Class Adm No

Candidate Name: _____

H

millennia institute

2018 Preliminary Exams
Pre-University 3

GEOGRAPHY **9751/02**
Paper 2 Data Response Questions **10 September 2018**

3 hours

Additional Materials: Answer Paper
1 Insert
World Outline Map

INSTRUCTIONS TO CANDIDATES

Write your name, admission number and class on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a soft pencil for any diagrams, graphs, or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Candidates answer **all** questions.

The Insert contains all the Resources referred to in the questions.
You should make reference to appropriate examples studied in the field or the classroom, even where such examples are not specifically requested by the question.
Diagram and sketch maps should be drawn whenever they serve to illustrate an answer.
The world outline map may be annotated and handed in with relevant answers.
You are reminded of the need for good English and clear presentation in your answers.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

Section A

Theme 4: Geographical Investigation

(a) Suggest a research question for the investigation based on Resource 1 and state how the research question might be suitable for the investigation. [4]

1m – Suitable research question: How has the setting up of Rolls-Royce's R&D facility at Seletar affected the residents and businesses of Seletar and Punggol?

Suitability of RQ:
1m: Geographical manageability: Punggol is a housing estate adjacent to Rolls-Royce facility and Seletar is the area where Rolls-Royce is located and can be segmented into suitable areas for data collection by the twenty students to collect relevant data based on the residents' and businesses' experiences with Rolls Royce in various areas.
2m: Temporal manageability: The students can focus on collecting secondary data and primary data, such as number of employment generated for residents staying in Punggol and Sengkang from the year of the setting up of Rolls-Royce's R&D facility to today or identify businesses which have been operating before the setting up for Rolls-Royce facility to for interviews.

Point marked

Marker's Report:

- Some students are still unable to provide manageable RQs, although most were able to score 1m for this.
- Suitability of RQ lacked elaboration. For e.g., there is a need to elaborate on the types of data that might be appropriate to collect based on the area of research and why is that suitable.

(b) Suggest an appropriate plan to collect primary data in the area as represented in Resource 1. [7]

Indicative content:

Data needed:

- Primary data: Through quantitative surveys for residents and businesses to find out the impacts of setting up of Rolls Royce (RR) has on them, such as possibility of traffic congestion due to the setting up of the plant (for residents) and increase of earnings due to setting up of RR (for businesses). A survey will be most appropriate as it is easy to administer and does not take up very much time. Likert scale can be used as it is the easiest to understand and used by the mass public. There could also be interviews and focus group discussions with identified residents and businesses in Punggol and Seletar to find out about the impacts of setting up of RR on the residents and businesses in a more in-depth manner (such as interviewing a resident who works at RR, and businesses who have/have not benefitted from the setting up for RR in Seletar).

- Appropriate sampling method: e.g. For students, convenience sampling is probably most accessible and easiest of the sampling method for them. Simple random sampling or stratified random sampling will be very difficult

to carry out as access to employees' and residents' information is restricted.

- Secondary data: No. of jobs generated for Punggol residents since the setting up for RR facility. No. of forward or backward linkage suppliers of RR located in Seletar.

- Limitations: e.g. Students might need information from Rolls Royce itself but the company might not want to divulge information to these students due to confidentiality and sensitivity of the information. When interviewing businesses, it may also be easier to gather information from establishments such as restaurants/cafes/eateries as compared to gathering information from the business in the forward and backward linkages of RR as they may deem such information to be confidential and sensitive as well.

Research ethics: e.g. listing the key points that would be shared with the survey respondents about their research purpose, anonymity of respondents.

Risk mitigation: need to manage safety of the students e.g. stop fieldwork before sunset, use appropriate language during interviews, work in pairs

Levels marked

- *L1/1-2m: Type of data needed unclear/not stated; methods chosen may not be appropriate. Context of research not considered.*
- *L2/3-5m: Considers at least 4 of the above points, although not responses for all points are valid/well-considered.*
- *L3/6-7m: Considers all aspects and contexts of planning for investigation.*

Marker's Report:

- Many obtained low L2 because while there was information on what data to collect and how to collect, there was not much justification/elaboration on why the data would be collected in the manner described.
- Many did not really use the information provided in the question stem to help them to elaborate on their plan.
- Many provided brief explanation → unclear response

(c) Suggest how students could supplement the information and findings presented in Resource 2 to find out more about Rolls-Royce's impact on local industries. [5]

