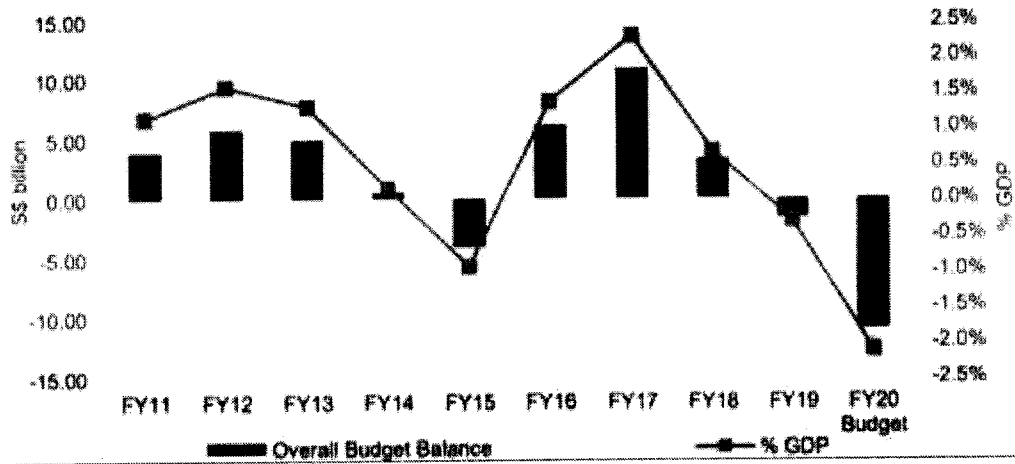
### Mark Scheme

Level	Descriptor	Marks
L3	Well-developed answer that uses the case material to clearly explain how the Australian government, through its key industries, is <b>both</b> achieving and hampering sustainable growth.	6 – 9
L2	Undeveloped or underdeveloped answer that explains how the Australian government, through its key industries, is <b>both</b> achieving and hampering sustainable growth.  OR  One-sided well-developed answer that only considers either how the Australian government, through its key industries, is achieving <b>or</b> hampering sustainable growth.	3 – 5
L1	Answer shows some knowledge about sustainable growth and describes how the Australian government is or is not pursuing sustainable growth, without economic analysis. Answer contains major theoretical errors.	1 – 2

**Up to 3 marks** can be awarded for a valid evaluative conclusion that makes a judgement on whether the Australian government is or is not successful in attaining sustainable growth, using appropriate angles of evaluation.

