1	The sales volume of electric cars increases despite the rise in material cost. High petrol prices also encouraged drivers to switch away from petrol cars to electric cars. Governments are considering providing subsidies to encourage adoption of electric cars.	
	(a)	Explain why sales volume of electric cars increases despite the rise in material cost. [10]
	(b)	Discuss whether providing subsidies is the best way to further increase sales volume of electric cars. [15]

Suggested Answers for 2022 H2 Prelim Exam – Essay Q1

Question Analysis (3'Cs' Approach):

Command	**Explain** Making clear of causal links, supported by economic analysis. Economic analysis: Demand and supply framework
Content	**Rise in material cost how does it affect the market of electric cars?** **Demand and Supply factors to explain why sales volume of electric cars increase (Qty)** What are demand and supply factors? What are the relevant elasticity factors? What framework and tools of economic analysis to use?
Context	No specific context

Question Approach:

This question tests on the demand and supply factors to explain why sales volume of electric cars increase despite rising material cost. Besides demand and supply factors, there can be application of elasticity concepts such as PES and XED.

Suggested Answer:

Introduction (Explain impact of rising material cost on Qty):

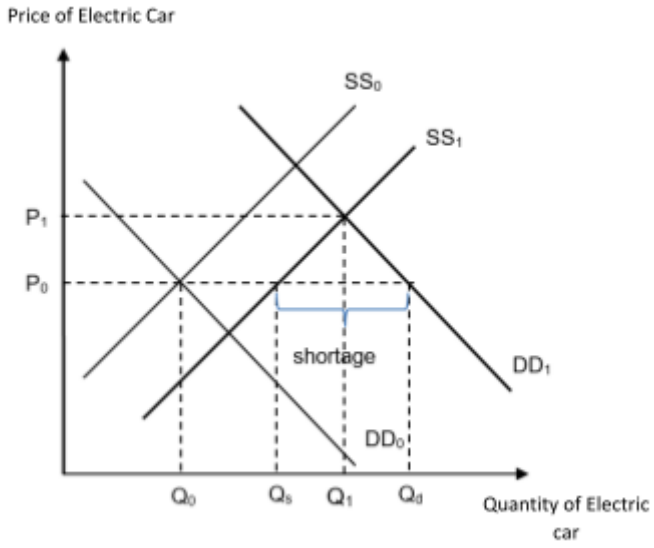
- Sales volume of electric cars is also known as equilibrium quantity. It is determined by market forces such as demand and supply factors.
- A rise in material cost such as car body parts can lead to a higher COP of electric cars, profitability falls, producers less willing and able to produce at every price level, hence supply falls and quantity (sales volume) of electric cars will decrease, ceteris paribus.
- However, there are other demand and supply factors changes that will lead to increase in quantity of electric car (sales volume of electric cars).

Body Paragraph 1: Increase in demand

- As mentioned in the preamble, factors like high prices of petrol and more awareness that electric cars generally emit lesser pollution during its usage compared to petrol cars lead to a change in taste and preferences towards electric cars. Since petrol cars required the use of petrol to keep these cars moving, with the rise in petrol prices, it will lead to an increase overall cost to own a petrol car and also more pollutive when driven around, car owners might prefer switching over to electric cars that are more environmentally friendly and not subjected to immediate changes in petrol prices. Demand for electric car is likely to increase. The demand curve shifts rightwards from D1 to D1, Qty increases.

Body Paragraph 2: Increase in supply

- Overall supply of electric cars is likely to increase despite rising cop.
- Due to improvement in technology such as better lithium-ion batteries and more energy efficient car batteries with breakthrough in research and development for electric cars producers find it profitable producers are more willing and able to supply at all price levels supply for electric car is likely to increase. The supply curve shifts rightwards from S0 to S1, Qty increases.
- Furthermore, there could be an increase in number of sellers and expansion of the electric car market besides Tesla, Hyundai, more petrol car companies such as Ford, Volkswagen and Nio are also expanding into the electric car market, hence increasing the number of sellers now with more producers are willing and able to supply at all price levels supply for electric car is likely to increase. The supply curve shifts rightwards from S0 to S1, Qty increases.