Indicative content:

- Should include information to better understand the extent to which the collaborations have impacted locals, such as number of people who has participated in the partnerships for each local institutions and out of these, how many of them are locals. There should also be more information on the income generated or added due to such collaborations, such as from Singapore Airlines Engineering Company whose employees have participated in the collaboration to advance their skills in the aerospace industry and also from those who have participated in the collaboration with WDA's new aerospace manufacturing programmes.
- The information provided in R2 is surely inadequate to assess impact of RR on local industries as there is no information on the local private institutions that RR might have worked with. Such private institutions include private

training establishments. For example, 4 out of 5 of the listed collaborations are with public institution and even the TNC stated is a state-linked corporations. More could be gleaned if more information on RR's collaboration with private firms or institutions.

- Finally, there should be more comprehensive information on the type of forward and backward linkages that RR has provided to the local suppliers in aerospace and other related industries. This should enable one to have a fuller overview of the types and depth of economic impact that setting up an R&D research facility which is of higher value-addedness has on the local industries.

Levels marked

- *L1/1-2m: Supplementary of information suggested is piecemeal and may not be purposeful.*
- *L2/3-4m: Considers some aspects and contexts to propose the information and findings needed to carefully consider the various impacts on local industries*
- *L3/5m: Considers all aspects and contexts to propose the information and findings needed to carefully consider the various impacts on local industries with relevant and strong use of resource.*

Marker's Report:

- Many obtained low L2/3 as use of resource was not strong and piecemeal.
- The possible impacts of RR via backward and forward linkages were not considered at all by any candidate.

(d) Using Resources 1 and 2, evaluate how this research might be useful in understanding the impacts of Rolls-Royce R&D in Singapore. [9]

Indicative content:

Stand: Useful to a small extent

Useful:

- Able to use map provided in R1 to identify the areas nearest to the RR facility to draw out useful boundaries to scope the research in order to ensure that it is manageable for the students.
- R2 provides a brief overview of the type of collaboration and possible effects that RR has on the various groups of communities in Singapore when they partner with RR. For example, the list shows that RR has collaborated with a few stakeholders in SG, other than TNC such as Singapore Airlines. It can be gleaned from R2 that a few statutory boards and educational institutions in Singapore have been working with RR to provide training platforms to benefit local workforce and students.

Not useful:

- R1 may not be useful because it merely informs one of the location of RR in relation to its surrounding areas. However, the effects of this R&D facility may be more far reaching than those depicted in the map, such as whether the jobs created by the facility have benefited locals who are staying in the other parts of Singapore. The same goes to the impacts on local suppliers which might fall outside the area stated in R1. There is also no indication of the related traffic congestion or enhancements to public transport in the

immediate vicinity due to the RR facility, which could bring about both positive and negative impacts to the surrounding residents as depicted in R1.

- R2 is also not useful as this is only a list of collaborations with government agencies, institutions and government-linked TNC. The impact of RR on the local industry is certainly more than just these 5 collaborations. There has to be more information, from the types of jobs and related income of the jobs created in the facility itself, the jobs created from related industries because of the backward and forward linkages to the RR facility, and the GDP that has been generated due to the presence of RR in these related industries.

Levels marked

- *L1/1-3m: Poor use of resources to explain stand. No prominent stand. Stating the use of resource instead of evaluating.*
- *L2/4-6m: Adequate use of resources to explain stand. Able to evaluate resource based on some aspects of 'impacts to local community'.*
- *L3/7-9m: Good and tight use of resources to explain stand. Able to evaluate resource based on comprehensive aspects of 'impacts to local community'.*

Marker's Report:

- Most fell in L2 as only a limited range of impacts were explored using the resources.
- Some explored a wider range of impacts and used that to evaluate the resources but the linkages to resources 1 and 2 are weak.

Section B

Theme 1: Tropical Environments

The Tropical Environment of Vietnam

2 Resource 3 shows data on protected status of karst areas in Southeast Asia. Resource 4 shows the climograph and a photograph of the karst landscape of Ha Long Bay in Vietnam. Resource 5 shows an aerial photograph of the Mekong River in Vietnam. Resource 6 shows the changes in forest cover in Vietnam from 1990 to 2005.

