H

TEMASEK JUNIOR COLLEGE

2022 JC2 PRELIMINARY EXAMINATIONS

Higher 1

TEMASEK JUNIOR COLLEGE

ECONOMICS **8823/01**

Paper 1 **24 August 2022**

3 Hours

Additional Materials: **one 12-page** answer booklet, **one piece** of writing paper for rough work

READ THESE INSTRUCTIONS FIRST

An answer booklet will be provided with this question paper. You should follow the instructions on the front cover of the answer booklet. If you need additional answer paper ask the invigilator for a continuation booklet.

Answer **all** questions.

Indicate the question number clearly in your answers.

Start Question 1 and Question 2 on a fresh page.

The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **8** printed pages.

Question 1: Government intervention in the market for rare earths

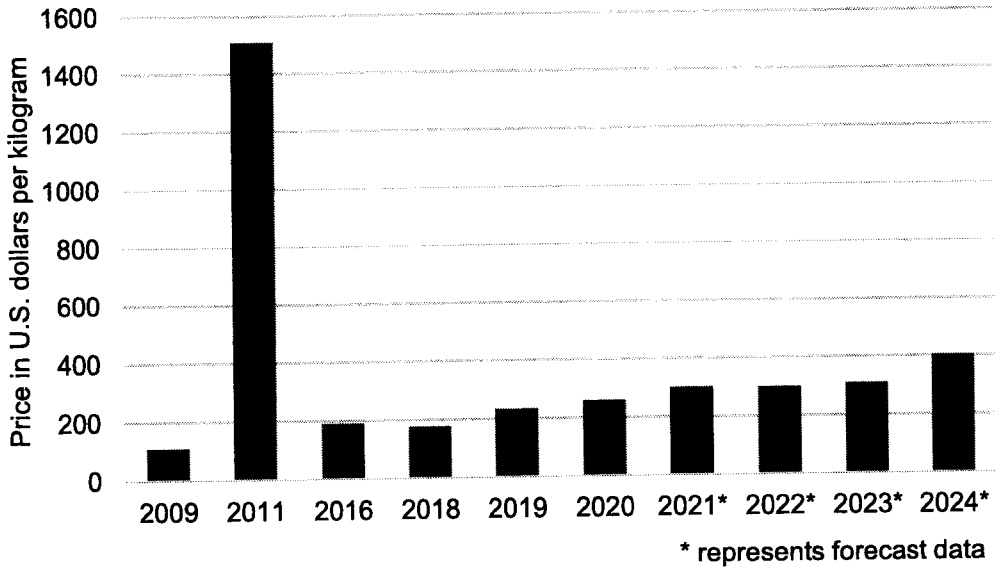
Extract 1: The uses of rare earth elements

Rare earth elements (REEs) is a collective term for seventeen chemical elements in the periodic table. Despite the name, REEs are not very rare and found far more commonly in the Earth than most precious metals such as gold and platinum. However, extracting, processing and refining REEs are tricky for a myriad of technical and environmental reasons.

Rare earth metals like dysprosium and terbium play a critical role in defense, technology and electric vehicles. Neodymium and praseodymium are some of the most sought-after rare earth elements crucial in products such as motors, turbines and medical devices. Demand for them exploded in recent years with the growth of technology and will continue to climb amid the ongoing race to create a large electric vehicle market.

Source: *CNBC*, 17 April 2021

Figure 1: Price of rare earth dysprosium oxide, 2009 – 2024 (US$ per kilogram)



Source: *statista.com*

Extract 2: The harms of rare earth mining

Beginning in the 1990s, rare earth mining took off in the region located in Southeast China about 300 miles north of Hong Kong. As China began to produce more smartphones, wind turbines, electric vehicles, and other high-tech products requiring REEs, the mining intensified. But the removal of these elements from the earth's crust, using a mix of water and chemicals, caused extensive water and soil pollution.

"To us as an environmental group, we hope that the environmental damage can stop and that these external [pollution costs] could be internalized in the cost" of products, Ma Jun, a leading Chinese environmentalist and director of the Institute for Public and Environmental Affairs, said in a phone interview.

Ma's fear is that other regions around the world could suffer a similar fate if they become, like China, the supplier of cheap rare earth elements, with little or no environmental price attached. "I hope that we don't miss this opportunity," he said. "There is talk that similar mining could be started in Africa and other regions, so we should not repeat the same mistakes."

Deng Zhiyong, director of the Longnan Environmental Protection Department, said in an interview that the mining has dumped excessive amounts of ammonia and nitrogen compounds into the region's ground and surface water. Other pollutants, such as cadmium and lead, are also released during the mining process; long-term exposure to these metals poses health risks.

Source: *Yale School of the Environment*, 2 July 2019

Extract 3: China's stranglehold of the rare earths supply chain will last another decade

Western economies are set to remain heavily dependent on China's exports of REEs and its related products for the next decade. For three decades, the Chinese government has had a strategic vision for the REE industry – something the West has lacked – and it now dominates the supply chain.

In 2021, China made up 54% of global REE mine supply, followed by North America at 18%, the rest of Asia at 14%, Australia at 12% and Europe at 2%, according to Roskill. However, its dominance of neodymium's global mine supply is higher, at 62%. In 2021, China accounted for 85% of the global supply of refined REEs, followed by the rest of Asia at 13% and Europe at 2%, according to Roskill. In the case of neodymium, it made up 84% its refined supply.

Furthermore, China has a more than 90% share of the global production of downstream rare earth products and technologies, including magnets, according to consultancy Tahuti Global.

Source: *Mining-technology*, 26 Apr 2022

Extract 4: Tesla inks battery materials deals with two China suppliers

Tesla Inc. has signed new long-term deals with two of its existing Chinese battery-materials suppliers, the latest move by automakers to secure supplies amid intensifying competition. Zhejiang Huayou Cobalt Co. and CNGR Advanced Material Co. signed pricing agreements with the electric-vehicle giant for supplies until the middle of this decade. The deals are for ternary precursor materials — chemical cocktails that are key to storing energy in lithium-ion batteries.

The transition to cleaner energy is boosting demand for battery ingredients, while supply has been hampered by Covid-related logistical woes and a lack of investment. As a result, price of the raw materials has increased and is denting profitability for some carmakers.

Source: *Bloomberg News*, 1 Aug 2022

Extract 5: Cleaning up mining

There are several things that need to happen regarding the environmental impact of rare-earth mining.

First, there should be efforts in research and development toward products that rely less on rare-earth metals. For example, Honda is developing hybrid cars that are mostly free of rare-earth metals.

Second, there needs to be an emphasis on finding more sustainable options for extraction.

Third, diplomatic channels should be used to incentivise a modernising reform of China's lax regulation of rare earth mining and an improvement of standards for environmental protection. Only then will associated environmental cleanup and preservation costs be added to the cost of operating mines.

Lastly, the United Nations could pursue global standards for rare-earth mining.

All of these steps will go toward preventing additional damage to the Earth. However, existing damage must be cleaned up. China is taking steps toward fixing the issues resulting from decades of rare earth mining.

The country is also enacting tougher regulations to stem the damage done by existing mining companies. For example, companies must upgrade their equipment to more modern, efficient technology and must mine for metals using more sustainable practices.

