(a)	(i)	**With reference to Figure 1, describe the trend in the world price for rare earths between 2002 and 2010.**	[2]
		General trend – rise in world price for rare earths [1m]	
		Specific trend – sharp increase/ spike in world price in 2010 [1m]	
		(No mark awarded for decrease in price in 2008 since it is not a significant feature in the trend)	
	(ii)	**Explain how the trend in world price for rare earths would impact the market for hybrid cars.**	[4]
		(The answer should be based on the trend given in a(i).)	
		Rare earths are used as raw materials to produces parts of hybrid cars. The rise in the price of rare earths will increase the cost of production for producing hybrid cars. [1m]	
		The supply curve will hence shifts left. [1m] *A diagram is helpful although there is no specific mark awarded for diagram as it is not asked in the question).*	
		Assuming ceteris paribus, the equilibrium price of hybrid cars will increase [1m] and the equilibrium quantity sold will fall. [1m]	
		Given that the demand for hybrid cars is likely to be price elastic (luxury good), the price will increase more than proportionately than the fall in quantity of cars sold. [optional 1m]	
(b)	(i)	**With reference to Extract 2, explain how the existence of 'external costs' leads to market failure.**	[4]
		• *Evidence from the extract: Some of the external costs identified in extract 2 include polluted air and water and radioactive residues.* • *Explain how external costs cause a difference between MPC and MSC. [1m]* • *Explain how both market and social equilibria are reached. [2m]* • *Explain how overproduction of rare earths occurs in this case with presence of deadweight loss. [1m]*	
		The mining of rare earths resulted in negative externality where these external costs (such as polluted air and water and radioactive residues) causes harm to the environment and people who are not involved in the production of rare earths. As such, the marginal social cost (MSC) is higher than marginal private costs (MPC) due to these external costs. [1m]	
		Private producers acts in their own self-interest and will produce up to	

marginal private benefit (MPB) equal to marginal private cost (MPC). However, the society's optimal production of rare earths is where marginal social benefit (MSB) equals marginal social cost (MSC). This results in an overproduction of rare earths from the society's perspective. [2m]

There is the presence of deadweight due to overproduction of rare earths which is allocative inefficient as MSC> MSB at that level of production of rare earths. [1m]

(No additional mark is given for diagram separately but they can be considered in totality as part of the answer. Students are not expected to draw the diagram to access the full range of marks since it is not in the syllabus nor required in the question.)

(ii) With reference to Extract 3, explain how China can reduce these 'external costs' through the imposition of a tax on rare earths minerals. **[6]**

(The essence of this question is to test students' understanding of how external costs can be reduced:

i) through increasing MPC towards MSC so that with lesser production of rare earths, external costs can be reduced AND

ii) through reducing the external costs of mining rare earths so that MSC falls and can allow a higher optimal production of rare earths.

Explain how the tax will increase MPC, reduce production of rare earths and hence less external costs.

From the extract, China will be imposing a tax of 60 yuan per tonnes on mining of light rare earths and that of 30 yuan for medium and heavy rare earths. The tax will increase the cost of production of mining rare earths for producers which results in the shifting up of MPC. As producers internalise the tax, they will produce less rare earths since the production is now at MSB = MSC+tax. With less production of rare earths, the

external costs will be lesser and hence there is less deadweight loss incurred by the society. If the tax is exactly equal to the MEC, then the deadweight loss will be removed and there is allocative efficiency.
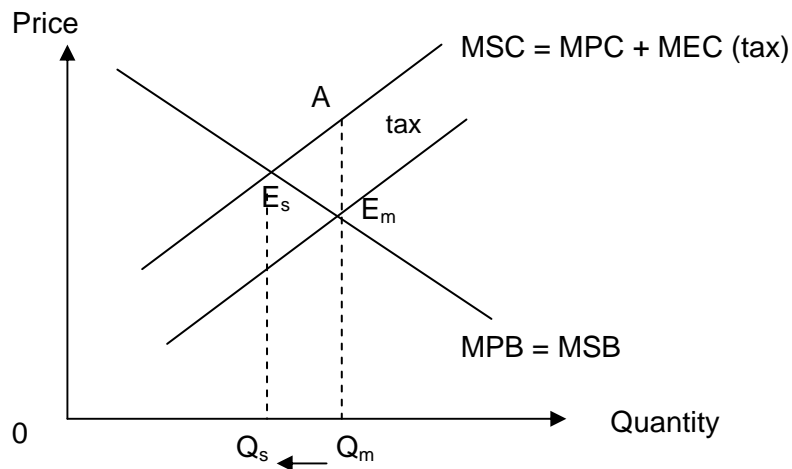

Figure 6: Government tax to correct negative externality

<u>Explain how the tax can be used to reduce MSC of rare earths production in the long run.</u>

From extract 3, the tax will be used to support research on rare earths processing and set up environmental compensation fund. The purpose is to reduce the external costs of mining rare earths to the environment which will lower the MEC and hence the MSC of rare earths mining. With cleaner methods of mining rare earths, this will allow producer to produce the same of production but with lesser externals cost of production.