(a) Describe Vietnam's karst landscape relative to those in other Southeast Asia countries' as shown in Resource 3. [3]

Award 1 mark for each description, up to a maximum of 3 marks

Possible responses include:

- Vietnam has the 3rd largest karst area in SEA
- Vietnam has 14.7% of karst landscape in SEA
- However, Vietnam has the 3rd lowest percentage of karst protected area with only 7% of its karst protected compared to other countries in SEA
- Vietnam has lower than average protected karst area in percentage, protecting only 7% of its karst area when the region's average is 13%

Point marked

Marker's Report

- Most students were able to get at least 2 marks for this question
- A handful of students had description of karst in SEA in general which does not answer the question and hence did not obtain marks for those description
- Students have to work on the specificity of their answers (e.g. some wrote Vietnam has one of the most/least … → give a sensing of their placing compared to the other countries in SEA!)

(b) Using Resource 4, explain the conditions necessary for the development of karst landscape. [7]

Indicative Content

Karst landscapes are associated with the humid tropics. Students should discuss the climatic conditions associated with Halong Bay, based on the climograph given in the resource, that provides the necessary conditions for the formation of karst landscape. Besides climate, students should also make use of the photograph resource provided of Halong Bay to discuss how geology also affects the development of karst landscape, not just in the type of rock (limestone) but also how joint pattern would affect the resultant karst landscape.

Climate

- Temperature
  - From R4, Halong Bay receives moderate mean annual temperature of 23°C, where monthly temperature tends to reach its highest in the middle of the year in June and July with temperatures about 27°C
  - High temperature increases the rate at which biochemical activities take place, such as the decomposition of organic matter, that would increase the production of carbon dioxide and organic acid that will then increase the rate at which chemical weathering could take place
  - Furthermore, vant Hoff's rule states that the rate of chemical weathering increases 2 to 3 times with every 10°C increase in temperature, thus the moderate mean annual temperature of Halong Bay would allow for chemical weathering, in particular carbonation and solution, to occur and facilitate the development of karst landscape

- Precipitation
  - For the development of karst landscape, chemical weathering (carbonation and solution) of the limestone needs to take place. The agent responsible for chemical weathering is acidulated water
  - From R4, Halong Bay's receives high total annual precipitation of about 1920mm
  - This high amount of precipitation favours the active weathering of limestone, especially during the middle of the year when Halong Bay experiences the wet season

Geology

- Besides climate, the formation of karst landscape would require the presence of soluble rocks, such as limestone
- As seen in R4, Halong Bay is made up of cone karst. The white scarp indicates soluble carbonate rocks
- Joint pattern of rocks is important in influencing the resultant karst landscape. In this case, it could be inferred that the joint spacing of the karst is not too dense to allow for the formation of cone karst

Vegetation

- From R4, it could be seen that the karst landscape has vegetation grown on it

- The presence of vegetation contributes to carbon dioxide levels as well as humic acid into the soil environment when it decomposes which raises the acid level in the soil
- When rainwater infiltrates through the soil, the soil becomes more acidic through the enrichment of dissolved carbon dioxide and thus would become more effective in carrying out carbonation and solution weathering processes

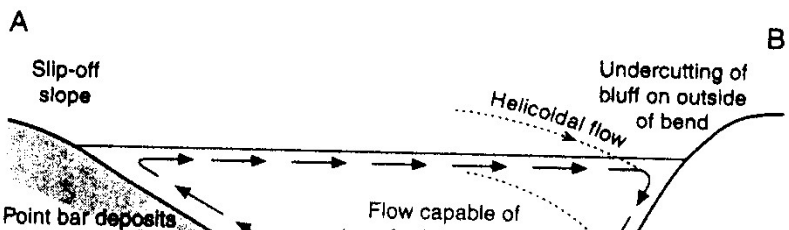
Levels marked

Level	*Marks*	*Description*
3	*6-7*	Response demonstrates accurate knowledge as well as clearly identifying and accounting for the conditions necessary for the development of karst landscape as seen in R4. Explanation made use of both good and accurate use of resources and content knowledge to account for at least 2 conditions in the development of karst landscape seen in R4. Response is clearly focused on the question throughout with a detailed account of the necessary conditions for the development of karst landscape.
2	*3-5*	Response demonstrates adequate knowledge and identifies at least 2 conditions necessary for the development of karst landscape and attempts to account for them. Response uses R4 to account for the necessary conditions but may be limited or lack accuracy at times. Response may lack detail and depth or lack a clear focus on the question.
1	*1-2*	Response demonstrates limited knowledge and identifies only 1 condition necessary for the formation of karst landscape from R4. Limited reference is made to R4 to account for the necessary conditions required. Use of resource where present lacks accuracy. Little or no explanation is made and response lacks detail, clarity and focus on the question.
0	*0*	No creditworthy response