Source: *earth.org*, 14 July 2020

Questions

(a) With evidence from Extract 1,

(i) What can you conclude about the price elasticity of supply of rare earth elements (REEs)? [2]

(ii) Using a demand and supply diagram, explain the likely change in the REEs market in the future. [4]

(b) With reference to Figure 1, summarise the trend of the price of dysprosium oxide during the period 2009 – 2024. [2]

(c) Explain the meaning of a positive statement and a normative statement and identify an example of each type from Extract 2. [4]

(d) Using **one** relevant elasticity concept, explain how the increase in the price of raw materials could have dented the profitability for some carmakers (Extract 4) and comment on the validity of this claim. [7]

(e) To what extent would rare earth mining improve the standard of living of people in China? Discuss. [10]

(f) **(i)** Explain how the increased extraction of REEs leads to allocative inefficiency in resource allocation. [6]

(ii) Discuss the view that tougher government regulations for mining companies to 'upgrade their equipment to more modern, efficient technology in rare earth mining' (Extract 5) is the best policy to alleviate the negative effects in the extraction of rare earth metals. [10]

[Total:45]

Question 2: Opportunities and challenges in Southeast Asian economies

Table 1: Selected economic indicators of Indonesia from 2016 – 2020

	2016	2017	2018	2019	2020
Unemployment Rate (%)	4.3	3.9	4.4	3.6	4.3
Consumer Price Inflation (% change in Consumer Price Index)	3.5	3.8	3.2	3	1.9

Source: World Bank, 2022

Extract 6: Is low growth the new normal for Singapore?

When the global financial crisis hit Singapore in 2009, the shock left the country with real GDP growth of 0.1 per cent. But the economy rebounded quickly. The following nine years delivered an average annual growth of 5.2 per cent, owing largely to a sharp rebound in 2010, registering a growth of 14.5 per cent. The mood is discernibly more downbeat this time. The Government now forecasts that the economy will grow only within the range of 0.5 to 2.5 per cent in 2020. Is low growth the new normal for Singapore? As a small, open economy heavily dependent on external demand, Singapore's national output is subject to the vagaries of the global economy. One reason to think we are less likely to see a strong recovery this time around is that the US-China trade war is affecting the Singapore economy by disrupting global supply chains. Although many of the tariffs (taxes on imported goods) imposed by the US on Chinese goods do not directly affect Singapore, there are spillover impact due to Singapore's role in global supply chains. For example, Singapore companies that produce intermediate goods used as inputs in the production of China's exports to the US may see a lower demand for their goods.

Singapore's continued growth will be tested as it faces bigger challenges on the horizon including an ageing population and weakening productivity. The growth of Singapore's total real GDP today also depends on labour force growth, and capital investment. The number of citizens in the working ages of 20 to 64 years will start to decline from this year onwards due to more retiring and fewer entering the workforce, as the number of babies dropped to an eight-year low in 2019. Ageing reduces economic growth as there are fewer new workers to boost output. Workforces in some 40 countries are already shrinking because of demographic change. Technology may at some point overcome the stifling effect of ageing. Some experts find that when young workers are sufficiently scarce, manufacturers invest in more automation, and experience faster productivity growth as a result, measured as an increase in output produced per unit input.

Source: Various

Extract 7: 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. 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$NEER) policy band has "depreciated to a level slightly below the mid-point of the policy band". "MAS will adopt a zero per cent per annum rate of appreciation of the policy band starting at the prevailing level of the S$NEER," it added. The COVID-19 pandemic has led to a severe contraction in economic activity in Singapore and globally, due to the combination of supply chain disruptions, travel restrictions imposed in many countries and a sudden decline in demand. Looking ahead, MAS expects global economic growth to stall or even contract in the first half of 2020, with "significant interruption" to economic activity in most of Singapore's major trading partners. Growth in the trade-related industries will be weighed down by the decline in external demand and supply chain disruptions.

Source: Channel News Asia, 30 March 2020

Extract 8: Economic prospects in Indonesia

Disruption from COVID-19 and developments in commodity and financial markets will have severe implications for Indonesia in 2020. As events unfold, Indonesia's key trade partners already expect severe impacts on their economies. Domestic demand is likely to weaken as business and consumer sentiment falls. GDP growth is accordingly forecast at 2.5% this year. As the global economy recovers in 2021 and investment reform gains traction, growth is forecast at 5.0%.

Earnings from exports of goods and services are expected to contract for a second year in 2020. As the COVID-19 outbreak halts production in economies that import Indonesian commodities, earnings from petroleum, palm oil, and coal are likely to suffer this year. Travel bans and flight cancellations will hit tourism receipts. Signs already show domestic consumer confidence beginning to decline. The impact of the COVID-19 outbreak on consumer sentiment and spending is likely to be strong. Unless the government successfully contains the outbreak, household spending on health care could jump, productivity fall, and discretionary spending shrink.

Growth in Indonesia has averaged 5% since 2015, yet much higher growth is needed for the country to achieve its ambition to join the world's five largest economies by 2045. The main factor constraining potential growth has been stagnant productivity partly attributed to limited technological sophistication. To exploit the benefits of new technologies, companies and workers need to have the know-how to absorb and adopt them. However, Indonesia currently lacks such workers. Many firms struggle to find workers with the right competencies in software and information technology services, inducing them to move to other countries. The share of the population in the 25–34 age group with a tertiary education is still relatively low at 16.1%, below that of other countries in the Group of 20.

Source: Asian Development Outlook 2020, www.adb.org

Extract 9: Vietnam economy is Asia's shining star during COVID-19

Vietnam has minimised the economic damage from Covid-19 and is the only country in Southeast Asia on track for growth this year. Its economy is expected to grow 2.4% this year, according to latest figures from the International Monetary Fund. The IMF credited "decisive steps to contain the health and economic fallout from COVID-19" for the country's success. Vietnam has had only 1,288 Covid-19 cases and 35 deaths. The IMF is predicting a strong economic recovery in 2021, with growth projected to strengthen to 6.5% "as normalisation of domestic and foreign economic activity continues."

The country has seen slower growth this year and its once-thriving tourism sector has taken a particularly bad hit, but it has avoided the worst economic effects of the pandemic. A number of factors have cushioned the blow, according to Michael Kokalari, chief economist for Vinacapital, a Vietnam-focused investment company. Vietnam's exports to the US have increased by 23% in the first three quarters compared to the same period in 2019, with electronics exports up 26%. The ongoing US-China trade war has made China a less attractive place to manufacture, with a number of tariffs in place on exports. Many multinationals have started operating in Vietnam, including global technology leaders like Apple and Samsung. Apple now has plans to manufacture its high-end Airpods studio earphone in Vietnam. The pandemic has also prompted more companies to consider manufacturing there, because of the need to diversify their supply chains, said Mr Kokalari. "When Covid comes, you thought you had a global supply chain, and you find out that you only have a China supply chain and you can't produce. Well that's a much more urgent, emotionally catalysing problem," he said.