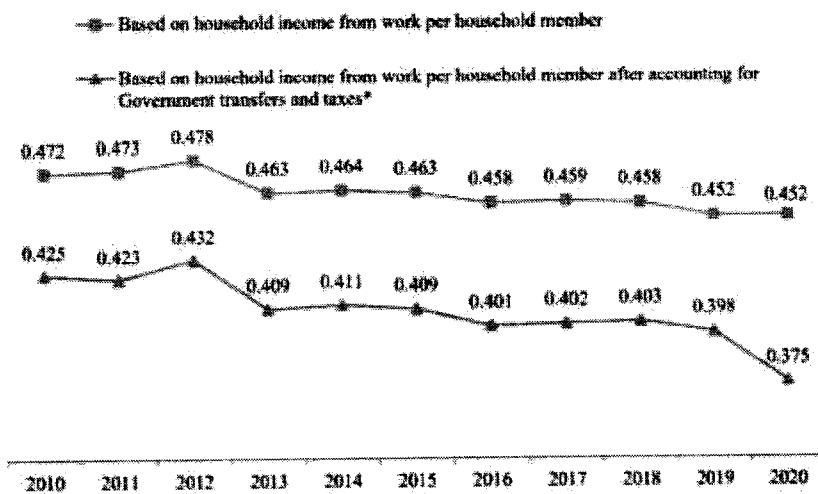
**Question 2: Living in a COVID world**

**Figure 2: Singapore Budget Balance (2011-2020)**



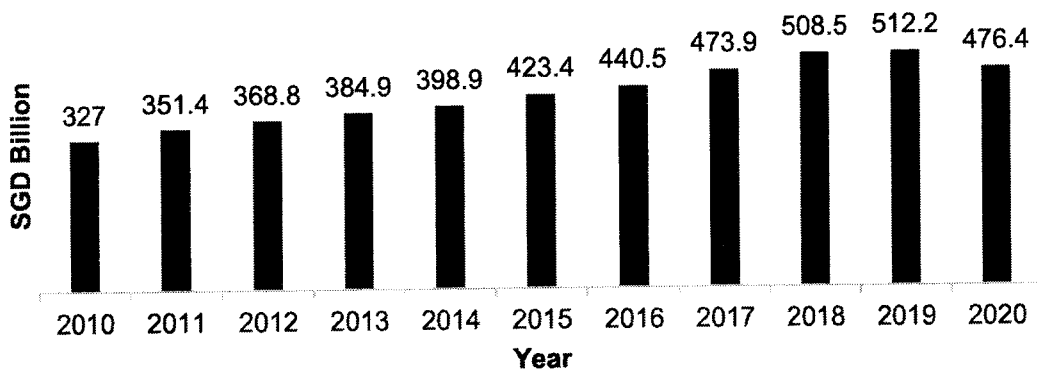
Source: UOB, accessed 15 August 2022

**Figure 3: Singapore's Gini coefficient (2010-2020)**



Source: Department of Statistics, Singapore, 2020

**Figure 4: Singapore's GDP (SGD billion) at current market prices (2010-2020)**



Source: Singstat.gov.sg, accessed 29 August 2022

**Extract 6: Performance of the Singapore Economy in 2020**

The COVID-19 pandemic caused massive global economic disruptions in 2020. Singapore was not spared as the economy recorded its worst full-year recession since independence.

During the year, the economy had to grapple with both demand- and supply-side shocks, such as a fall in external demand for goods and services produced in Singapore caused by the economic slowdown in major economies and global travel restrictions, supply chain disruptions, as well as the implementation of the circuit breaker measures domestically from April to June 2020.

*Source: Ministry of Trade and Industry, 15 February 2021*

**Extract 7: Singapore cannot afford to close its borders completely to foreign workers**

During the pandemic, Singapore lost many foreign workers who chose to return to their home countries or were retrenched. This is further compounded by travel restrictions that have slowed down the inflow of foreign workers needed to replace those who left. Without access to sufficient manpower, there will be serious impact on businesses, on our economy and on Singaporeans' livelihoods. For example, without access to inflow of foreign workers, delays in construction projects will be aggravated. This prevents new investments in Singapore from being actualised, be it new manufacturing plants, new R&D or innovation centres, or new offices. This will in turn mean that Singaporeans are unable to take up the new jobs that the new investments will bring. Insufficient manpower will also affect investors' confidence in Singapore and Singapore's competitiveness and attractiveness as a business destination. Should investors decide to exit Singapore as a result, this will mean job losses for Singaporeans.

*Source: Singapore Business Federation, 10 May 2021*

**Extract 8: More than \$28.1 billion disbursed under Jobs Support Scheme since February 2020**

Over 19,500 employers will receive the final payouts from the Jobs Support Scheme (JSS) totalling over \$145 million from 31 March 2022. These payouts are meant to support the wages of over 289,500 local employees. These employers are in sectors like food services, which were affected by safe management measures instituted in the second half of 2021. The JSS has provided wage support for employers and helped them retain local employees during the pandemic. The scheme is estimated to have saved 165,000 local jobs from March to December 2020 and helped support local wages.

*Source: Ministry of Finance, 29 March 2022*

**Extract 9: Cleaner air in Singapore with reduced activities, but it is unlikely to last**

Mirroring a trend of better air quality seen around the world, the 24-hour Pollutant Standards Index (PSI) in Singapore, which is a broad indicator of air quality, has been largely trending downwards since the circuit breaker brought economic activity to a near-halt. The circuit breaker, a term used by the Government in taking action to restrict the movement of people and business activities and to stem the spread of the deadly coronavirus, began on April 7.