Hence, the tax can reduce these externals costs in both the short and long run.

L2	Clear and well explained answer in terms of how the tax can reduce the external costs in the short run using MPC analysis and how the tax revenue can be used to improve the efficiency of rare earths mining and to protect the environment in the long run.	4-6
	- The answer do not necessary have to show MPC at optimal level due to tax, but as long as it shows how MPC is raised and hence lead to reduced production of rare earths and DWL.	
	Answer that explains how external costs can be reduced in the short run only – 4m max.	
L1	Undeveloped explanation of how a tax can reduce the external costs of rare earths mining. There may be some inaccuracies in expression or conceptual understanding.	1-3

| **(c)** | Assess the impact of export quota of rare earths on China's Balance of Payments. | [6] |

Export quota – a limit of the amount of rare earths allowed to be exported to other countries.

Short run impact

The fall in amount of export rare earths led to higher world price of rare earths since China produced 95% of world supply (extract 1). Given that the demand for rare earths is price inelastic (due to nature of the good being raw materials essential for production of many consumers goods or unavailability of rare earths from other countries), the fall in supply results in the more than proportionate increase in price, hence export revenue increases. This improves the current account of China's BOP.

Long run impact - (only one required)

i) Firms began to shift to China for access to cheap rare earths (extract 3) which will results in inflow of long term capital into China (improve capital/financial account).

ii) Other countries may discover rare earths or build capability to mine rare earths makes the demand for rare from China less price inelastic since there are alternatives sources of rare earths from other countries, current account may not improve as much compared to the short run.)

Conclusion

China's BOP is likely to improve greatly with the rare earths export quota in the short run increased export revenue and FDI inflows but that improvement will likely to diminish in the future when other countries began to produce rare earths on their own.

| L2 | Clear and well developed explanation of the impact of export quota on China's Balance of Payments by analyzing its impact on both current and capital/financial accounts. A conclusion is given for the impact on BOP.

- An answer that examines impact on both current and capital/financial accounts without conclusion or judgment is given a max of 5 marks.

- An answer that examines impact on only current without conclusion or judgment is given a max of 4 marks. | 4-6 |
| L1 | Undeveloped explanation of how an export quota can affect China's BOP in terms of either current or capital/financial accounts. No conclusion is given. | 1-3 |

(d)	**Using information from the data where appropriate, discuss what may happen to the world price of rare earths in the future.**	[8]
	Students are required to use demand, supply and elasticity analysis as the main framework in their answer. Students would have to use the data in the case study to examine the likely demand and supply shifts in the future, coupled with elasticity, to forecast the price of rare earths.	
	Evidence on future demand:	
	- demand is expected to rise in the future as rare earths can be used as inputs into the production of wider range of consumer products as well as higher demand for these consumer products (extract 1)	
	Evidence on future supply:	
	- Supply of rare earths may possibly decrease in China as new licenses were not issued by Chinese authorities as well as due to higher taxes and increased production caps, building of rare earths reserves (extract 3)	
	Supply of rare earths may possibly decrease due to higher cost of production when environmental, social and labour costs involved in the production of rare earths rises.	
	- Supply of rare earths may increase in other parts of the world as US, Australia and Canada seeks to increase rare earths output. Chinese producers are seeking to expand their production capacity in China. (extract 4)	
	- Students would have to evaluate and argue for their case of supply shifts	
	Evidence on elasticity of rare earths:	
	In the near future, demand is price inelastic because it is a necessary components for a wide range of consumer products	
	- Supply is price inelastic because a long time period is required to explore and to build facilities to mine and process the rare earths. Time taken to get license would be substantial as well since the mining of rare earths causes negative externalities.	
	Students will be expected to draw a demand and supply diagram incorporating the possible shifts of demand, supply and their elasticities and evaluate and conclude on the final impact on equilibrium price and quantity in the market in the short and long run.	

L3	Clear and well developed explanation using demand and supply analysis coupled with elasticity concepts to forecast future price of rare earths. The explanation was based on evidence from the case study.	7-8
	Well drawn diagram to illustrate the future price of rare earths.	
	Evaluative comment on the determinants and hence impact on	

		future world price of rare earths was given.			
	L2	Well explained answer using demand and supply and elasticity concepts to forecast future price of rare earths. The explanation was based on evidence from the case study. Analysis may be underdeveloped. A diagram was drawn to illustrate the future price of rare earths. No evaluative comment was made. Max 4m - if only demand and supply factors were considered without any evaluation.	4-6		
	L1	Undeveloped explanation on how demand and supply factors may affect the future price of rare earths. Elasticity concepts were not evident. There is some attempt to use evidence from the case study. Max 3 - if only demand OR supply factors was given.	1-3		