Marker's Report

- Most students were able to identify the climatic condition, however the use of resource to support the explanation can be better. Some only managed to able to mention chemical weathering without explaining how it helps with the development of karst
- Many students were able to provide the condition of vegetation which is good
- However, only a handful discussed about geology! The factor of geology was not well-explained. Some mentioned purity of the rock which cannot be seen from the resource itself. But what can be seen is the joint density which should be discussed
- A few discussed about underground caverns which cannot be seen from the resource at all! Focus on what is shown on the resource, do not be too excited to throw out your content knowledge

(c) With the aid of a well-labelled diagram, explain the channel characteristics at cross-section AB as shown in Resource 5. [5]



Indicative content

- Point A is the inner convex bank while Point B is the outer concave bank
- At Point B, helicoidal flow that is moving faster at the outer concave bank leads to greater erosion rates
- As a result of lateral erosion by a river on its concave bank where channel flow is fast, a steep slope known as a river cliff is formed
- This helicoidal flow then loses its energy at Point A, resulting in the river to move slower and deposits its material there
- Coarse sediments carried by the river from erosion or mass movement accumulate to form point bars
- The gradual dissipation of energy leads to progressive fining of sediment towards the upper surface that could form slip off slope

Level	Marks	Description
3	5	Response provides a well-labelled diagram of the cross section AB seen in R5. Diagram is supported with accurate knowledge of the processes that take place at the cross section of a meander and the effect on the characteristics across points AB. Response is clear, detailed and shows focus on the question.
2	3-4	Response provides a diagram of the cross section AB but with few minor errors. Diagram is supported with knowledge on the processes that take place at the cross section of a meander and the effect on the characteristics across point AB but may lack accuracy or detail in parts. Response is mostly clear but may lack focus on the question at times.
1	1-2	Response fails to provide a well-labelled diagram of the cross section AB seen in R5. Diagram is supported with some knowledge on the processes that take place at the cross section of a meander and the effect on the characteristics across point AB. However, response lacks detail, clarity and focus on the question with little or no explanation of the characteristics at the cross section AB.
0	0	No creditworthy response

Marker's Report

A question that is relatively poorly done

A handful of students brought in pools and riffles but is NAQ because this question specifically just need you to explain how the channel characteristics form at the cross-section AB

Most diagram are not well-drawn/well labelled. Some even missed out AB. Some confused between concave/convex banks

Students need to know the role of helicoidal flow and how it shapes the cross-section of rivers

(d) With reference to Resource 6, suggest **two** reasons for the trends in forest cover in Vietnam from 1990 to 2010. [5]

Indicative Content

- From R6, primary forest cover has fallen from 390,000 hectares in 1990 to 75,000 hectares in 2010 but forest cover (excluding plantations) has increased from 8,300,000 hectares in 1990 to 10,200,000 hectares in 2010
- Primary forest cover in Vietnam has fallen due to drivers of deforestation such as logging, agriculture and development (students need to choose 1 to explain in detail)
- However, forest cover continues to increase despite fall in primary forest cover due to strategies adopted such as reforestation or afforestation to manage the issue of deforestation

Level	Marks	Description
3	4-5	Able to accurately explain for the nuance shown in R6. Reasons provided are explained in detail and to the context of the question (Vietnam). Resource used accurately to describe the trends shown as well. Focus on the question is evident.
2	2-3	Response did not make full use of the resource. Provided 2 reasons but lacks analysis by providing one-sided reasons. I.e. both on why primary forest has decreased or both on why forest cover has increased. Explanation may lack detail but is relevant to the context of the question (Vietnam).
1	1	Response did not make accurate use of the resource. Explanation lacks detail and clarity. Reasons provided are not suited to the context of the question (Vietnam). Response lacks focus on the question.
0	0	No creditworthy response

Marker's Report:

- Many were unable to pick out the nuance shown in the resource. Focused only on forest cover (excluding plantations) trend and hence max L2
- Some managed to point out the 2 trends but reasons provided are not strong/have flaws. For example, mentioning deforestation for the decline in primary forest cover but increase in protected areas for increase in forest cover (then shouldn't primary forest increase as well? Unless it is stated that secondary forests are planted and protected then okay). The resource is showing that deforestation is still happening especially for primary forest but the country is planting secondary forests as part of afforestation efforts (students should know the difference between primary and secondary forests)
- Note that when the question asks for only **two** reasons, please provide only **two** reasons. Any reason provided after will not be accepted

(e) Explain how the changes in primary forest cover in Vietnam as shown in Resource 6 would affect the tropical environment of Vietnam shown in Resources 4 and 5. [5]

Indicative Content

- From R6, primary forest cover has fallen from 390,000 hectares in 1990 to 75,000 hectares in 2010 indicating that deforestation is taking place in Vietnam
- The act of deforestation could result in increased sedimentation in the Mekong River in Vietnam seen in R5. Due to deforestation, soil erosion could take place at higher rates due to lack of tree roots to hold the soil together. Soil materials may then end up in the river, causing sedimentation that could lead to flooding in the long run due to accumulation of sediments in the river that lower the river's capacity.
- Deforestation also releases stored carbon due to the role that trees play as carbon sinks. Deforestation through direct burning of the logged trees, decomposition of biomass and other processes disrupts the global carbon cycle

by increasing the concentration of atmospheric carbon dioxide and the removal of trees also reduces the ability to remove subsequent inputs of carbon dioxide by photosynthesis (removal of carbon sink). This could accelerate the rate at which chemical weathering of carbonation and solution takes place on soluble rocks seen in R4.

Level	Marks	Description
3	5	Response demonstrates accurate knowledge to explain possible effects of deforestation in R6 on tropical environments in R4 and R5. Explanation made use of both good and accurate use of resources and content knowledge to elaborate. Response is clearly focused on the question throughout with a detailed account of the possible effects on tropical environment seen in R4 and R5.
2	3-4	Response demonstrates adequate knowledge to explain possible effects of deforestation in R6 on tropical environments in R4 and R5 and attempts to account for them. Response uses the resources but may be limited or lack accuracy at times. Response may lack detail and depth or lack a clear focus on the question.
1	1-2	Response demonstrates limited knowledge to explain possible effects of deforestation in R6 on tropical environments in R4 and R5. Limited reference is made to the resources. Use of resource where present lacks accuracy. Little or no explanation is made and response lacks detail, clarity and focus on the question.
0	0	No creditworthy response

Marker's Report

- Many were able to discuss how deforestation has taken place but will be good to provide data again to prove that
- While talking about the effects, students should relate to impacts learnt in content and connect to the resources
- Some mentioned about deforestation on the karst landscape itself which is most limited in scale. Rather, discuss about impacts that are more probable to occur
- Some still mixed up mass movement and soil erosion. Note that in R5, there is no slope, so it should just be on soil erosion (explain how it occurs)
- Need to work on elaboration: Some were very brief in explaining how deforestation causes soil erosion and hence flooding.

Theme 2: Development, Economy and Environment

Nike's Global Production Network

3 Resource 7 shows Nike's production map in 2014. Resource 8 shows Nike's job openings in the US and around the world and the description of the jobs offered in its corporate offices in 2015. Resource 9 is a factfile about China.

(a) With reference to Resource 7, describe the spatial distribution of Nike's global production network. [3]

1m – From R7, the HQ remains in Nike's home country of the USA.
1m – The branches are generally located in the European countries with estimated 25 branches. The next most populous area with Nike's branches is Asia-Pacific with about 15 branches.
1m – Manufacturing facilities are mainly in the developing countries, such as China, Indonesia, Thailand and Vietnam.

Point marked

Marker's Report:
- This question was generally well done.

(b) Suggest reasons for the locations of Nike's global production network as shown in Resource 7. [6]

Indicative content:

- HQ in home country:
  - Coordinate and control global operations with help of skills analysts and monitoring systems for key personnel to make informed decisions within short periods of time to cope with volatile needs in the department.
  - Most TNCs will retain their HQs in the home country as this is where the culture and design language of the TNC is kept intact according to the original culture of the TNC.
- Branches in Europe and Asia Pacific:
  - Purchasing power of consumers in Europe are higher as these are developed countries with high standards of living.
  - With rising level of affluence in Asia Pacific especially in China and India, it makes business sense to tap into the improving purchasing prowess of the consumers in the region.
- Manufacturing in Asia:
  - Textile industry such Nike's is labour intensive – imperative to keep cost down by situating production with large supply of labour to keep labour cost to the minimum and these are often found in Asian countries such as China, Thailand and Vietnam.
  - Regulations regarding labour rights and environmental laws are also laxer and ill-enforced in these countries.