A spokesperson from the National Environmental Agency told TODAY on Wednesday that the air quality in the two weeks before the circuit breaker – March 24 to April 6 – was already better than the same period last year. Another factor was the "slowing down of industrial activities in tandem

with the global economic situation", the spokesperson said. Air travel, too, had been significantly curtailed, with various borders closed around the world.

*Source: TODAY Online, 16 May 2020*

#### **Extract 10: Federal Budget will bring forward tax cuts as part of coronavirus response**

Millions of Australians will have more money in their pockets within weeks, as the Federal Government plans to bring forward tax cuts. The Government hopes the cuts will take effect by month's end, increasing take-home pay by up to \$12 billion in 2020-21. Treasurer Josh Frydenberg has previously outlined why the Government believed bringing forward tax cuts would be a good idea. "We are looking at that issue and the timing of those tax cuts because we do want to boost aggregate demand in 2020-21.

One of Australia's key welfare groups has outlined its opposition to the tax cuts and has argued for other measures to be considered instead. The Australian Council of Social Service's chief executive, Cassandra Goldie, said further welfare support was needed, which would instead help the economy. "To grow more jobs – a key part of that is consumer expenditure and every economist is very clear that the dollars provided to people on the lowest incomes is the best expenditure the Government can do when it comes to putting additional dollars into the hands of people who will spend it," she said.

*Source: ABC News, 5 October 2020*

#### **Extract 11: MAS eases monetary policy as economy reels from impact of COVID-19**

Singapore's central bank eased monetary policy as expected on Monday (Mar 30), as the economy reels from the impact of a novel coronavirus pandemic. In its half-yearly monetary policy statement, the Monetary Authority of Singapore (MAS) said with the deterioration in macroeconomic conditions and expectations of a weaker outlook, the Singapore dollar nominal effective exchange rate (S\$NEER) policy band has "depreciated to a level slightly below the mid-point of the policy band".

Mr. Alex Holmes from research firm Capital Economics described the central bank's latest decision as a "complement" to fiscal policy, which will remain the key form of support for the economy. He added that there could be a limit in terms of what more the MAS could do further down the road. "The question now is whether the MAS will loosen policy further in the coming months. With global growth collapsing, a much weaker currency probably wouldn't make much difference to export prospects," Mr. Holmes wrote in a note.

Several other economists have also said they expect the central bank's monetary policy to remain on hold throughout 2020. A note from Fitch Solutions Country Risk and Industry Research explained that this is because further easing will risk amplifying any spikes in import prices of essentials including food and medical supplies, as well as sparking off another sell-off in the Singapore dollar.

*Source: Channel News Asia, 30 March 2020*



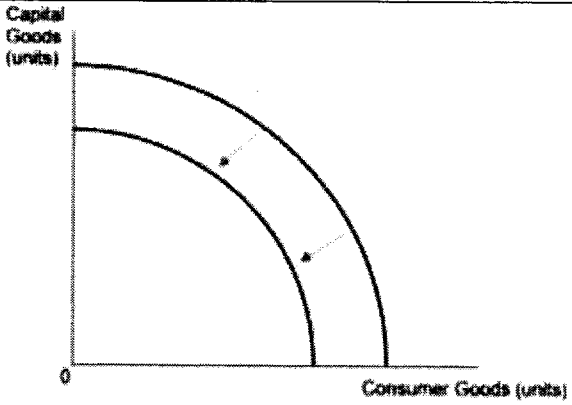
**Questions**

- (a) (i) Describe the trend in Singapore's overall budget balance from 2017 to 2020. [2]
- (ii) With reference to Figures 3 and 4, explain what could have accounted for Singapore's budget position in 2020. [5]
- (b) Explain **two** reasons why the data in Figure 4 is insufficient to conclude that material living standards in Singapore improved from 2010 to 2019. [4]
- (c) Using AD-AS analysis, explain how the general price level in Singapore might be affected by the demand and supply shocks mentioned in Extract 6. [5]
- (d) Using a production possibility curve diagram, explain the impact of a border closure (Extract 7) on Singapore's economic growth. [2]
- (e) Discuss the extent to which the implementation of a 'circuit breaker' would lead to a fall in the standard of living of residents in Singapore. [8]
- (f) Assess the relative effectiveness of income tax cuts and an increase in transfer payments such as welfare supports in helping an economy recover from the crisis. [7]
- (g) Discuss the factors that the MAS would have to consider when deciding whether to further ease monetary policy in Singapore. [12]