Body Paragraph 3: Simultaneous DD SS shift

- Considering that there is an increase in demand and other factors that will increase and decrease supply simultaneously, Qty is indeterminate and the outcome of qty is dependent on direction and relative extent of shift.
- Supply is likely to overall still increase as rising material cost such as more costly car body parts does not contribute largely to the overall cost of production of an electric car. The largest component of cost of production lies on the lithium-ion batteries where its cost has drastically decreases which also encourage more car companies that solely sell petrol cars to also venture into electric car market. Overall, leading to supply of electric car increases.

- Demand increases and supply increases, overall equilibrium quantity of electric car will increase despite rising cost of materials.

As seen from the diagram above, the increase in demand and an increase in supply leads to a reinforced increase in quantity of electric car.

Body Paragraph 3: Cross elasticity of demand and price elasticity of supply

- While the demand increase and supply increase could contribute to rise in sales volume of electric cars due to the reinforced effect, XED and PES concepts could be used to explain why quantity increase despite rising material cost.
- The **cross elasticity demand for electric car with petrol car is positive and likely to be XED>1, which shows that they are relatively close substitutes** as both petrol cars and electric cars are able to satisfy the same wants of the consumers by being comfortable form of transportation to consumers destinations without any much differences. Hence when prices of petrol cars increase, it will lead to more consumers are switching over to electric cars, it will lead to a more than proportionate increase in demand for electric cars, leading to rightward shift of demand and thus sales volume of electric cars will increase more than proportionately.
- The **supply of electric car is also relatively price elastic** due to the development of technology and streamline of the production process that speeds up the production time for electric cars as it take lesser time to produce. Thus with any increase in price of electric car due to a fall in supply (such as rising material costs), it will lead to a more than proportionate increase in quantity supplied as car producers are able to respond quickly to the changes in prices.
- Therefore, with demand for electric cars is close substitute for petrol cars and supply being price elastic, it can also lead to an increase in sales volume of electric car.

Conclusion

In conclusion, a rise in demand, coupled with an overall increase in supply despite rising material cost are the main reasons behind the increase sales volume of electric cars. In addition, electric car being a close substitute to petrol cars where its XED is>1 and its supply being relatively price elastic will allow producers respond quickly to any increase in prices of electric car sale volume to increases.

Mark scheme

Knowledge, Understanding, Application and Analysis		
L3	For a well-developed answer that thoroughly explains how rising material cost affect supply and other possible demand and supply factors to explain for sales volume of electric cars increasing. Answer demonstrates excellent knowledge and understanding of demand and supply analysis, including simultaneous shift and concepts on elasticity.	8 - 10
L2	For an under-developed answer that explains how explains how rising material cost affect supply and other possible demand and supply factors to explain for sales volume of electric cars increasing. Answers may not have included including simultaneous shift and concepts on elasticity.	5 - 7
L1	For a largely irrelevant or smattering answer that demonstrates little/some knowledge & understanding of how rising material cost affect electric car market and limited use of relevant demand and supply factors to explain increasing sales volume of electric cars. Answer may contain conceptual errors.	1 - 4

Marker's Comments

Discuss whether providing subsidies is the best way to further increase sales volume of electric cars. [15]

Question Analysis (3'Cs' Approach):