Levels marked
- *L1/1-2m: Did not provide reasons for all 3 aspects of the GPN.*

- *L2/3-4m: All 3 aspects of the GPN was covered but elaboration was found wanting or was generic.*
- *L3/5-6m: All 3 aspects of the GPN was well elaborated and insightful.*

Marker's Report:

- Most obtained high L2.
- Whilst most are able to provide extensive explanations for locations of branches, the explanation for production should go beyond cheap labour.
- Explanation for location of HQ in the home county was not well elaborated. Answers need to go beyond 'stable economy and political system', or 'coordinate and control' but rather, what is available in the US to enable this 'coordinate and control' function to be situated in the US and in any other country (such as the UK) capable for providing the same (if not better) function.

(c) With reference to Resource 8, describe the global patterns of job openings (including US) offered by Nike's corporate offices. [3]

1m – Majority of Nike's job opening is in the US cities, with 429 openings for the US, with Portland having the highest number of openings. This number is much more than the total number of job openings combined globally outside the US (244).
1m – In areas outside the US, Asia has been given the most number of openings with China, Taiwan and Singapore taking 3 out of the top 5 countries for job openings in Nike. On the whole, job openings in Asia accounted for about 49% of the job openings outside of the US.
1m – European countries such as Netherlands, Belgium and Germany also accounted for 34% of the job openings outside of the US.

Point marked

Marker's Report:

- Use of resources was weak. Candidates generally stated the numbers as reference to the resource but more could be done to state a % to provide a sense of proportion to the job opening in relation to the global/US total job openings.

(d) Using evidence from Resource 9, suggest **two** reasons why Nike may want to continue its operations in China. [4]

2m – R9 shows an increase in total population from 1304 billion to 1364 billion, a total of 60 billion increase in population just within 2005 and 2015. This means potential increase in demand with larger consumer base. This will help Nike to increase its profit due to higher sales in China.

2m – In terms of purchasing power, R9 shows that the GDP per person has increased significantly from US$1753 to US$8069. This is about 4.5 times the income in 2005. This increase in GDP is a good indication of the purchasing power of the population. It can be foreseen that there should be more people who can afford more expensive products such as Nike's and also potential for Nike to bring in their higher-end products to enhance their profit margin.

Other possible points: sustained or even enhanced labour supply due to increase in total population

Point marked

Marker's Report:

- Whilst most are able to point to higher population and income, elaboration of cause and effect of these to Nike's operations/margins are weak.

(e) Using Resources 7, 8, 9 and your own knowledge, recommend whether Nike should prioritise its investment in Asia Pacific or the Americas region and justify your decision. [9]

Indicative content:

- [State objective of a TNC like Nike]: Obtain higher revenue to maximise profit, gain market foothold in new markets, stay at the top of the game via advanced R&D and innovation.
- [Asia Pacific]:
  - Presence of emerging developing economies such as China as shown in R9 with increasing population and even more impressive GDP growth.
  - From R7, with manufacturing facilities already mostly present (98% for footwear) in Asia, it makes sense for Nike to prioritise investment in Asia to capitalise on proximity of manufacturing facilities to these emerging markets
  - Also from R7, currently Asia Pacific region is already raking in $1.6 billion as compared to Americas region of $0.6 billion. Nike should continue with this momentum to introduce new products or even set up R&D in the Asia Pacific region to cater to the needs of the consumers in the Asian market for their new products.
  - From R8, Asia Pacific is also emerging to become one of the key geographical area of employment of Nike's global operations, taking up nearly 50% of the global job openings outside of the US. Thus, this means that there is increasing suitable types of labour in the Asian economies that can Nike could employ, as compared to the Americas where from R9, apart from 9 job openings, there is no other job openings. This may be a reflection of the fact that labour type in the Americas are not suitable for Nike's global productions or operations and this may become problematic even if Nike would like to expand its investment in the Americas.