[Total: 45]

## CSQ2 Suggested Answers and Mark Schemes

(a)	(i)	<b>Describe the trend in Singapore's overall budget balance from 2017 to 2020.</b>	[2]
		The overall budget balance was worsening from 2017-2020. [1] It worsened from a budget surplus to a budget deficit. [1]	
	(ii)	<b>With reference to Figures 3 and 4, explain what could have accounted for Singapore's budget position in 2020.</b>	[5]
		<p>In 2020, Singapore had a budget deficit which indicated that the government spending was more than the tax revenue received from various sources. [1]</p> <p>This could have been caused by the increased in government spending on transfers that caused the fall in Gini coefficient after accounting for government transfers and taxes, as seen in Figure 3. [2]</p> <p>Another reason that could have accounted for the budget deficit in 2020 could have been due to the fall in the GDP and as such tax revenue collected in 2020. A fall in GDP would indicate a fall in total national income and if population size stays constant, there would be a drop in average income for households which would lead to fall in income taxes paid and collected. Furthermore, the fall in GDP could also indicate a fall in profits for firms and thus less corporate taxes were collected as well. [2]</p>	
(b)		<b>Explain two reasons why the data in Figure 4 is insufficient to conclude that material living standards in Singapore improved from 2010 to 2019.</b>	[4]
		<p>Material living standards are measured using <b>real GDP per capita</b> in the country. Although the Gross Domestic Product (GDP), which measures the total national income earned in the country and thus the amount of goods and services that can be consumed, had risen in Singapore from 2010 to 2019, it is still insufficient to conclude that the living standards have risen for all. This is because:</p> <ol style="list-style-type: none"> <li>1. The GDP at current market prices does not take into account <b>changes in the general price level (GPL)</b> over the years. If the increase in GPL was larger than the increase in GDP at current market prices, this could mean a <b>fall in the real GDP</b> and a fall in the total amount of goods and services that could be consumed, leading to a worsening of material living standards in Singapore. [2]</li> <li>2. In addition, the data does not provide the <b>change in population size</b> over the years. If population size increased faster than the GDP at current market prices, this would mean that the <b>GDP per capita</b> would have fallen and on average, less can be consumed leading to a fall in material living standards. [2]</li> </ol>	

(c)	<b>Using AD-AS analysis, explain how the general price level in Singapore might be affected by the demand and supply shocks mentioned in Extract 6.</b>	[5]
	<p><u>Explain demand shock</u> One demand shock that Singapore had to deal with is the fall in external demand for goods and services produced in Singapore. Due to the economic slowdown in major economies leading to precautionary savings due to poor expectations of the economy, as well as global travel restrictions, foreign households become less willing and able to consume Singapore's goods and services respectively, leading to a fall in export revenue and aggregate demand (AD) of the country. [1]</p> <p>This decrease in AD will lead to a rise in inventories and firms will respond by lowering output. When output is reduced, the resulting rise in unemployment means that firms are better able to get the resources that they need, resulting in more efficient factor combinations and falling unit cost of production. As such, firms are willing to sell the lower output at lower prices leading to a fall in the general price level. [1]</p> <p><u>Explain supply shock</u> A supply shock that affected Singapore could be the supply chain disruptions in the world that lead to higher prices of imported factor inputs as transportation costs increased. [1]</p> <p>The rise in price of imported factor inputs will lead to a rise in unit cost of production for Singapore firms and profit motivated firms will continue producing the same output level only if they receive higher prices. This will result in a fall in the AS and a rise in the general price level as the increase in UCOP is passed on to consumers in the form of higher prices. [1]</p> <p><u>Any justifiable reason for either an overall fall or rise in GPL [1]</u> It is likely that the overall general price level will fall as the massive global recession will have significant direct and indirect impacts on the AD of Singapore. In addition, the rise in price of imported inputs due to supply chain disruptions would likely be minimal as it would be offset by lower demand for such inputs around the world.</p>	
(d)	<b>Using a production possibility curve diagram, explain the impact of a border closure (Extract 7) on Singapore's economic growth.</b>	[2]
	 <p>[1] for correctly drawn and labelled diagram</p> <p>The border closure means that Singapore will be unable to replace the foreign workers who left, and this will lead to a fall in the quantity of labour available resulting</p>	