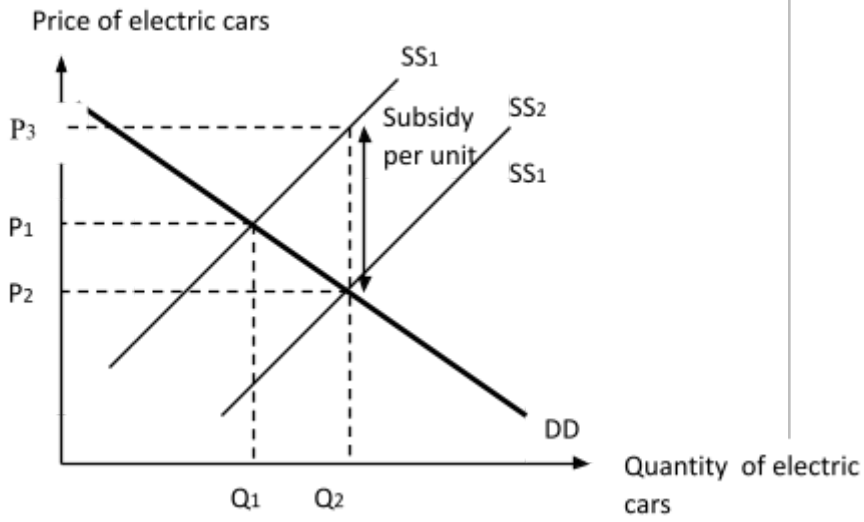
Command	**'Discuss' (whether)** 2 sided arguments + Stand. Support answers with economic analysis
Content	**Consider 2-3 ways that can further increase sales volume of electric cars including subsidies.** Explain how subsidies works to increase qty of electric cars. Consider the limitations/disadvantages. Explain how other ways work to increase qty of electric cars and consider their limitations/disadvantages. What are the criteria to determine which is the best way to further increase sales volume of electric cars?
Context	**Electric cars**

Question Approach:

This question tests on subsidies works to increase sales volume of electric cars and compare it with other ways that government could use to increase adoption of electric cars by consumers. Students have to decide on the criteria to determine which is the best way to further increase sales of electric cars.

Suggested Answer

Introduction	Petrol prices kept rising and governments trying to encourage consumers to adopt electric cars over petrol cars to push for net zero carbon and achieve sustainable growth. Given electric cars emit less pollutants when used compared to petrol cars, governments would like to see increasing number of car owners to switch to electric cars. One of the ways that governments are considering adopting was to provide subsidies to improve society's welfare. This essay seeks to discuss the ways that would further increase the sales volume of electric cars.
Body 1:	The objective of subsidy is to encourage overall consumption of electric car hence further increasing sales volume. A production subsidy is a payment made by the government to producers to encourage the production of electric cars, but it is not made in exchange for any goods or services. Government can consider subsidizing the production of lithium-ion batteries in electric cars. When the government gives a subsidy to the producer, it will decrease the marginal cost of production. Since the supply curve is affected by the marginal cost of production, the supply will increase, shifting the supply curve rightwards from SS1 to SS2 as shown in Figure below. Due to the subsidy given, consumers benefit from the lower prices (i.e. they used to pay P1 but now pay

	P2) and producers now can sell at higher quantity of Q2 instead of Q1, thus further increasing sales volume of electric cars. **Figure 2: Impact of subsidy on a market**  For the subsidy to be effective in increasing the sales volume, the price elasticity of demand for electric cars has to be relatively price elastic. Thus, when price of electric car falls, quantity demand will increase more than proportionately leading to a significant increase in sales volume. However, when electric cars demand is price inelastic, the amount of government subsidy given has to be significantly large to have a substantial increase in sales volume.
Body 2: (change in T& P)	Another way to increase sales volume of electric cars would be public campaigns and education to raise awareness of climate change and target car owners and educate them on the pollution level of petrol car vs electric car. These might change the taste and preferences of car owners, encouraging car owners to switch to electric cars from petrol cars. Leading to an increase in demand for cars, rightward shift of demand, under ceteris paribus condition, it will lead to further increase in sales volume of electric cars. Limitation: Education and campaigns are limited in its outreach as car owners might not be persuaded by just the bigger picture of climate change and being sustainable or greener as proportion of income spent on car could be large amount for some consumers, hence it might not be a large contributing factor to their choice of cars as electric cars are generally still more expensive compared to petrol cars. Mindset about consuming responsibly will take time to take effect. Government can also consider increasing the amount of charging points and improve the infrastructure to charge electric cars such as allocating more parking spaces for electric cars or lanes dedicated to electric car, EV-ready HDB towns. These might change the taste and preferences of car owners,