Source: BBC, 19 November 2020

Questions

(a) **(i)** Explain what is the Consumer Price Index (CPI). [2]

(ii) Using AD/AS analysis, explain how variations in consumption could cause variations in unemployment and inflation in Indonesia during the period 2016 to 2018. [6]

(b) With reference to Extract 6 and an AD/AS diagram, explain how the US tariffs on Chinese exports might affect prices in Singapore. [4]

(c) Using a production possibility curve diagram, explain the likely impact of the change in Singapore's labour force described in Extract 6 on its economic growth. [3]

(d) Explain how any **one** component of aggregate demand would be expected to change as MAS eases its monetary policy. [4]

(e) With reference to Extract 8, explain how supply-side policies can increase Indonesia's growth rate in the short run **and** long run and consider how likely they are to be successful. [8]

(f) With reference to Extract 8 and Extract 9, discuss the likely impact of the COVID-19 pandemic on the economic performance of Southeast Asian economies. [8]

(g) Assess whether tackling falling growth rate is more important than raising productivity. [10]

[Total: 45]

Question 1: Government intervention in the market for rare earths

Suggested answers

(a) With evidence from Extract 1,

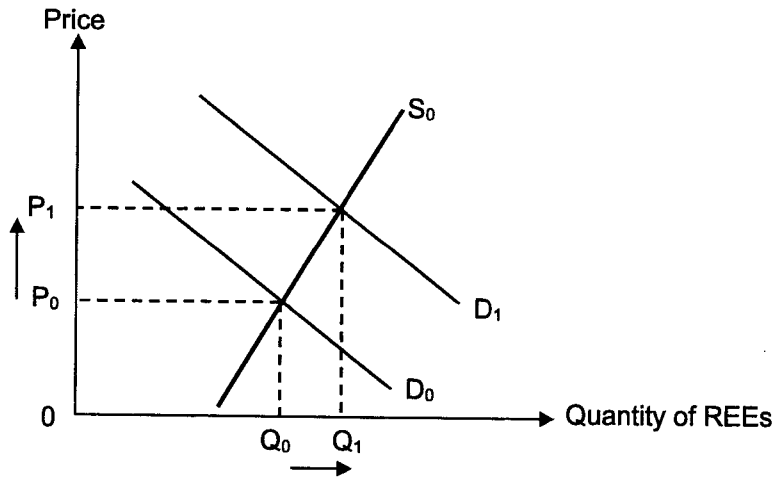
(i) What can you conclude about the price elasticity of supply of rare earth elements (REEs)? [2]

- Extract 1 mentions that "extracting, processing and refining REEs are tricky for a myriad of technical and environmental reasons". This suggests that the production of REEs is highly complex with a lengthy production process. **[1]**
- The supply of REEs would hence be price inelastic **[1]** with quantity supplied increasing less than proportionately when price increases.

(ii) Using a demand and supply diagram, explain the likely change in the REEs market in the future. [4]

- The demand for REEs like dysprosium and terbium are derived from the demand for electric vehicles because these elements are factor inputs in the production of electric vehicles. **[1]**
- Amid the ongoing race to create a large electric vehicle market (Extract 1), the derived demand for REEs will continue to increase, shown by the rightward shift of the demand curve from D0 to D1. **[1]**

Figure 1: REEs market



- **[1]** for a fully labelled and accurately drawn diagram
- Given a price inelastic supply of REEs as concluded in (a)(i), an increase in the demand for REEs in the future will lead to a significant increase in price from P0 to P1, and a slight increase in equilibrium quantity from Q0 to Q1. **[1]**

(b)	**With reference to Figure 1, summarise the trend of the price of dysprosium oxide during the period 2009 – 2024.**	[2]

General trend:

- The price of dysprosium oxide is <u>forecasted</u> to increase generally during the period 2009-2024. **[1]**

Refinement:

- except for the years 2016-18 where the price decreased. **[1]**

OR

- There was a spike in 2011. **[1]**

(c)	**Explain the meaning of a positive statement and a normative statement and identify an example of each type from Extract 2.**	[4]

- A positive statement is an <u>objective statement</u> whose accuracy can be tested by looking at evidence. **[1]**
- One example is "*the removal of these elements from the earth's crust, using a mix of water and chemicals, caused extensive water and soil pollution.*" **[1]**

OR

- "*Other pollutants, such as cadmium and lead, also are released during the mining process; long-term exposure to these metals poses health risks.*"
- A normative statement involves <u>value judgement</u> and is <u>subjective</u>; cannot be proven or disproved by looking at facts. **[1]**
- An example is "*There is talk that similar mining could be started in Africa and other regions, so we should not repeat the same mistakes.*" **[1]** OR
- "*Ma's fear is that other regions around the world could suffer a similar fate if they become, like China, the supplier of cheap rare earth elements, with little or no environmental price attached.*"

(d)	**Using <u>one</u> relevant elasticity concept, explain how the increase in the price of raw materials could have dented the profitability for some carmakers (Extract 4) and comment on the validity of this claim.**	[7]

<u>Explain how the increase in price of raw materials could have reduced profitability (5m)</u>

- An increase in the price of raw materials would likely increase the cost of production **[1]** of cars, leading to a fall in the willingness and ability of carmakers to produce.
- As supply of cars fall, the equilibrium price rises while the quantity falls. **[1]**
- *The impact on total revenue would depend on the price elasticity of demand for cars.*
- The PED of cars is more than one given that they form a high proportion of income. This means that when prices increase, quantity demanded falls more than proportionately, ceteris paribus. **[1]**
- The fall in revenue from selling less cars is more than the increase in revenue from selling at a higher price, thus overall revenue decreases. **[1]**
- Since profits in the difference between total revenue and total costs, a fall in revenue, ceteris paribus (or assuming constant costs), could have reduced profits and dented the profitability for some carmakers. **[1]**

Comment on the validity of the claim (Stand + Substantiation 2m)

- **[Magnitude + Stand]** Over time, the price of cars as a proportion of income might decrease. If PED decreases to the point where it is less than one, then a rise in price will lead to a less than proportionate fall in quantity demanded, and revenue might increase.
  - Hence the claim might not be valid as the increase in price of raw materials might not dent profitability.

(e)	**To what extent would rare earth mining improve the standard of living of people in China? Discuss.**	**[10]**

Question interpretation:

Command phrase	*To what extent…improve*	Balanced discussion on both sides (SOL improved and worsened) before an evaluative conclusion on the overall extent
Content	*Standard of living (SOL)*	Material (supported with AD/AS analysis) and non-material SOL
Context	*Rare earth mining and people in China*	Evidence from case material on the effects of rare earth mining on the people in China.

This question requires a balanced discussion on the effects of rare earth mining to the standard of living (improve and worsen) of the people in China. The discussion should be undergirded by AD/AS analysis where relevant and supported with evidence from case material before coming to a reasoned conclusion on the overall extent mining REEs improves SOL in China.

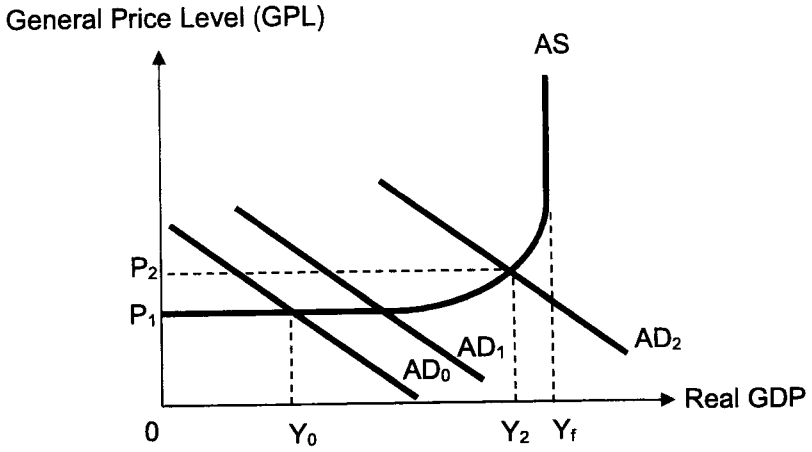
Introduction

- With the intensification of rare earth mining in China (Extract 2), it remains to be seen whether the standard of living would improve or decrease.
- Standard of living comprises two components, material standard of living and non-material standard of living.

