Question 1: Fuel subsidies and vehicle emissions

(a) With reference to Figure 1, compare the trend in carbon dioxide emissions [2] for the European Union (EU) and China between 1990 to 2010.

Carbon dioxide emissions for EU was generally falling while that for China was generally increasing. (1)

The extent (or rate) of fall for EU was small (or gradual) but the extent (or rate) of increase for China was great (or exponential). (1)

- No marks for comparisons of LEVELS of carbon dioxide emissions.
- No marks if there were no comparisons.
- (b) Explain what is meant by 'true costs' (mentioned in Extract 1).

True costs refer to direct financial costs, spillover cost (negative externalities) and opportunity cost (next best alterative foregone).

[2]

1m for relating true cost to direct financial cost + spillover cost or opportunity cost. 1m for explaining/elaborating the spillover cost or opportunity cost.

(c) With reference to Extracts 1 and 2, discuss the impact of fossil fuel [8] subsidies on the economic goal of inclusive and sustainable economic growth.

Impact of fossil fuel subsidies on inclusive economic growth (3m)

Fossil fuel subsidies → production cost of fossil fuel to fall → SS curve of fossil fuel to shift right (1) → surplus at original price → fall in price of fossil fuel (1) → increase affordability to fossil fuel (an essential) for low-income households/producers → improve inclusiveness of economic growth (1)

Extent of impact on inclusive economic growth (2m)

- It was mentioned in Extract 2 that low fuel prices mostly benefit the better-off than the poor as the better-off consume more fossil fuel (evidence: the poorest 20% received 7% of subsidy benefit, richest 20% received almost 43%).
- Therefore, the extent of improvement in inclusiveness of economic growth could be to a small extent.

Impact of fossil fuel subsidies on sustainable economic growth (3m)

Fossil fuel subsidies → MPC of consuming/producing fossil fuel to decrease → MPC curve shift down (1) → MPC' cuts MPB at higher Qp → worsen problem of over-consumption (1) → worsen market failure → worsen sustainable economic growth (1)

Extent of impact on sustainable economic growth (2m)

 It was mentioned in Extract 1 that fossil fuel subsidies will lead to higher environmental costs like global warming, air pollution. Figure 1 also supports this fact with ROW's and China's CO2 emissions increasing exponentially. - Therefore, the extent of worsening of sustainable economic growth is to a large extent.

Analysis on direction of impact: $3+3 = \max 5$ Analysis on extent of impact: $2+2 = \max 3$

- (d) With reference to the material and the use of a diagram, explain the market [5] failure in motor vehicles usage.
 - Motor vehicle users will equilibrate at MPC=MPB \rightarrow Qp (1)
 - Usage of motor vehicles generate negative externalities → MPC+MEC=MSC → MSC > MPC (1)
 - Social equilibrium occurs when MSC=MSB \rightarrow Qs (1)
 - Qs > Qp \rightarrow over-consumption (1)
 - Over-consumption \rightarrow welfare loss \rightarrow mkt failure (1)
 - Diagram (1)

Max 5

No need to be too strict with respect to with reference to data. It is enough if the explanation keeps to negative externalities in terms of emissions from motor vehicle.

An explanation on traffic congestion will be considered theoretical/generic (max 3 if perfect).

- (e) With reference to Extract 3, explain the likely value of the price elasticity of [3] supply for electric cars.
 - PES value is likely to be <+1. (1)
 - This is due to the lack of spare capacity or unsold stocks. (1)
 - As can be saw from the difficulties in mining essential raw materials such as lithium and cobalt, making the supply of electric cars price inelastic. (1)

Or

- PES value is likely to be <+1. (1)
- This is due to the lack of responsiveness of quantity supplied to the increase in demand. (1)
- As can be saw from the waiting time and repeatedly extended delivery dates. (1)
- (f) Discuss the effectiveness of promoting the use of electric vehicles in [10] tackling the problem of global greenhouse emissions.

Analyse how promoting the use of electric vehicles can tackle the problem of global greenhouse emissions

- Promoting the use of electric vehicles → increasing the substitutability of electric vehicles and non-electric vehicles → fall in DD for non-electric vehicles → fall in MPB of using non-electric vehicles → fall in vehicle usage, Qp closer to Qs → reduction of global greenhouse emission.
- Diagram

Analyse how promoting the use of electric vehicles may not tackle the problem of global greenhouse emissions

The relative price/cost of using electric vehicles vs non-electric vehicles.

- It can be seen from the Norway example, that even when the cost savings of using electric vehicles is 75% compared to diesel vehicles (which is attractive), the adoption rate is only about 20%.
- Therefore, unless these countries can bring down the relative cost of using electric vehicles significantly, promoting the use of electric vehicles may not tackle the problem of global greenhouse emissions. Extract 5 mentions that Singapore need to invest significantly in a network of strategically located and accessible charging stations for a wide adoption of electric vehicles.
- [Ev] The (opportunity) cost of promotion the use of electric vehicles could be substantial and therefore may not be feasible or sustained, as seen in the array of incentives in provided in Norway, e.g. no road tax, registration fee, not sales tax, no value-added tax, free public parking, exemption from tolls. Tax revenue could significantly be reduced. In the case of UK, government expenditure is bound to increase significantly as £900m is required to support the growth of its electric vehicle industry.
- The source of emission / nature of pollution
 - Whether promoting the use of electric vehicles could reduce global emissions depend on the source of electricity generation.
 - As mentioned, Poland uses high volumes of coal in generating electricity and the use of electric cars merely move pollution from cities to distant power plants.
 - The carbon emissions from electric vehicles (or really the source of electricity generation) will depend if clean energy will continue to be cheaper and there is widespread adoption.
 - The extra weight of batteries in electric cars could also mean more particle pollution instead of carbon emissions.
 - Therefore, total global emissions may not be significantly reduced.

Synthesis or valued judgement

- While promoting the use of electric vehicles can reduce the emissions from vehicles usage, a lot will still depend on the source of electricity generation. Therefore, unless there are also efforts or measures taken to adopt cleaner energy sources, it is unlikely that promoting the use of electric vehicles is able to reduce global emissions in the short-term.
- We have seen from the analysis that promoting the use of electric vehicles is also costly and may not be feasible or sustained for certain countries, especially those with budget problems.
- The supply of electric vehicle is also highly price inelastic which limits the effectiveness at least in the short-run.

Mark scheme

Levels	Descriptors	Marks
L2	For a developed explanation of how promoting use of electric vehicles can reduce global emissions <u>AND</u> at least 1 limitation.	5 - 7
L1	For a developed explanation of how promoting use of electric vehicles can reduce global emissions <u>OR</u> 1 limitation.	3 – 4
	For an under-developed explanation (could be generic) of how promoting use of electric vehicles can reduce global emissions and at least 1 limitation.	
	For an un-developed explanation (descriptive, inaccurate) of how promoting use of electric vehicles can or cannot reduce global emissions.	1 – 2
E	For an overall evaluation on the effectiveness.	
	Merely stating with NO attempt to explain	0
	With attempt to explain but inaccurate / incoherent / incomplete	1
	Attempt to explain was accurate / coherent / contextual	2 - 3

[Total: 30]