Levels marked

- *L1/1-3m: Weak/little use of resources to back decision. Justifications might be based on sweeping statements.*
- *L2/4-6m: Appropriate use of resources to back decision. Justifications of decisions reflect some knowledge of the supply chain of textile industries and the key objectives of TNC operations.*
- *L3/7-9m: Appropriate use of resources to back decision. Justifications of decisions reflect in-depth knowledge of the supply chain of textile industries and the key objectives of TNC operations. Able to justify decision by proposing problems based on resources if the other area is chosen instead.*

Marker's Report:

- Most candidates are not able to counter-argue their decision by pointing out the possible problems if investments were to be expanded in the other area.

Theme 3: Sustainable Development

Global and China's Investments in Renewable Energy

4 Resource 10 shows the worldwide investments in renewable energy between 2006 to 2015. Resource 11 shows the renewable energy investments by technology in 2015. Resource 12 shows the leading investors in renewable energy in 2015. Resource 13 shows China's targeted energy mix by 2050.

(a) With reference to Resource 10, describe the changes in worldwide investments in renewable energy between 2006 to 2015. [4]

Award 1 mark for each point to a maximum of 4 marks.

Possible responses include:

- Worldwide investment in renewable energy has generally increased from 112 US Billion in 2006 to 290 US Billion in 2015
- The largest increase took place between 2009 to 2010, where investment increased by approximately 62.5 US Billion
- Smallest change is a decrease from 2008 to 2009, with a fall by 12.5 billion
- Worldwide investment in renewable energy is inconsistent/not a consistent increase.
- From 2008 to 2009 and from 2011 to 2013, investment decreased by approximately 12.5 US Billion and 50 US Billion respectively.

Data from the Resource should be used when appropriate to support responses.

Point marked

Marker's Report

- A handful of students did not answer the question which asked to describe the CHANGES and not just describe worldwide investments in general (take note of such words!)
- Hence, students should describe general change (increase from 2006 to 2015), specific largest and smallest changes (increase/decrease by how much) and anomalies
- Need to read data properly. A handful wrote that the largest increase was from 2008 to 2009 when it should be 2009 to 2010

(b) With reference to Resource 10, account for the changes in worldwide investments in renewable energy between 2006 to 2015. [4]

Award 1 mark for each point to a maximum of 2 marks.
Award 1 mark for each accompanying explanation to a maximum of 2 marks.

Possible responses include:

- Population growth threatening already-scarce supply of non-renewable energy sources
- Pressure to reduce the negative effects of climate change
- Promoting economic development in ways that reduce harm on the environment

Data from the Resource should be used when appropriate to support responses.

Point marked

Marker's Report:

- Not done well, most students were unable to 1) identify suitable/possible reasons and 2) elaborate on them
- Students need to think why there has been an increase in worldwide investment (linking to CC!)
- A handful discussed the drop in investment in some years due to financial crises which was accepted
- Note: Renewable energy does not include nuclear energy

(c) Explain possible reasons contributing to the proportion of renewable energy investments by technology as shown in Resource 11. [4]

Award 1 mark for each point to a maximum of 2 marks.
Award 1 mark for each accompanying explanation to a maximum of 2 marks.

Possible reasons include:

- Already established infrastructure/technologies for certain forms of renewable energy (eg. Solar and Wind Energy)
- Cost of investment

Data from the Resource should be used when appropriate to support responses.

Marker's Report

- Another poorly done question
- Question asked about reasons that contribute to the PROPORTION of renewable energy, i.e. some form of comparison is needed but some just stated reasons for each type of renewable energy
- Many were unable to elaborate 2 proper reasons
- Some wrote sweeping statements such as how solar is widely available with countries receiving sunlight every day or how solar is free and infinite (others are not?). Phrasing is important. You may write that sunlight is a MORE widely available resource than geothermal energy and hence more investment to harness the energy

(d) Discuss possible reasons contributing to China's investment in renewable energy as shown in Resource 12. [6]

<u>Indicative Content</u>

- Pressure by the developed world to transit towards greener modes of growth
- Economic benefits of developing their renewable energy sector
- Population growth threatening already-scarce supply of non-renewable energy sources

Levels marked

Marker's Report

- Many did not do well as they focused only on why china's investment in renewable energy is high but did not compare the amount of money invested by China relative to other countries and also did not discuss the significance of why China's investment in renewable energy is that high in 2015