	a fall in productivity capacity. This is represented by an inward shift of the PPC as there is a drop in potential economic growth [1]	
(e)	<b>Discuss the extent to which the implementation of a 'circuit breaker' would lead to a fall in the standard of living of residents in Singapore.</b>	[8]
	<p><b>Introduction</b></p> <p>A 'circuit breaker' was implemented to 'restrict the movement of people and business activities and to stem the spread of the deadly coronavirus' (Extract 9). This has an impact on the standard of living (SOL) of residents in Singapore, affecting both the material and non-material aspects of SOL.</p> <p><b>Thesis – Implementation of circuit breaker led to a fall in material SOL</b></p> <p>A circuit breaker leads to a fall in AD due to the restrictions implemented. With a circuit breaker, households are only allowed to go out for essential activities, and this decreases their level of consumption. With a fall in consumption expenditure, this will lead to a fall in AD. Firms will experience an unplanned rise inventory levels and they will reduce production to restore their inventories to the planned levels. This leads to a fall in the amount of factors of production hired, and households receive less income, which results in a fall in induced consumption. Through the multiplier process, this leads to a multiplied fall in real GDP. Assuming population size remains constant or does not fall by a larger extent than the fall in real GDP, real GDP per capita falls.</p> <p>As households earn less income, their purchasing power falls and thus, there is fall in their material SOL.</p> <p><b>Thesis – Implementation of circuit breaker led to a fall in non-material SOL</b></p> <p>A circuit breaker leads to a fall in non-material SOL as households are unable to head out to pursue leisure activities.</p> <p>With the restrictions, households are not able to pursue leisure activities such as watching movies or going out with friends. This could result in a fall in the non-material SOL due to the potential increase in stress levels from being cooped up at home. Although they have more free time now, they are not able to make use of this free time to engage in activities that will help them relax.</p> <p>Hence, non-material SOL may have also worsened.</p> <p><b>Anti-thesis – Implementation of circuit breaker led to a rise in non-material SOL</b></p> <p>A circuit breaker leads to better air quality and hence an improvement in the state of the environment.</p> <p>With the 'slowing down of industrial activities' and 'air travel significantly curtailed' (Extract 9), it has resulted in less pollution being emitted. This results in better air quality as the air now is fresher and cleaner.</p> <p>Being able to breathe in cleaner air and enjoy a cleaner environment means that non-material SOL has improved.</p> <p><b>Conclusion</b></p> <p>[Stand] SOL of residents living in Singapore would likely have gone down due to the circuit breaker measures.</p>	

[Substantiation] The reduction of economic activities due to the circuit breaker would have worsened the negative economic growth that Singapore was experiencing due to COVID-19. Given that having an income would be the priority that households would have due to the economic climate, any improvements in non-material SOL due to cleaner air would not have outweighed the loss in income and loss of leisure activities that most residents would have experienced.

#### Mark Scheme

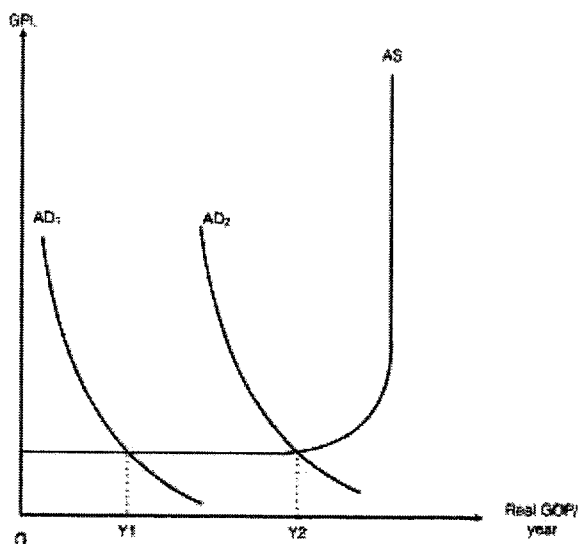
Level	Descriptor	Marks
L2	A well-developed answer that examines impact on both MSOL <b>and</b> NMSOL.	4 – 6
L1	A well-developed one-sided answer that only examines the impact on MSOL <b>or</b> NMSOL.  OR  An underdeveloped two-sided answer on both MSOL <b>and</b> NMSOL.	1 – 3

**Up to 2 marks** can be awarded for evaluative comments on the overall impact on the SOL of residents in Singapore.

(f) **Assess the relative effectiveness of income tax cuts and an increase in transfer payments such as welfare supports in helping an economy recover from the crisis.**

[7]

**Explain how an income tax cut and increase in transfer payment increases real GDP [4]**



With income tax cuts and increase in transfer payments, it increases the disposable income and hence purchasing power of households. [1] This leads to a rise in consumption expenditure, thus leading to a rise in AD. [1] With a rise in AD, firms would experience an unplanned fall in their inventories. They would then increase production by hiring more factors of production, including labour. [1] This increase in

	<p>production would result in a multiplied rise in real GDP from Y1 to Y2. With a rise in real GDP back to Y2 now, the economy has recovered from the crisis. [1]</p> <p><b>Assess relative effectiveness of income tax cuts and increase in transfer payments [3]</b></p> <p>The extent of rise in GDP depends on the extent of increase in consumption that can be brought about by the two measures. Since income tax cuts apply to everyone in the economy while an increase in transfer payments only apply to lower income groups, there will be a difference in the effectiveness of the policies. Given that 'the dollars provided to people on the lowest incomes is the best expenditure the Government can do', it will result in a greater increase in real GDP as the lower income households are less likely to have already fulfilled their basic needs (e.g. food, rent, utilities) with their current lower income levels. As such, transfer payments to lower-income households would likely result in a more significant rise in consumption expenditure and hence AD and real GDP. Transfer payments will therefore likely be more effective in helping the economy recover from the crisis, as it helps lower income households to become more able to consume goods and services.</p>	
(g)	<p><b>Discuss the factors that the MAS would have to consider when deciding whether to further ease monetary policy in Singapore.</b></p>	[12]
	<p><b>Introduction</b></p> <p>MAS would want to ease monetary policy in Singapore in order to tackle the macroeconomic problems brought about by COVID-19. The economy has seen a fall in real GDP. Easing of monetary policy would involve depreciation of the Singapore Dollar (SGD) against foreign currencies.</p> <p><b>Briefly explain how a depreciation of the SGD against foreign currencies would result in a rise in real GDP</b></p> <p>When there is a depreciation of the SGD against foreign currencies, exports would become cheaper in terms of foreign currencies. This rise in demand for exports would lead to a rise in SG's export revenue as foreign households switch to buying Singapore's goods and services. At the same time, quantity demanded for imports would decrease as imports become more expensive in terms of SGD, and SG households switch away from imported goods and services to domestically produced ones instead. Assuming that the demand for imports is price elastic, there would be a more than proportionate fall in quantity demanded of imports, leading to a fall in import expenditure. This rise in X and fall in M would result in a rise in AD, and there would be a multiplied increase in real GDP via the multiplier process.</p> <p><b>Factor 1 – Global economic outlook</b></p> <p>One factor that the MAS has to consider when deciding whether to further ease monetary policy is the global economic outlook.</p> <p>The extent of rise in AD, and thus real GDP depends on the extent of rise in (X-M). Given the "deterioration in macroeconomic conditions" and "global growth collapsing" (Extract 9), there would likely be a negative outlook on the economy globally. This would result in households in SG's trade partners having a negative outlook. They would expect their future income to fall (or not rise as fast), and thus purchasing power to fall (or to rise by a smaller extent). This would result in a fall in consumption (or smaller rise in consumption) as they prefer to increase their precautionary savings,</p>	