Thesis: Rare earth mining would improve the standard of living of people in China

- The mining of rare earth could have increased the material standard of living of people in China as it increases the national income of her people through its net export revenue.
- As China dominates the global REE supply chain (Extract 3), an increase in the extraction of rare earths to meet the explosion of demand for REEs (Extract 1) will increase the export revenue of China, increasing its (X-M), and thus increasing the AD.
  - Assuming spare capacity, the increase in (X-M) will trigger successive rounds of income-induced consumption due to the multiplier effect.
  - AD increases from AD_0 to AD_1 because of the initial injection, and eventually to AD_2 because of the multiplier effect. This would result in an increase in real GDP from Y_0 to Y_2, where there is ***higher actual economic growth.***

Figure 2: Higher actual economic growth from REEs mining



- If the rate of real GDP growth rate exceeds the population growth, there will be an increase in ***real GDP per capita***. This translates to consumers having greater purchasing power and hence higher ability to purchase more goods and services. This increases their material standards of living.

- With higher actual growth from increased REE mining, the increase in output also increases the derived demand for labour, reducing demand deficient unemployment from $Y_f - Y_0$ to $Y_f - Y_2$.
  - With more people having jobs and incomes, this will increase the opportunity costs of committing crime. The crime rates in China would be expected to reduce, leading to an improvement in non-material standard of living as well.

  OR

  - The increase in incomes from the higher employment rates would mean higher tax revenue for the government, increasing the government's budget and ability to spend more on education and healthcare to improve literacy rates and life expectancy rate, increasing China's non-material SOL.

Anti-thesis: Rare earth mining may decrease the standard of living of people in China

- However, the mining of rare earths generates negative externalities which would decrease the non-material standard of living of people in China.
  - The extraction of REEs generate spillover costs in terms of "extensive soil and water pollution" (Extract 2) to third parties who are not involved in the rare earth mining process. These people are the residents staying nearby the rare earth mines.
  - The pollution would worsen air and water quality and lower sanitary levels, leading to people developing illnesses, reducing life expectancy rates and lower non-material standard of living.
- If a significant number of people fell ill due to the pollution, and lose the ability to work, the fall in incomes may also worsen the material stand of living.

Evaluative Conclusion

- **[Stand + Alternative]** As rare earth mining could raise the material living standards of residents in China due to an increase in net export revenue and hence income, the overall impact on resident's living standards depends on the government's ability to mitigate the negative externalities in production.
  - With tougher regulation to stem the damage done by rare earth mining, together with more sustainable mining practices (Extract 5), these negative effects are likely to be minimised. Thus, rare earth mining would improve the living standards of people in China.

OR

- **[Time Frame + Stand]** In the short run, the production of rare earths suffers from negative externalities in production, hurting residents' non-material living standards. However, in the long run, as China take steps to fix the issues and enacting tougher regulations to mitigate the negative effects, rare earth mining will likely raise the living standards of people in China in the future.

Mark Scheme

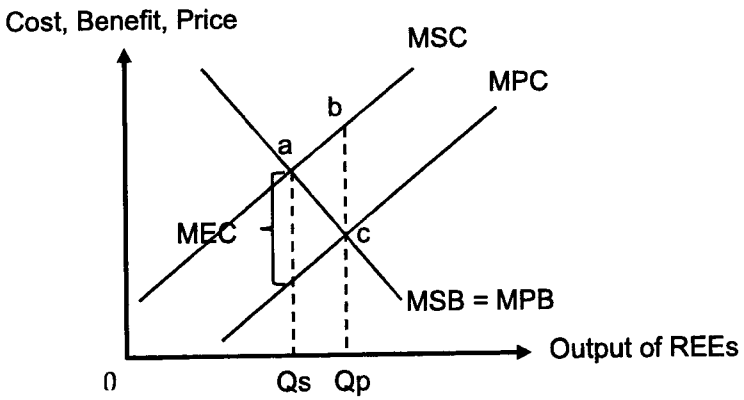
Level	Knowledge, Application/Understanding, and Analysis	Marks
L3	For a well-developed answer that has: • **good scope** – explains the impact of rare earth mining on the material and non-material SOL of people in China; and • **good balance** – explains the positive and negative impact of rare earth mining on SOL; and • **good rigour** – explains using AD/AS analysis; and • **good application to context** – applies analysis to the context of China	5 – 7
L2	For an under-developed answer that: • lacks scope – did not explain the impact of rare earth mining on the material SOL or non-material SOL; and/or • lacks balance – did not explain the positive or negative impact of rare earth mining on SOL; and/or • lacks rigour – descriptive explanation of how SOL of the Chinese is affected by rare earth mining • lacks application to context – did not explain change in SOL using case material.	3 – 4
L1	A vague, descriptive answer on the impacts of rare earth metals extraction on the material and/or non-material SOL of people in China with minimal elaboration.	1 – 2
E	For a well-reasoned judgement on the extent to which rare earth mining will improve or worsen the material and non-material SOL of people in China.	1 – 3

(f)	(i)	**Explain how the increased extraction of REEs leads to allocative inefficiency in resource allocation.**	**[6]**

Explain using the PET DQQD framework (and with respect to a diagram 6m)

- **[P]** In the production of REEs, producers only consider their private costs, such as cost of labour in extracting the REEs through mining, and their private benefits, such as the revenue or profits from selling REEs. **[1m for contextualising pte costs and pte benefits]**
- **[ET]** They ignore negative externalities (external costs) such as the "extensive water and soil pollution" (Extract 2) that could negatively affect residents staying near the mining areas **[1]** by reducing their availability of clean drinking water, or reducing the amount of arable land for agriculture or spending on medical expenses as a result of illnesses from exposure to toxic chemicals. **[1]**
- **[D]** The presence of marginal external cost (MEC) creates a divergence between the marginal social cost (MSC) and marginal private cost (MPC), where MSC > MPC.
- **[Qp]** If left to the free market, firms produce Qp units of REEs, where MPB = MPC as they only consider their own private costs and benefits.
- **[Qs]** However, the social optimal level of production is Qs units, where MSB = MSC. **[1m for QpQs]**
- As Qp > Qs, there is overproduction of REEs. **[D]** From Qp to Qs units, the total social costs (area QsabQp) exceed the total social benefits (area QsacQp). **[1]**
- The triangle area 'abc' represents the deadweight loss which is the welfare loss to society when output is not produced at the social optimal level. Negative externalities from the increased extraction of REEs thus leads to allocative inefficiency. **[1m coupled with a fully labelled and accurately drawn diagram]**

Figure 3: Negative externalities in REEs extraction



(f)	(ii)	**Discuss the view that tougher government regulations for mining companies to 'upgrade their equipment to more modern, efficient technology in rare earth mining' (Extract 5) is the best policy to alleviate the negative effects in the extraction of rare earth metals.**	**[10]**

Question interpretation

Command word/phrase	*Discuss the view…best policy*	Present a balanced perspective of the workings and limitations/unintended consequences of two policies, one of which is the policy stated in the question followed by a well-substantiated judgement on which policy would be better.
Content	*Regulations for… upgrade equipment…* *Alleviate the negative effects*	The use of more efficient technology can help reduce the MEC associated with the extraction of REEs. Address the negative externalities in (f)(i) and improve allocative efficiency
Context	*Extraction of rare earth metals*	The case material should be used, where applicable.