- With these angles, what would you be writing instead? This will then make use of the resource more purposefully to show higher level analysis for higher marks

Levels	Marks	Descriptors
3	5 -6	Response demonstrates good knowledge of the likely reasons contributing to China's leading position in the investment in renewable energy. Explanation is detailed, thorough and relevant to the context of the question. Reference is made to the resource to substantiate response.
2	3-4	Response demonstrates reasonable knowledge of the likely reasons contributing to China's leading position in the investment in renewable energy. Explanation is clear and mostly relevant to the context of the question. Reference is made to the resource to substantiate response.
1	1-2	Response demonstrates some or limited knowledge of the likely reasons contributing to China's leading position in the investment in renewable energy. Explanation may not be always relevant to the context of the question.
0	0	No creditworthy response.

(e) Discuss the likelihood of China achieving its aims by 2050 as stated in Resource 13. [7]

Indicative Content

- Prioritization of the renewable energy sector by the Chinese state would allow China to achieve its aims by 2050
- Contestations by the civil society against certain forms of renewable energy development by prevent China from achieving its aims by 2050
- China's population may grow faster than the speed at which the renewable sector can develop

Levels marked

Levels	Marks	Descriptors
3	6-7	Response demonstrates good knowledge on the possibilities and challenges of China's renewable energy targets/aims. Explanation is detailed, thorough and relevant to the context of the question. Reference is made to the resource to substantiate response.
2	4-5	Response demonstrates reasonable knowledge on the possibilities and challenges of China's renewable energy targets/aims. Explanation is clear and mostly relevant to the context of the question. Reference is made to the resource to substantiate response.
1	1-3	Response demonstrates some or limited knowledge on the possibilities and challenges of China's renewable energy targets/aims. Explanation may not be always relevant to the context of the question.
0	0	No creditworthy response.

Marker's Report

- Another question that is poorly done
- Some did not address the demand of the question. Question is asking whether its targets are possible and NOT asking for reasons for the trends shown
- Students should be discussing why there is the potentials for China to venture into AES, the challenges as well as whether the target for reduction in coal is possible!

Copyright Acknowledgements

Question 1 Resource 1	http://www.streetdirectory.com/sg/engine-test-rolls-royce-singapore/6-seletar-aerospace-rise-797575/105236_151296.html (last accessed 20 Aug 2018)
Question 1 Resource 2	https://www.rolls-royce.com/media/press-releases-archive/yr-2010/101028-enhance-skills.aspx https://www.rolls-royce.com/media/press-releases-archive/yr-2010/activity-contributing-to-singapore-economy.aspx https://www.a-star.edu.sg/News-and-Events/News/Press-Releases/ID/5691 https://www.rolls-royce.com/media/press-releases.aspx#18-07-2018-dsta-and-rr-partner-to-harness-digital-technologies-for-defence (last accessed 20 Aug 2018)
Question 2 Resource 3	https://academic.oup.com/bioscience/article/56/9/733/262911 (last accessed 24 August 2018)
Question 2 Resource 4	https://www.klook.com/activity/7448-halong-bay-day-tour-hanoi-halong-bay/ and http://www.southalltravel.co.uk/holidays-tours/vietnam/discover-vietnam/ (last accessed 25 August 2018)
Question 2 Resource 5	https://www.flickr.com/photos/fesign/29348001830 (last accessed 25 August 2018)
Question 2 Resource 6	https://news.mongabay.com/2013/09/hydro-projects-a-front-for-logging-in-vietnam/ (last accessed 25 August 2018)
Question 3 Resource 7	https://slideplayer.com/slide/8732707/ (last accessed 20 Aug 2018)
Question 3 Resource 8	http://timdegner.com/nike/ (last accessed 4 May 2018)
Question 3 Resource 9	Copyright, Millennia Institute, 2018
Question 4 Resource 10	https://www.rsm.global/insights/economic-insights/global-trends-renewable-energy
Question 4 Resource 11	https://www.rsm.global/insights/economic-insights/global-trends-renewable-energy
Question 4 Resource 12	https://www.rsm.global/insights/economic-insights/global-trends-renewable-energy
Question 4 Resource 13	http://www.nepalenergyforum.com/chinas-shift-from-coal-to-hydro-comes-at-a-heavy-price/