which means that the extent of increase in real GDP might not be so significant as well. In this case, further easing monetary policy might not be very effective.

### **Factor 2 – Unintended impact on cost-push inflation**

Another factor that the MAS has to consider would be whether the further easing of monetary policy would result in unintended consequences such as imported inflation. As explained above, a depreciation of the SGD would result in imports becoming more expensive. Singapore is a country with no natural resources, which means that Singapore imports a lot of her factor inputs. With a depreciation of the SGD, it would lead to a rise in the price of factor inputs as firms have to pay more in SGD for the factor inputs. This results in a rise in the unit cost of production for firms, which leads to a fall in AS and is represented by an upward shift of the horizontal portion of the AS curve. As consumers pass on the higher costs to consumers in the form of higher prices, this would result in a rise in GPL. Real GDP would also fall via the wealth, interest rate and international substitution effects. Consumers would also have to pay more for imported goods and services, and this could affect their SOL as “further easing will risk amplifying any spikes in import prices of essentials”. With a rise in the prices of essential goods, it would lead to a fall in the ability of consumers in purchasing these essential, which leads to a fall in material SOL.

Thus, if further easing monetary policy were to create these unintended negative consequences, the SG government might have to think twice about doing so.

### **Factor 3 – Proportion of AD that (X-M) takes up**

One other factor that the MAS would have to consider is how effective further easing monetary policy is likely to be, in terms of the extent of the rise in AD that would result. The extent of rise in AD, and thus the extent of rise in real GDP depends on the proportion of AD that (X-M) takes up. Singapore has a small domestic market, and thus depends largely on the global market for growth. Hence, (X-M) takes up a significant proportion of AD and this depreciation of the SGD against foreign currencies would lead to a significant rise in AD, and thus real GDP.

As such, further easing monetary policy by allowing the SGD to depreciate would likely be effective in achieving actual growth, at least in theory.

[Ev] However, this would be dependent on the global economic outlook (Factor 1). If foreign households do not end up buying SG's exports even though they have become relatively cheaper, the increase in (X-M) and hence AD and real GDP might not be significant.

### **Conclusion**

[Stand] The most important factor that MAS has to consider when deciding whether to ‘further ease monetary policy’ would be the global economic outlook.

[Substantiation] Given how dependent SG is on trade, the effectiveness of the policy largely depends on how optimistic the foreign consumers are about the outlook of the economy. If they are not optimistic, the extent of the rise in AD will not be significant, no matter how much the SGD is weakened and even if the SG economy is highly dependent on trade for growth. If the global outlook is negative, then perhaps easing of monetary policy alone may not be the best move forward.

The government can consider perhaps adopting a mixture of policies to bring about greater recovery for the economy. For instance, the government could adopt expansionary fiscal policy via an increase in government expenditure for a direct

increase in AD and hence real GDP. In addition, while allowing the SGD to depreciate, the SG government could also implement supply-side policies such as wage subsidies and the subsidisation of skills upgrading to mitigate any cost-push inflation that unintentionally results from easing of monetary policy.

**Mark Scheme**

Level	Descriptor	Mark
L3	Well-developed explanation of factors that MAS should consider when deciding <i>whether</i> to further ease monetary policy in Singapore.	6 – 9
L2	Underdeveloped explanation of factors that MAS should consider or well-developed explanation of ONE factor that MAS should consider.	3 – 5
L1	Mere listing of factors.	1 – 2

**Up to 3 marks** can be awarded for evaluative comments that examine which factor would be the most important one that MAS has to consider.