A relevant response requires a balanced analysis of the appropriateness of two policies, including the tougher regulations for firms to upgrade their mining equipment through technology, in terms of their workings and limitations/unintended consequences in addressing negative externalities before making a well-reasoned judgment on overall appropriateness of the policies in addressing the market failure.

Introduction

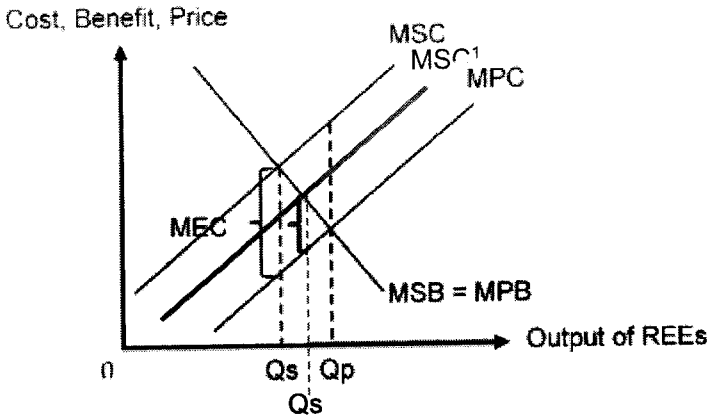
- **[Set context and outline approach]** Alleviating the negative effects in the extraction of rare earth metals would mean reducing the deadweight loss as explained earlier in (f)(i). Besides tougher government regulations for mining companies to upgrade their equipment, a government can also impose an indirect tax on REE mining.

Policy 1: Explain how tougher regulations for firms to upgrade to more efficient technology can reduce the extent of negative externalities to alleviate the negative effects, alongside its limitations

- **Tougher regulations for firms to upgrade to more efficient technology will reduce the extent of negative externalities, and hence reduce the deadweight loss to improve allocative efficiency.**
  - As companies upgrade their equipment to more modern and efficient technology, the extraction process will release lesser pollutants into the atmosphere.
  - This represents a decrease in the spillover costs to third parties, leading to a decrease in the MEC in rare earth mining.
  - As MEC decreases, MSC moves to MSC', which is nearer to MPC. The new socially optimal level of rare earth mining is at Qs', where MSC' = MSN, which is closer to Qp.

- The deadweight loss (DWL) falls, hence alleviating the negative effects of rare earth mining.

Figure 4: Effects of tougher regulations



This policy could **incur high administrative costs** on governments to monitor and enforce the regulation as inspections would need to be carried out periodically. This incurs an opportunity cost as the budget could have otherwise been spent on other areas such as improving the healthcare industry.

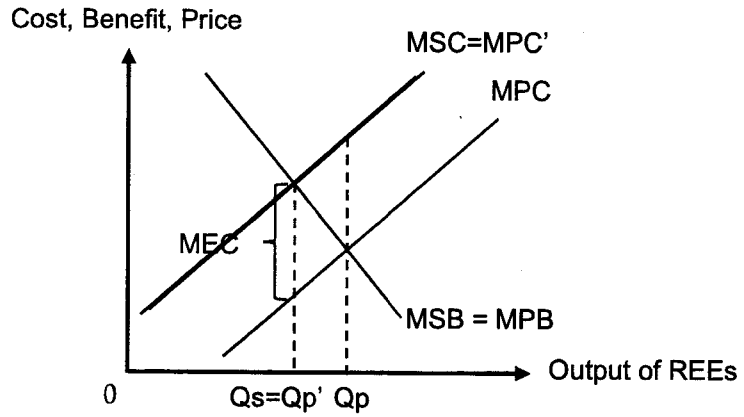
OR

- This policy is likely to be **limited in its effectiveness** as the mandate to upgrade to more modern, efficient technology would require governments to have a good understanding of the REE mining industry and the available technologies. However, imperfect information could reduce the extent to which MEC can be reduced and hence the reduction in the DWL.

Policy 2: ***Explain how an indirect tax can reduce the extent of negative externalities to alleviate the negative effects, alongside its limitations***

- **Another policy that a government can implement is an indirect tax on REE mining so that the "external [pollution costs] could be internalised in the cost" of products (Extract 2).**
- By implementing a per-unit **tax equal to the MEC at Qs**, this forces producers to internalise the external costs to third parties by raising their unit costs of production, increasing the MPC.
- This is shown as a shift of the MPC curve to the MPC', which coincides with the MSC curve.
  - The new private optimal production level, Qp', where MPC' = MPB, falls to coincide with Qs, achieving allocative efficiency.
  - The DWL is eliminated, alleviating the negative effects of mining.

Figure 5: Effects of indirect tax



- However, the government is likely to have imperfect information regarding the monetary value of the MEC generated at Qs. Estimates would have to made, and errors in terms of under-estimation or over-estimation would mean that allocative inefficiency would still persist in the REEs market.
  - Moreover, an overestimation could result in a tax that is too high, possibly leading to government failure where the DWL generated could be greater than before non-intervention.

Evaluative conclusion

- **[Stand]** Tougher regulations alone may not be the best policy to alleviate the negative effects of rare earth extraction. A combination of both tougher regulations and indirect taxes may be more suitable instead.
- **[Alternative]** The taxation is a short run policy which can yield immediate effects and raise tax revenue. Given China's domination in the global market for rare earth elements and the rising global demand, it is likely to generate substantial tax revenue for China which can be directed towards enforcement of regulation and be used to finance the research and development into cleaner technology, whose effects can only be reaped in the long run.

Mark Scheme

Level	Knowledge, Application/Understanding, and Analysis	Marks
L3	For a well-developed answer that has: • **good scope** – explains the tougher regulations for firms to upgrade to more efficient technology in rare earth mining and one alternative policy to alleviate the negative externalities in rare earth metals extraction. • **and balance** – explains both the workings and limtiations/unintended consequences of both policies; and • **good rigour** – explains using benefit-cost market failure analysis; and • **good application to context**	5 – 7

L2	For an under-developed answer that: • lacks scope – did not explain an alternative policy to alleviate the negative externalities in rare earth metals extraction • lacks balance – did not explain the limitations/unintended consequences of both policies; and/or • lacks rigour – descriptive explanation of the workings and limitations/unintended consequences of both policies in addressing the negative externalities of rare earth metals extraction; and/or • lacks application to context – limited use of case material to support analysis	3 – 4
L1	A vague, descriptive answer on how tougher regulations for firms to upgrade to more efficient technology in rare earth mining and/or an alternative policy will address the negative externalities.	1 – 2
E	A well-reasoned judgement on the extent to which the tougher regulations for firms to upgrade to more efficient technology in rare earth mining is the best policy to alleviate the negative effects in the extraction of rare earth metals.	1 – 3

Question 2: Opportunities and Challenges in Southeast Asian economies
Suggested Answers

(a) (i) Explain what is the Consumer Price Index (CPI). **[2]**

- The Consumer Price Index (CPI) is an index that is used to measure the price changes of a fixed basket of goods and services [1] consumed by a typical household of a country [1].

(ii) Using AD/AS analysis, explain how variations in consumption could cause variations in unemployment and inflation in Indonesia during the period 2016 to 2018. **[6]**

3m for explaining how increase in C can lead to demand-pull inflation & affect demand deficient unemployment. Link to Table 1 must be established.

- Assuming that the Indonesian economy is below full employment (approaching the intermediate range of the AS curve), an increase in C will increase AD from AD0 to AD1 in Figure 1 below.
- As the economy approaches full employment level of output Y_f, any continuous increase in C and hence increase in AD from AD0 to AD1 will raise the GPL steeply to P1 as firms compete for factor inputs, bidding up factor prices. The increase in cost of production is passed on to consumers in the form of higher prices, leading to demand-pull inflation. [1]
- The rise in real output from Y0 to Y1 leads to firms hiring more factor of productions, including labour, causing demand-deficient unemployment to fall. [1]
- The above could account for the rise in inflation rate and fall in unemployment rate from 2016 to 2017 in Table 1. [1]

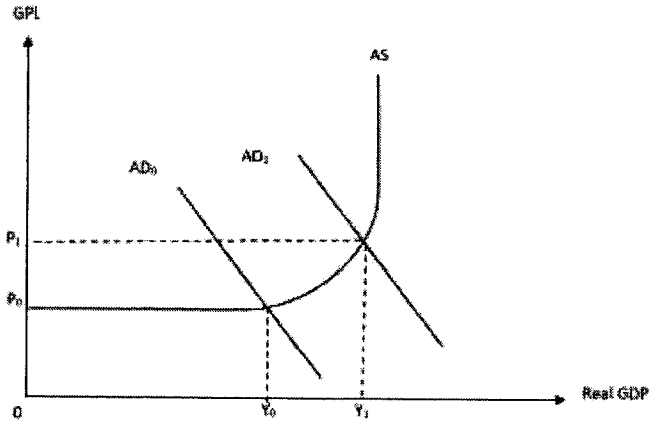


Figure 1

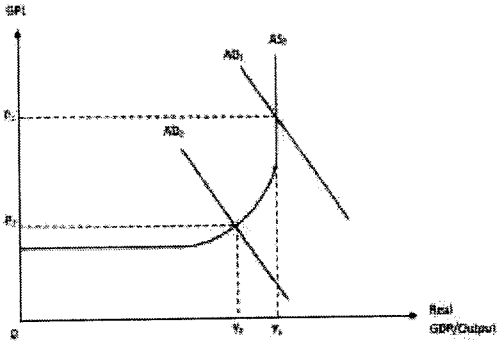
3m for explaining the impact of a fall in C on unemployment and inflation using Table 1.

- As for 2017 to 2018, a fall in C which reduces AD, will lead to lower inflation rates assuming that the economy is near full capacity. [1]
- At the same time, the fall in C leads to a fall in real output. Producers find themselves unable to sell their current output. Inventories rise and producers cut back on production and hire fewer factors of production, including labour. This gives rise to demand-deficient unemployment. [1]
- Hence, inflation rate fell and unemployment rate increased during this period in Table 1. [1]

(b) With reference to Extract 6 and an AD/AS diagram, explain how the US tariffs on Chinese exports might affect prices in Singapore. **[4]**

- US tariffs on Chinese exports would mean that Chinese exports to US become more expensive, leading to a fall in quantity demanded of Chinese exports. [1]
- As mentioned in Extract 6, this would thus lead to a fall in derived demand for imported factor inputs from Singapore to China. [1]
- As such, there is a fall in X and hence AD from AD1 to AD2. General price level falls from P1 to P2. [1]
- Well-labelled diagram [1]

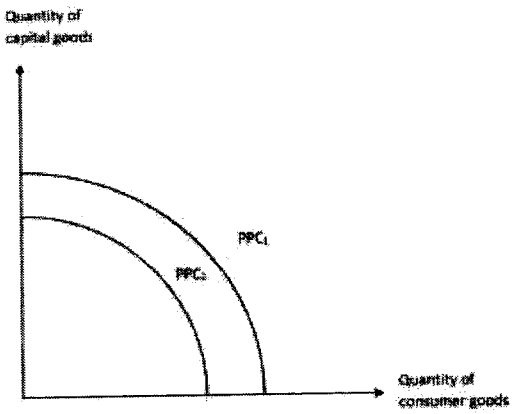
Figure 1: Impact of US tariffs on Singapore's GPL



(c) Using a production possibility curve diagram, explain the likely impact of the change in Singapore's labour force described in Extract 6 on its economic growth. **[3]**

- As mentioned in Extract 6, Singapore is facing an aging population which should lead to a decrease in quantity of labour. [1]
- There would be a fall in productive capacity, leading to an inward shift of the PPC from PPC1 to PPC2, denoting negative potential growth. [1]
- Well-labelled diagram [1]

Figure 2: Impact on Singapore's economic growth



(d) Explain how any one component of aggregate demand would be expected to change as MAS eases its monetary policy. [4]

- According to Extract 7, the MAS has depreciated the Singapore dollar. [1]
- As a result of the depreciation, Singapore's exports become cheaper in terms of foreign currency, leading to an increase in quantity demanded. [1]
- On the other hand, the price of imports become more expensive in domestic currency, causing a fall in quantity demanded for imports. [1]
- Assuming the Marshall-Lerner condition holds, i.e. the absolute sum of the price elasticities of demand for exports and imports is more than 1, there will be an increase in net export revenue (X-M), ceteris paribus. [1]

OR

- According to Extract 7, the MAS has depreciated the Singapore dollar. [1]
- The price of imports become more expensive in domestic currency, causing a fall in quantity demanded for imports. [1]
- Domestic consumers may switch from consuming foreign imports to domestically-produced import substitutes instead. [1]
- As a result, there is an increase in consumption expenditure (C) in Singapore's AD. [1]

(e) With reference to Extract 8, explain how supply-side policies can increase Indonesia's growth rate in short run and long run and consider how likely they are to be successful. [8]

Explain how supply-side policies can increase Indonesia's growth rate in the short run [3m]

- To increase growth rate, the Indonesian government may increase spending on research facilities and educational institutes to encourage domestic research and development (R&D) and skills upgrading to increase productivity among firms. *[1m – identify supply-side policies]*
- The increase in government spending (G) leads to an increase in AD. *[1m – explain how supply-side policies increase AD / increase in productivity leading to fall in COP and increase in SRAS]*
- Assuming there is spare capacity, the increase in AD will lead to multiple rounds of increase in income-induced consumption, leading to <u>actual growth</u>. *[1m – explain multiplier process + actual growth]*

(Note: Deregulation is accepted as a supply-side policy that lowers cost of production, thus increasing SRAS and leading to actual growth.)

Explain how supply-side policies can increase Indonesia's growth rate in the long run [3m]

- The increase in firms' R&D efforts can lead to process innovation which improves productivity. In addition, skills upgrading can help equip workers with the "know-how to absorb and adopt" new technologies (Extract 8), thus raising their productivity. *[1m – explain how supply-side policies increase productivity]*
- The increase in productivity of capital goods and labour leads to an increase in Indonesia's productive capacity, hence <u>increasing the LRAS</u>, leading to <u>potential growth</u>. *[1m – explain increase in LRAS / potential growth]*
- The increase in AD and LRAS leads to an <u>increase in real output</u> with little upward pressure on GPL, thus achieving <u>sustained growth</u> in the long run. *[1m – explain sustained growth or increase in real output]*

Consider how likely they are to be successful [2m – stand + 1 ATMS evaluative angle]

- **[Stand]:** Supply-side policies that focus on skills retraining and upgrading are likely to be more successful than policies to increase R&D.
- **[Situation]:** This is because there is currently a lack of workers who possess the "right competencies in software and information technology services", with a low proportion of workers having tertiary education (Extract 8). Hence, efforts to innovate are not likely to be effective at raising productivity if there is a lack of skilled workers to exploit the benefits of such technologies. Skills training will hence likely be more successful in raising Indonesia's growth rate.

(f) With reference to Extract 8 and Extract 9, discuss the likely impact of the COVID-19 pandemic on the economic performance of Southeast Asian economies. [8]

Question interpretation

Command word/phrase	*With reference to Extract 8 and Extract 9* *discuss the likely impact*	Support arguments with evidence from Extract 8 and 9. Provide a balanced analysis of the cause-process-effect links between COVID-19 (cause) and the economic performance (effect). Consider both positive and negative impacts. A final judgement on the overall likely impact is required.
Content	*COVID-19 pandemic* *economic performance*	Cause: Consider how the pandemic may affect the AD and/or AS of economies. Effect: Impact on the macro goals using AD/AS analysis.
Context	*Southeast Asian economies*	Consider Vietnam and Indonesia mentioned in Extracts 8 and 9 as examples of Southeast Asian economies.

The answer first needs to explain how the pandemic may negative affect the macroeconomic performance of Southeast Asian economies, using evidence and examples from the case. This is followed by an analysis of the possible positive impacts arising from the pandemic. Finally, an evaluative judgement on the overall likely impact is required.

Introduction

- While the COVID-19 pandemic has led to trade disruptions and a fall in tourism, hence adversely affecting the economic performance of Southeast Asian economies, it has also brought about some opportunities to these economies.
- This essay will analyse the positive and negative impacts of the pandemic on Southeast Asian economies, before evaluating the likely overall impact.

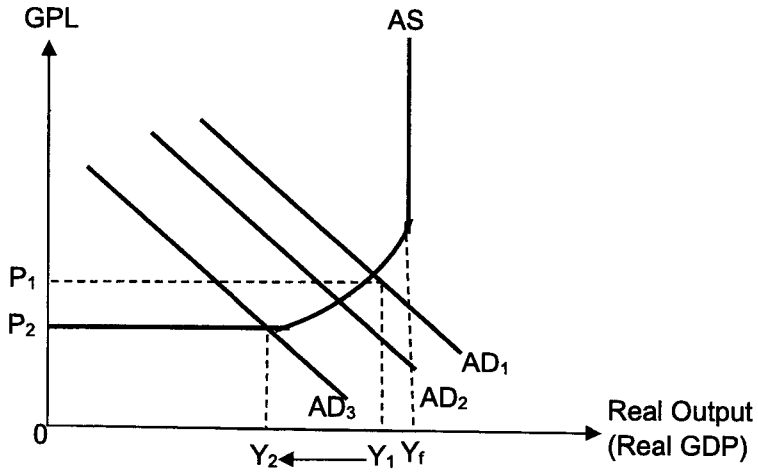
Body 1: Explain negative impact on economic performance of Southeast Asian economies

- **The pandemic has affected the economic performance of some Southeast Asian economies negatively due to the disruptions to trade, production and tourism.**
- For instance, due to the pandemic, there was a halt in production in many of Indonesia's trading partners as domestic demand weakened. As a result, there is a fall in demand for

Indonesia's exports of factor inputs and commodities e.g. palm oil and coal (Extract 8). In addition, due to travel bans, this is a fall in demand for Indonesia as a tourist destination.

- The pandemic also led to a weakening of consumer and business confidence where there was a fall in business and consumer sentiment, leading to a weakening of domestic demand (Extract 8). Consumers are pessimistic about their future incomes and businesses are pessimistic about their future profits.
- Due to the fall in demand for Indonesia's exports of factor inputs and tourism services, as well as weak consumer and business confidence, there is a fall in export revenue (X), consumption (C) and investment expenditure (I), leading to a fall in AD.
- As shown in Figure 3, the fall in AD from AD1 to AD2 leads to multiple rounds of reductions of income-induced consumption via the reverse multiplier effect, resulting in a multiplied fall in AD to AD3 and real GDP from Y1 to Y2, hence resulting in negative actual growth.
- In addition, the lower real output will cause firms to reduce their derived demand for labour, causing a rise in demand-deficient unemployment from Yf-Y1 to Yf-Y2.

Figure 3: Negative impact on economic performance



Body 2: Explain positive impact on economic performance of Southeast Asian economies

- **On the other hand, the pandemic has also given rise to opportunities to some Southeast Asian economies, causing their economies to benefit instead.**
- The pandemic has enabled Vietnam to enjoy greater export revenue (X) as its electronic exports to the US increased by 26% due to more people working from home globally (Extract 9).
- Furthermore, Vietnam has enjoyed an increase in foreign direct investment (FDI) due to more foreign firms e.g. Apple and Samsung setting up operations in Vietnam in a bid to diversify their supply chains and reduce their reliance on China for factor inputs.
- The increase in X and I increase AD. Assuming there is spare capacity present, the increase in AD will trigger multiple rounds of increase in income-induced consumption, causing a multiplied increase in real GDP and hence actual growth.
- The increase in real output increases the derived demand for labour, hence reducing demand-deficient unemployment in Vietnam.
- The increase in I also increases LRAS, hence allowing Vietnam to achieve potential growth. Together with the increase in AD, this helps Vietnam achieve sustained growth, where there is an increase in real GDP with no significant upward pressure on general price level.

Evaluative conclusion

- **[Stand]:** The pandemic is likely to have an overall negative impact on the economic performance of Southeast Asian economies because of the disruptions and reductions in global trade and tourism, causing Southeast Asian economies to suffer from falling export revenue and investment.
- **[Magnitude]:** While there might have been some positive outcomes from the pandemic, for instance in Vietnam's case, the increase in exports to the US and diversion of investment from China mainly served to reduce the extent of the pandemic's negative impact, allowing it to avoid "the worst economic effects of the pandemic" (Extract 9).

Mark scheme

Level	Knowledge, Application/Understanding, and Analysis	Marks
L2	A well-developed answer that has: • **Good balance and scope** – analyses the positive and negative impact on at least two macroeconomic goals; and • **Good rigour** – analyses the impact on the macroeconomic goals using AD/AS analysis; and • **Good application** – arguments are supported with case evidence and examples of Southeast Asian economies where relevant.	4-6
L1	For an answer that: • Lacks balance - analyses only the positive or negative impact on at least two macroeconomic goals; and/or • Lacks scope - analyses the positive and negative impact on only one macroeconomic goal; and/or • Lacks rigour – there are gaps in explaining the impact on the macroeconomic goals; and/or • Lacks application – there is little or no support with case evidence and examples of Southeast Asian economies.	1-3
	Evaluation	
E	For a well substantiated conclusion on the overall likely impact of the pandemic on economic performance of Southeast Asian economies.	1-2

(g) Assess whether tackling falling growth rate is more important than raising productivity. **[10]**

Question interpretation

Command word/phrase	Assess whether	Give a balanced and comparative analysis of the the benefits of tackling falling growth rate over raising productivity and vice versa, before providing a judgement on which which aim takes precedence.
Content	Falling growth rates...raising productivity More important	Analyse the impact (consequences) of actual growth vs productivity growth More important in terms of benefits

Context	Not stated	Answer should make reference to case material and bring in relevant examples of economies - Singapore or any economy is acceptable.

Introduction

- Falling growth rates could refer to a slower rate of positive actual growth or even negative actual growth.
- Raising productivity involves an increase in the quality of factors of production, resulting in an increase in output produced per unit input.
- Both tackling falling economic growth and raising productivity are important goals and this essay assesses whether the former should take precedence over the latter.

Body

Thesis: Explain how tackling falling economic growth may be more important than raising productivity.

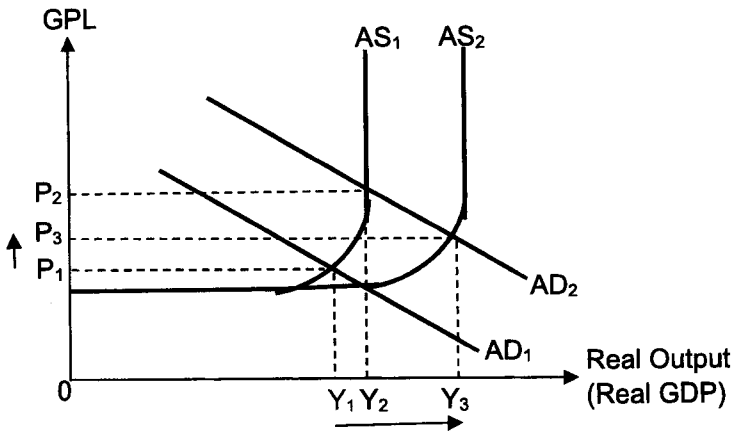
- **Tackling falling economic growth rates may be more important than raising productivity.** Slower actual growth can occur from a slower than expected growth or a decline in any of the components of the AD. This can lead to pessimism in the outlook of the economy. As consumer and business confidence falls, C and I will also fall because consumers are pessimistic about their future expected incomes, and firms are pessimistic about their future expected profits. This will then give rise to negative growth, lower derived demand for labour, higher demand-deficient unemployment, lower incomes and lower material SOL.
- Furthermore, continued weak economic growth could limit the amount of resources available to sustain growth, since there is less investment in capital, resulting in lower productive capacity and slower or even lower potential growth in the long run. Lower sustained growth limits both current and future material SOL as households have lower current and future incomes.
- With slower growth, the government collects less tax revenue, which can in turn limit its ability to enact redistributive policies to reduce income inequality to promote more inclusive growth. Non-material SOL could also be lowered if the lower tax revenue impacts the government's ability to spend on healthcare and education.
- Hence, falling growth rate, if not tackled, will lead to continuously falling AD and possibly a full-blown recession. Governments should focus on boosting the growth rates to mitigate the negative consequences of a recession.

Anti-Thesis: Raising productivity growth is more important than tackling falling growth rates.

- **Governments may decide to focus on raising productivity growth due to the positive consequences on its long-term growth.**
- The potential growth is especially important for economies that are operating near full employment. Without an increase in productive capacity, further actual growth is not possible. This is because at full employment level, an increase in AD causes factor prices to be bidded up as firms compete for factors of production that are in shortage, leading to demand-pull inflation as firms. This is the case in Indonesia where much higher growth is a challenge due to "stagnant productivity" which is the "main factor constraining potential growth" (Extract 8).
- By raising productivity, the increase in LRAS together with an increase in AD can lead to sustained growth as shown in Figure 4, where there is an increase in real GDP from Y1 to Y3

with no significant upward pressure on GPL (slight increase in GPL from P1 to P3). This increases both current and future material SOL.

Figure 4: Sustained growth arising from raising productivity



Evaluative conclusion *(stand + 1 well-reasoned ATMS evaluative angle)*

- **[Stand]**: Whether tackling falling economic growth is more important than raising productivity depends on the current economic state of the economy.
- **[Situation]**: While productivity growth is important, it takes a lower priority when there is an economic fallout as severe as the one during Covid-19. The economic fallout from Covid-19 was the most severe, surpassing even the SARS outbreak of 2002 and September 2001 attacks where the impact was more short-lived. Weaker economic growth during Covid could dampen already weak business and consumer confidence, and this could tip the economy into a full-blown recession, where growth rates become negative. Moreover, efforts at raising productivity have unpredictable outcomes, unlike efforts to boost economic growth by increasing government expenditure and through transfer payments to households. Ultimately boosting growth to preserve jobs takes precedence during times of recessions.

OR

- **[Stand]:** Whether tackling falling economic growth is more important than raising productivity depends on the severity of falling growth rates and types of challenges faced by the economy.
- **[Situation]:** If growth rates are still positive despite weaker growth, governments may choose to focus on raising productivity to address other challenges instead. For instance, while Singapore has been facing lower growth over the years, its growth rate was still forecasted to be "within the range of 0.5 to 2.5 per cent in 2020" (Extract 6). On the other hand, there are greater threats to its long-term growth, in the form of an "ageing population and weakening

productivity". Without an increase in productivity through greater investment in automation for instance, Singapore is likely to face limited potential growth which will greatly limit its ability to achieve sustained growth in the long run. Hence, for such economies facing long-term demographic challenges which threatens its long-term growth, boosting productivity is more important than tackling falling growth rates.

Student's Evaluation (Wang Yiqin 06/21)

- ***[Stand]:*** *In conclusion, tackling falling growth rate and raising productivity are both important as focussing on one objective alone would inevitably lead to creation of other unintended economic problems.*
- ***[Alternative]:*** *If the focus is on tackling falling growth rate and productivity growth is ignored, there may be significant inflation. If the focus is on productivity and not falling growth rate, unemployment could keep rising. Hence, both objectives must be taken care of.*
- ***[Situation]:*** *However, in real world situations, which objective to place more importance on depends on the situation of the economy as it is costly and incurs great opportunity cost to focus on both. Developing countries should focus on falling growth rates more as they are likely to have spare capacity in the economy for AD to rise further, while developed countries should focus on productivity more for future growth.*

Mark Scheme

Level	Knowledge, Application/Understanding, and Analysis	Marks
L3	A well-developed answer that has: • **Good balance and scope** – analyses the benefits of tackling falling economic growth and raising productivity; and • **Good rigour** – analyses the benefits of tackling falling economic growth and raising productivity using AD/AS analysis; and • **Good application** – arguments are supported with case evidence and examples of Southeast Asian economies where relevant.	5-7
L2	For an answer that: • Lacks balance and scope - analyses only the benefits of tackling falling economic growth or raising productivity; and/or • Lacks rigour – there are gaps in explaining the benefits of tackling falling economic growth or raising productivity; and/or • Lacks application – there is little or no support with case evidence and examples of Southeast Asian economies.	3-4
L1	A vague, descriptive or list-like answer on the consequences of tackling falling economic growth or raising productivity.	1-2
	Evaluation	
E	For a well substantiated conclusion on whether tackling falling economic growth is more important than raising productivity.	1-3