	encouraging car owners to switch to electric cars from petrol cars. Leading to an increase in demand for cars, rightward shift of demand, under ceteris paribus condition, it will lead to further increase in sales volume of electric cars. Limitation: Development of charging infrastructure could be challenging in large countries with rural areas. Drivers who need to use electric cars for long distance travel, hence it might not enable consumers to switch easily to electric cars. Overall: Such initiatives will incur opportunity cost and divert funds away from more pressing issues may have an undesirable impact on the society welfare as a whole as electric car adoption might not be the priority of the government though it can improve standard of living due to less pollutive environment.
Body 3: (Encourage investments) Regulation: (Indirect way: Regulation: stricter emission targets for car producers)	Government can also encourage investments into green technology as they achieve a sustainable economic environment with net zero carbon emission to deal with climate change. Encouraging more car maker companies to also step up their research and development into creating more models of energy efficient electric cars thus increasing supply. China imposed regulations which mandated car manufacturers to require them a certain percent of all vehicles sold by a manufacturer each year must be battery powered instead of petrol. To avoid financial penalties, every year manufacturers must earn a stipulated number of points, which are awarded for each EV produced based on a complex formula that takes into account range, energy efficiency, performance, and more. The requirements get tougher over time, with a goal of having EVs make up 40 percent of all car sales by 2030. Hence producers will need to step up production into the developing more electric vehicles, thus supply increase. Government can use regulations such as tightening pollutant thresholds to clearly distinguish the petrol cars and cleaner alternative cars such as electric cars that are more energy efficient and less pollutive to be on the roads. This would encourage car makers to invest and step up their production of such electric cars instead of just focus on improving petrol car models. It would increase supply of electric cars and differentiating into different models such as standard or sports version. Government regulations might be easier to implement and more cost efficient compared to subsidies. However, it also takes time for car makers improve on the efficiency of electric cars creating real differences.
Conclusion	However, which is the best way depends on the available government budget allocated towards such green and sustainable outcome. With limited amount of government budget, education and regulation that does not require large cost incurred in monitoring is better than providing subsidies to increase adoption of electric cars thereby increasing the sales volume of electric cars.

	Furthermore, subsidies might not be translated into cheaper prices of cars where demand is relatively price inelastic for example in Singapore. As the proportion of income spent on cars is relatively large, hence, to significantly increase the adoption of electric cars in Singapore, it might not be made successful with just provision of producer subsidy, it has to be complemented with better infrastructure to support electric cars to increase the sales volume of electric cars. The best way is to use range of ways that complement each other where the market seeks to increase sale volume of electric cars via an increase demand and supply of electric cars.

Mark Scheme

Knowledge, Understanding, Application and Analysis		
L3	For a well-developed answer that shows thorough knowledge of ways to increase sales volume of electric cars anchored on economic analysis and its limitations. Consider ways that affect both demand and supply. There is good application to the electric car context.	8 - 10
L2	For an under-developed answer explains ways to increase sales volume of electric cars anchored on economic analysis and its limitations. One-sided answer: Consider way that affect either demand or supply.	5 - 7
L1	For an answer that shows some knowledge of the ways to increase sales volume of electric cars.	1 - 4
Evaluation		
E3	For an answer that arrives at an analytically well-reasoned judgement.	4-5
E2	For an answer that makes some attempt at evaluation, but does not explain adequately their judgement.	2-3
E1	For an answer that gives an unexplained, unsupported evaluative statement.	1

Markers' Comments: