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FAIRFIELD METHODIST SCHOOL (SECONDARY)

PRELIMINARY EXAMINATION 2017
SECONDARY 4 EXPRESS

GEOGRAPHY **2236/01**
Paper 1 **Duration: 1 hour 40 minutes**

Date: 17 August 2017

READ THESE INSTRUCTIONS FIRST

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

Section A
Answer Question 1.

Section B
Answer <u>one</u> question.

Write all answers on the Answer paper provided.
Candidates should support their answers with the use of relevant examples.
Sketch maps and diagrams should be drawn whenever they serve to illustrate an answer.

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.

This question paper consists of 8 printed pages including the cover page.

Section A

This question is compulsory

1 The figure below shows the cross section of Rhinestone Coastal Dune Park. The park has not been doing well economically and in addition, it has had to execute a dune repair recently.

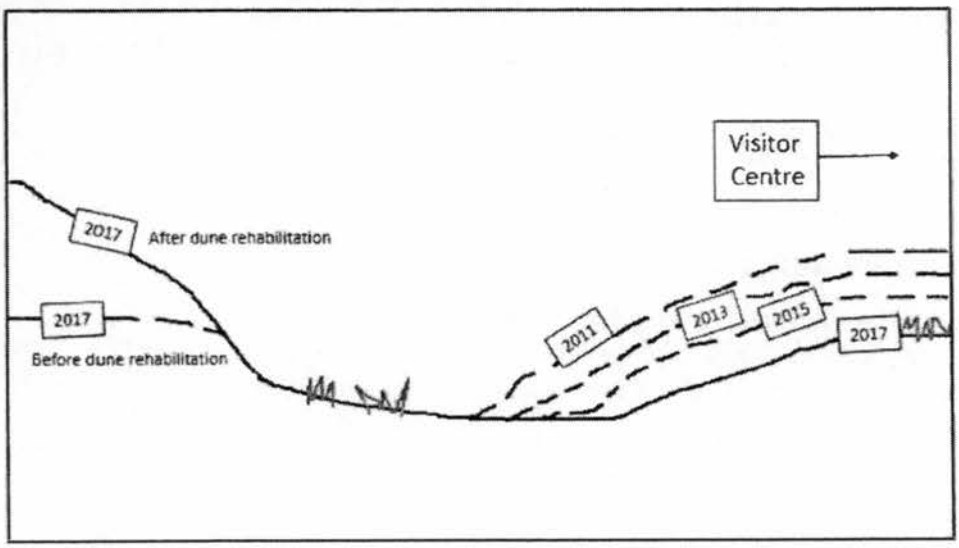


Fig. 1

a) (i) As one of the measures implemented to boost visitor numbers to the dune park, the management wanted to introduce sand sledding. In order for that to take place, the angle of the dunes should not be too steep.

Describe how the management can go about to study whether the dune that has just been rehabilitated is suitable for sand sledging. [6]

(ii) What considerations do the managers have to take to ensure that the readings collected are accurate? [2]

b)

	2011	2013	2015	2017
Dune that underwent repair (height in metres)	50	42	37	31
Dune that did not undergo repair (height in metres)	50	40	33	26

Table 1

With reference to Table 1, use a bar chart to represent the heights of the two dunes featured in Fig. 1, from 2011 to 2017. [3]

c) (i) Over the years, the management has also realised that the dune they repaired did not erode at as quick a rate as the other dune in their park. This difference can be observed in Fig. 1.

Suggest a hypothesis that describes the relationship between the rate of erosion of the sand dunes and the location of the dunes. [1]

(ii) Explain the reason that led you to come up with this hypothesis. [2]

d) A few years later, the management decides to re-implement the strategy in a). They then wanted investigate the effectiveness of the strategy and so they decided to carry out a bi-polar survey. The bi-polar survey was carried out on a Saturday afternoon and 50 dune park goers were asked to fill in the bi-polar survey. Fig. 2 shows a sample of the bi-polar survey used by the managers.

	-3	-2	-1	1	2	3	
Strategy is ineffective in preventing erosion.							Strategy is effective in preventing erosion.
Strategy is expensive to build.							Strategy is a cost-effective way of protecting the beach.
Strategy is unsightly.							Strategy does not detract from the scenic beauty of the beach.

Fig. 2

(i) To carry out the survey, the students moved around in a large group at the same time. After carrying out the surveys in one section of the dune park, they then moved on to the next. Explain the advantage and disadvantage of conducting surveys in this manner. [2]

(ii) Evaluate the criterion used in the bi-polar survey by commenting on the phrasing of the criterion. [2]

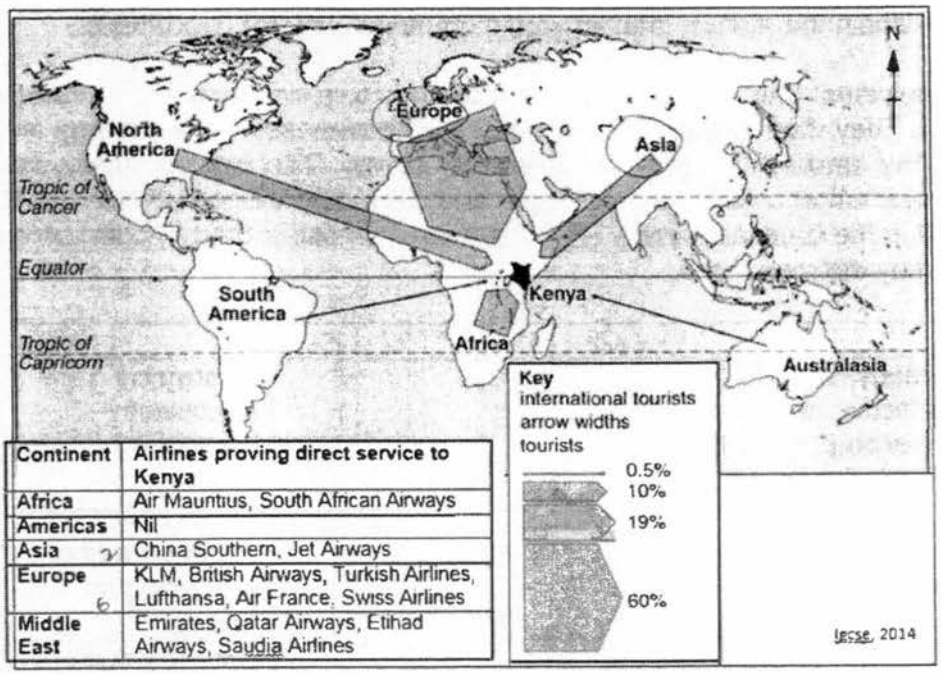
(iii) Describe how the bi-polar survey should be carried out so the results can be more accurate. [5]

(iv) Describe and explain where would be the most suitable location to conduct the bi polar survey so as to hit their target audience. [2]

Section B

Choose one question only

2. Study Fig. 3 which shows information about providing direct airline services to Kenya from different continents.



Continent	Airlines proving direct service to Kenya
Africa	Air Mauritius, South African Airways
Americas	Nil
Asia	China Southern, Jet Airways
Europe	KLM, British Airways, Turkish Airlines, Lufthansa, Air France, Swiss Airlines
Middle East	Emirates, Qatar Airways, Etihad Airways, Saudia Airlines

Fig. 3

(a) With the help of Fig. 3, describe and explain the difference in tourist arrivals to Kenya from Europe and Asia. [4]

(b) Fig. 4 shows tourist attractions in Hong Kong.

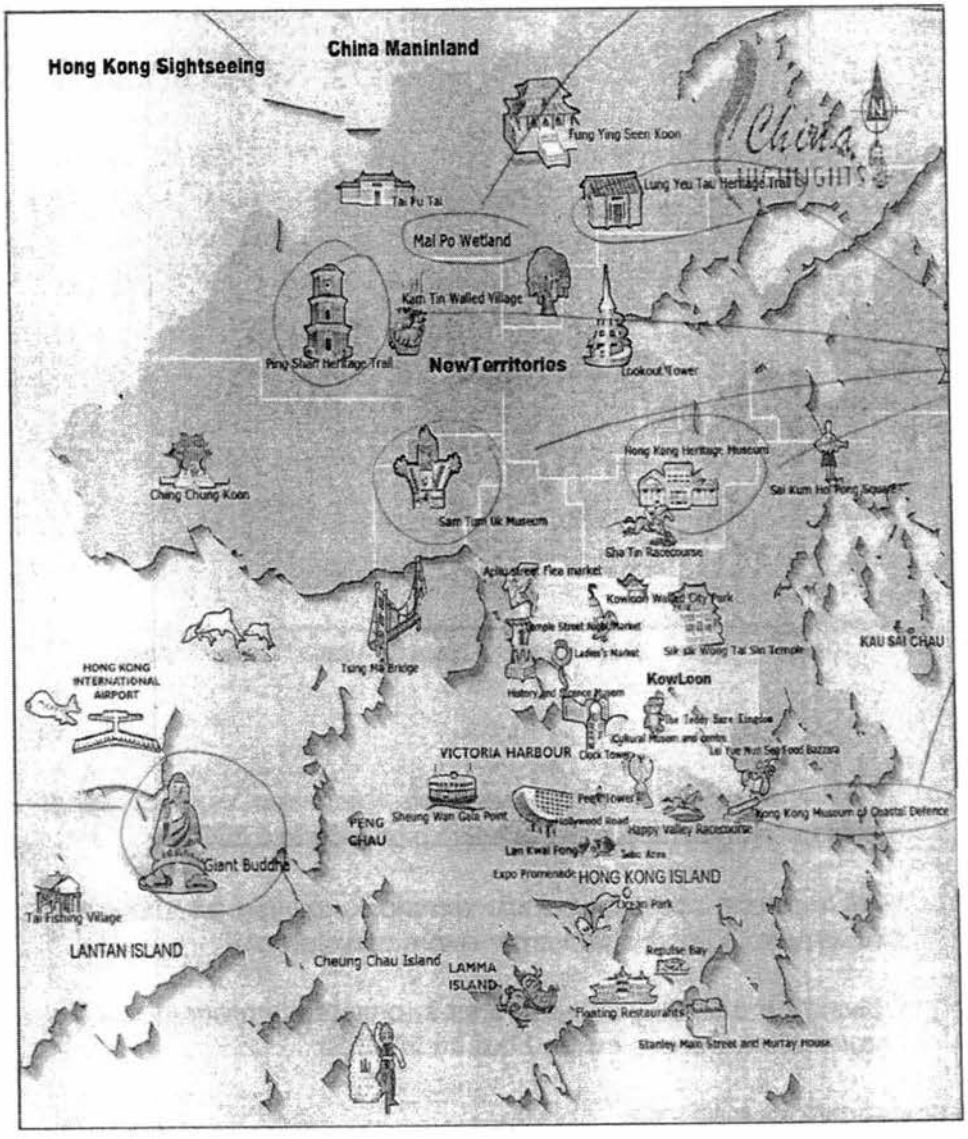


Fig. 4

With reference to Fig. 4, locate and explain 3 key tourist attractions that support the different types of tourism. [4]

(c) The graph below shows that the global average temperature of the earth.

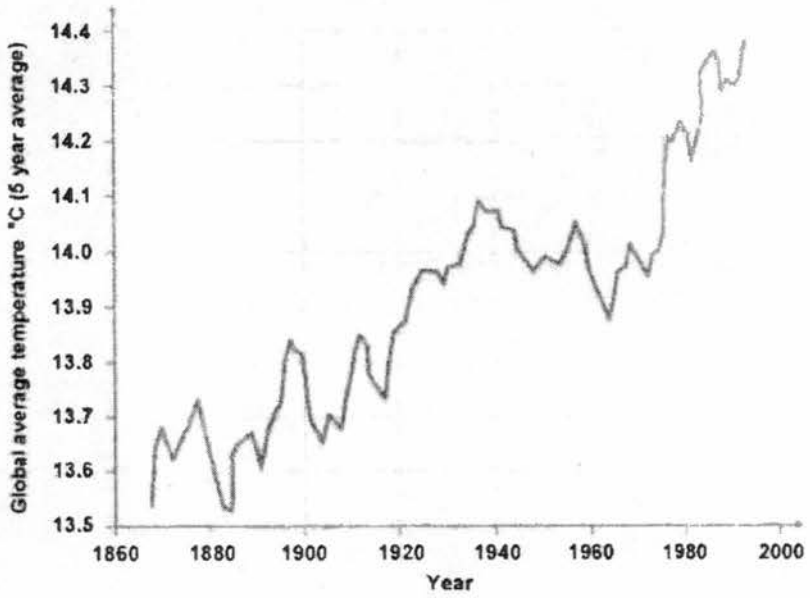


Fig. 5

(i) With reference to Fig 5, describe the trend of the global average temperature of the earth from 1860 to 2000. [3]

(ii) With reference to a specific example, explain how the trend observed in c(i) will affect coral reef ecosystems. [3]

(iii) Describe the likely consequences to coastal communities if the coral reefs were to be wiped out by 2050. [3]

(d) 'Tourism destroys tourism.'

How far do you agree? Use examples to support your answer. [8]

3. Fig. 6 is an attraction of a natural landform found along the coast in Tasman National Park, Tasmania, Australia.

Fig. 6

(a) (i) Describe the characteristics of the landform seen in Fig. 6. [2]

(ii) Identify the natural landform and with the aid of a diagram, describe how it may have been formed over time. [5]

(b) Explain how coastal areas can be managed in a sustainable manner. [3]

(c) Fig. 7 below shows a coastal management strategy found at Hanasaki harbor in Japan.

Fig. 7

(i) The coastal management strategy in Fig. 7 is actually a variation of one of the strategies you have learnt. Identify and describe what the strategy is. [2]

(ii) With reference to examples you have learnt, describe and explain one instance of success and one limitation of the aforementioned strategy in (i). [2]

(iii) Identify one other coastal management strategy which is constructed from the same material as the strategy in (i) and explain one instance of success and one limitation of the second strategy. [3]

(d) 'The threats that mangroves face will overcome their abilities to adapt and survive in their saline coastal environments.'

How far do you agree? Use examples to support your answer. [8]

FAIRFIELD METHODIST SCHOOL (SECONDARY)

PRELIMINARY EXAMINATION 2017
SECONDARY 4 EXPRESS

GEOGRAPHY **2236/ 02**
Paper 2 **Duration: 1 hour 30 minutes**

Date: 22 Aug 2017

Additional Materials: Answer Paper
1 Insert

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on the Answer Paper provided.
Write in dark blue or black pen on both sides of the paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Section A
Answer **one** question.

Section B
Answer **one** question.

Write all answers on the Answer Paper provided.
Candidates should support their answers with the use of relevant examples.
Sketch maps and diagrams should be drawn whenever they serve to illustrate an answer.
The Insert contains Fig. 2 for Question 1b, Fig. 4 for Question 2a, and Fig. 8 for Question 3a.

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.

This question paper consists of 9 printed pages including the cover page.

[Turn over

Name: _____ ( ) Class: _____

Section A

Answer one question from this section.

1(a) With reference to Fig. 1, describe the distribution of subduction zones in the world. [4]

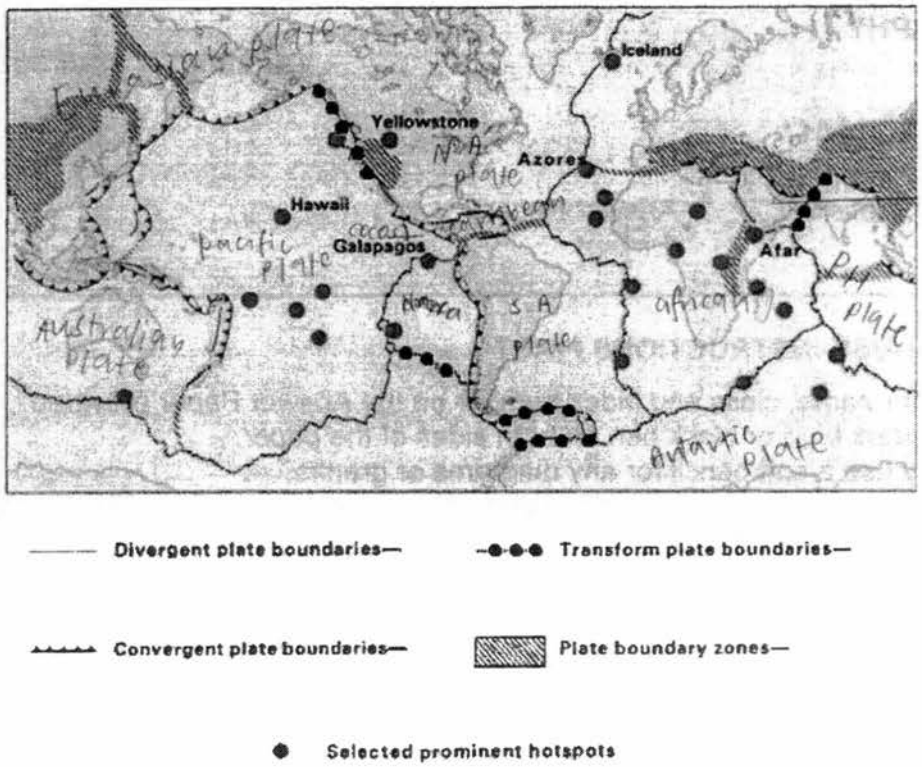


Fig. 1

(b) Study Fig. 2 (Insert) which shows a tectonic landform found in Iceland.

(i) Describe the characteristics of the landform found in Fig. 2. [2]

(ii) With the aid of a well-labelled diagram, explain its formation. [4]

Name: _____ ( ) Class: _____

(c) Fig. 3 shows the internal structure of the earth.

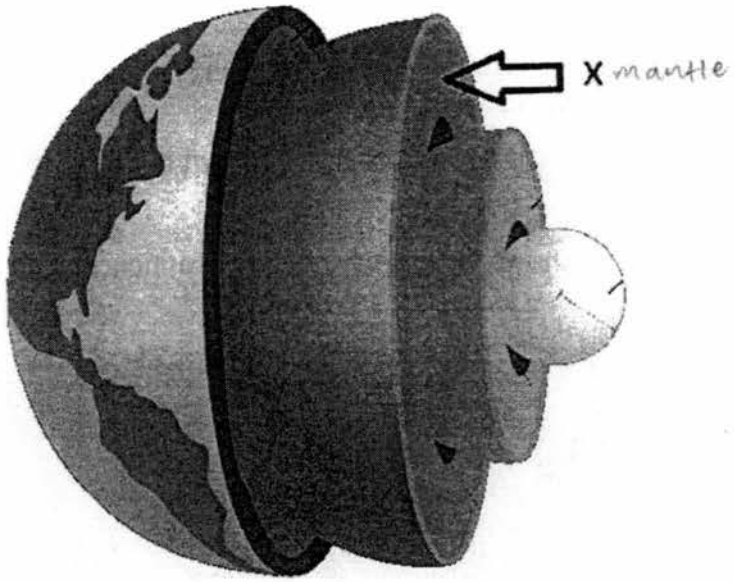


Fig. 3

Identify Layer X and describe its physical characteristics. [3]

(d) With the aid of examples, explain the advantage and disadvantage of a short term response in the event of an earthquake. [4]

(e) 'Destruction of properties and infrastructure is the greatest hazard of earthquake in an inland city.'

Do you agree? Support your answer with examples. [8]

Name: _____ ( ) Class: _____

2(a) Fig. 4 (Insert) shows the number of catastrophic events in the world.

(i) Describe the trend of the catastrophic events in the world between 1980 and 2012. [3]

(ii) Suggest a reason for a trend shown in Fig. 4. [1]

(b) Figures 5 and 6 shows a volcano, Mount Kerinci, and its location in the world.

Fig. 5

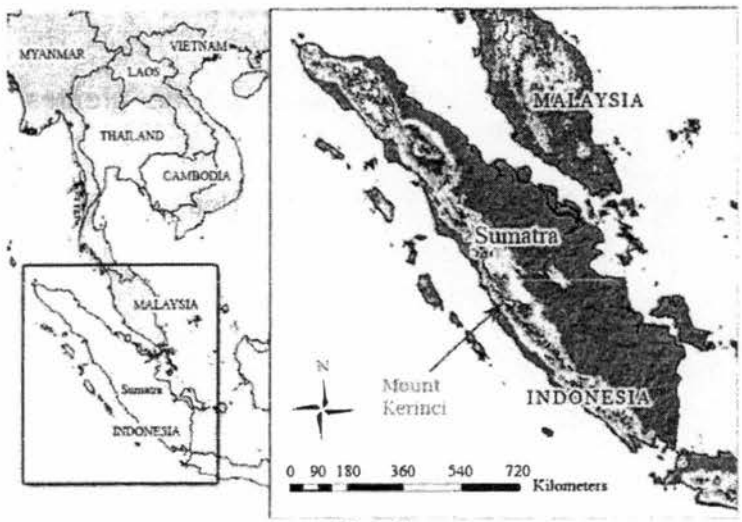


Fig. 6

(i) Describe the characteristics of Mount Kerinci shown in Fig. 5. [2]

(ii) With the aid of a well-labelled diagram, explain the formation of Mount Kerinci shown in Fig. 6. [4]

Name: _____ ( ) Class: _____

(c) Fig. 7 shows the Typhoon Haitang off the eastern coast of Taiwan in July 2005.

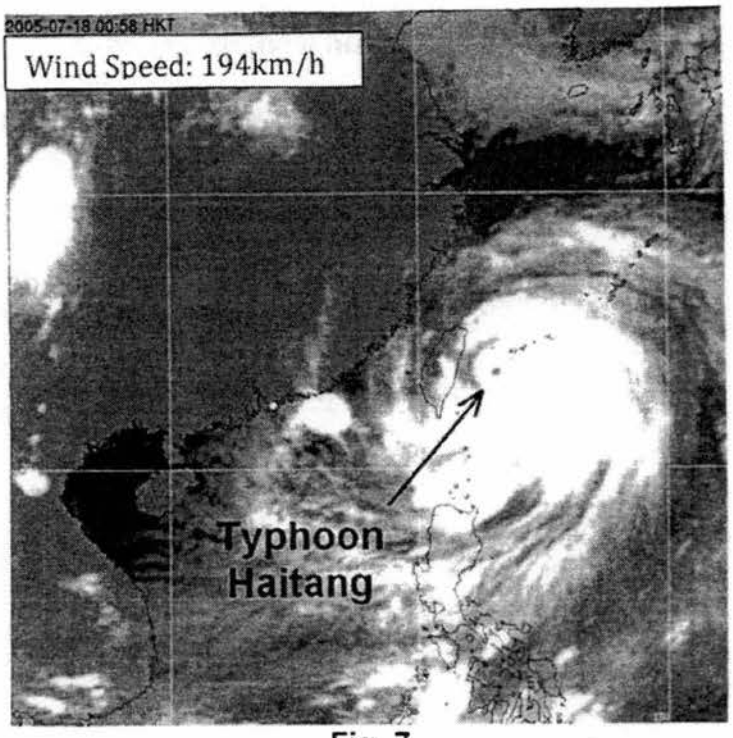


Fig. 7

Describe the characteristics of Typhoon Haitang. [3]

(d) Explain the advantages and disadvantages of a strategy adopted by Singapore to fight climate change. [4]

(e) 'Climate change is a greater concern for less developed countries than developed countries.'

Do you agree? Give reasons to support your answer. [8]

Name: _____ ( ) Class: _____

Section B

Answer one question from this section.

3 (a) Fig. 8 (Insert) shows the future projection of water stress condition in agricultural lands all over the world in 2025.

Describe the pattern of the water stress condition across the globe. [4]

(b) Fig. 9 shows the proportion of people who are hungry in developing countries and the percentage of children under five who are stunted.

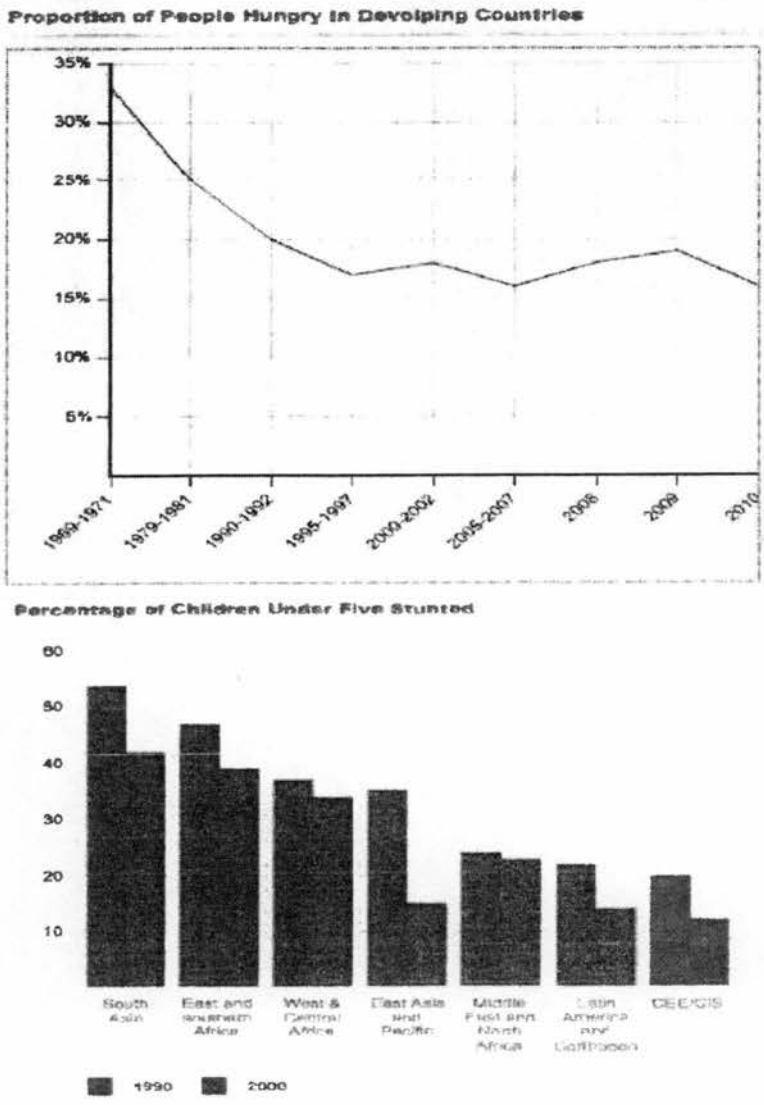


Fig. 9

Using Fig. 9, explain the political reason behind the trends. [5]

(c) Fig. 10 is an abstract on the food security issue in Sudan.

Name: _____ ( ) Class: _____

Nearly 4 million South Sudanese have been displaced from their homes since the country's internal conflict began in December 2013.

The latest IPC report, released this week, said armed conflict continues to disrupt agriculture and markets around the country, making food difficult to obtain.

Gottschalk said the onset of South Sudan's rainy season would make conditions worse by making roads impassable and bringing on waterborne diseases.

Fig. 10

Using Fig. 10 only, identify and explain the causes of food insecurity in Sudan. [4]

(d) With the aid of examples, explain why there is a high obesity rate in the developed countries. [4]

(e) 'The Green Revolution is more hazardous to the environment than Genetically-Modified Food'

Do you agree? Give reasons to support your answer. [8]

Name: _____ ( ) Class: _____

4 (a) Fig. 11 shows the world's largest markets for organic products.

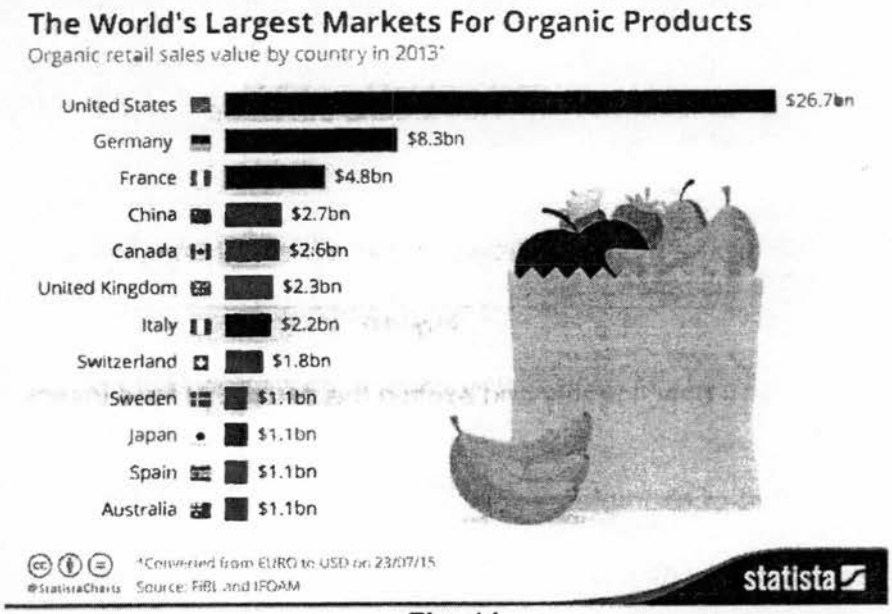


Fig. 11

Name: _____ ( ) Class: _____

(c) Fig. 13 shows a measure taken by the government to prevent the spread of malaria.

Fig. 13

(i) Describe the preventive measure shown in Fig. 13. [1]

(ii) With the aid of examples, evaluate a government mitigation measure against mosquito-borne diseases. [4]

(d) Explain a social and economic factor that contribute to the spread of the HIV/AIDS epidemic. [4]

(e) 'Education is the most important social factor in the difference of health between Developed Countries and Less Developed Countries.'

Do you agree? Explain your answer. [8]

End-of-paper

Name: _____ ( ) Class: _____

FAIRFIELD METHODIST SCHOOL (SECONDARY)

PRELIMINARY EXAMINATION 2017
SECONDARY 4 EXPRESS

GEOGRAPHY **2236/02**
Paper 2 **Duration: 1 hour 30 minutes**

INSERT

READ THESE INSTRUCTIONS FIRST

This Insert contains Fig. 2 for Question 1b, Fig. 4 for Question 2a, and Fig. 8 for Question 3a.

This Insert consists of 3 printed pages including the cover page.

Name: _____ ( ) Class: _____

Fig. 2

No. of catastrophic events in the world

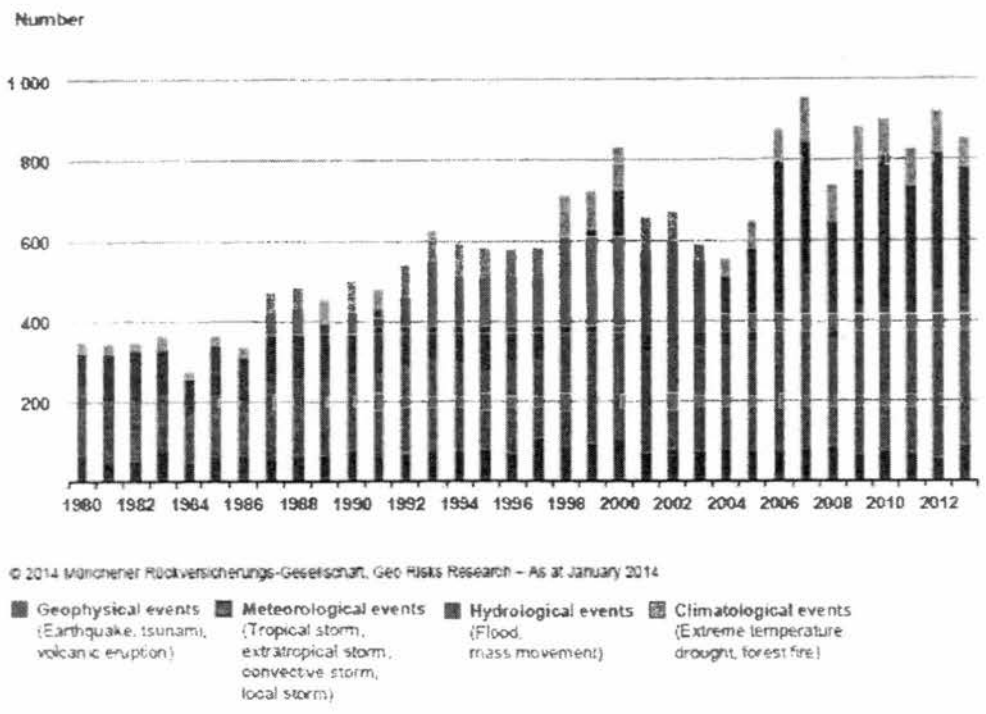


Fig. 4

Name: _____ ( ) Class: _____

Water stress will increase in many agricultural areas by 2025 due to growing water use and higher temperatures (based on IPCC scenario A1B)

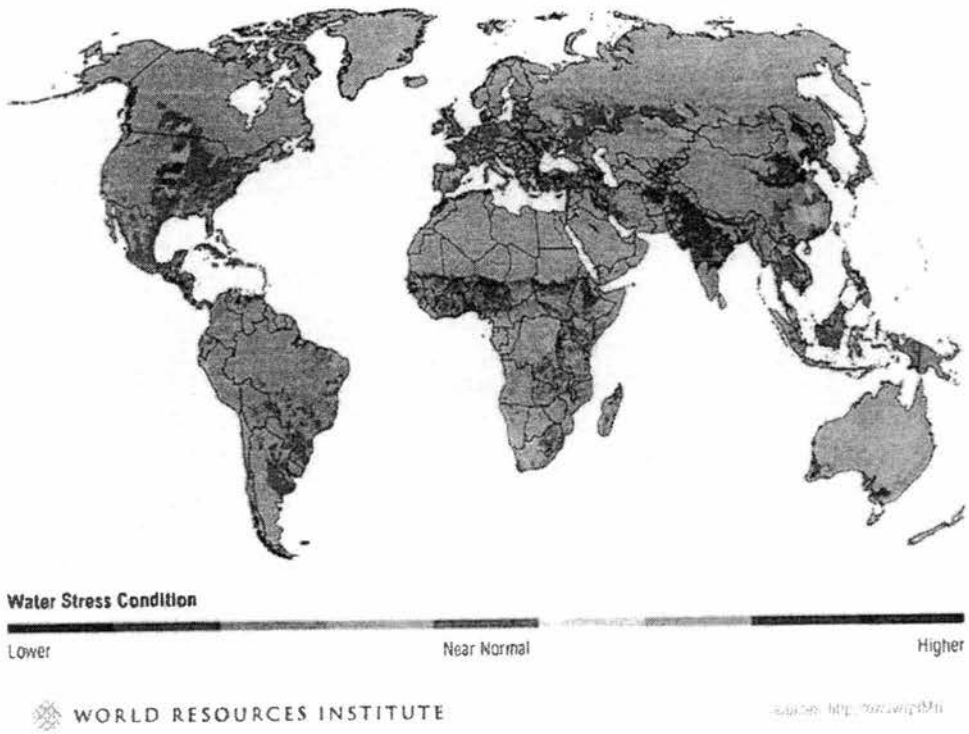


Fig. 8

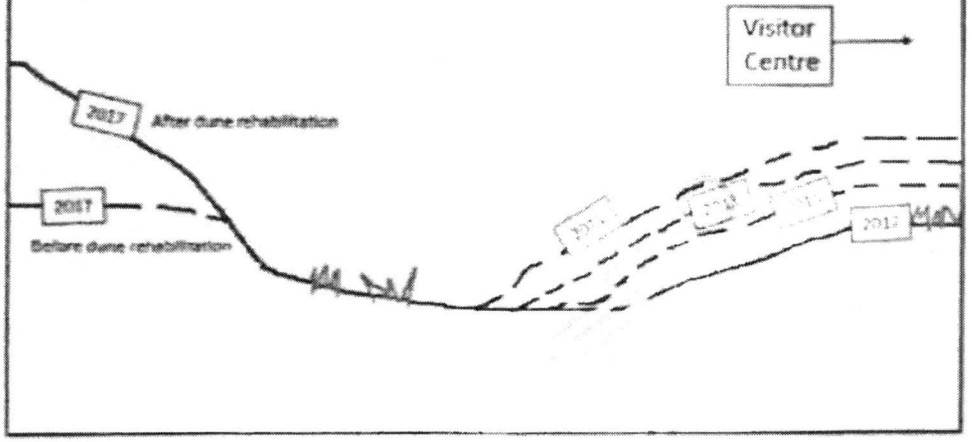


Fig. 1

a)	(i) As one of the measures implemented to boost visitor numbers to the dune park, the management wanted to introduce sand sledding. In order for that to take place, the angle of the dunes should not be too steep. Describe how the management can go about to study whether the dune that has just been rehabilitated is suitable for sand sledding.	[6]
	• Lay out the measuring tape along the line of the transect, starting from the base of the slope to the peak • Mark out equidistant points along the transect where there is a distinct change in the gradient of the dune slope. • Place the first ranging pole at the base of the dune and the second at the first change in gradient. • Use a clinometer to measure the dune slope by placing it on the top of the first ranging pole and aiming it to the top of the second ranging pole • Record the gradient value along with the distance between the poles.	

- Move the first pole to the next change of beach slope and measure the angle of the slope and distance between poles and continue for all changes in dune slopes.

Award 1m for each valid point.

(ii) What considerations do the managers have to take to ensure that the readings collected are accurate? [2]

- Make sure both poles are the same height and do not push poles into the sand
- Hold poles upright.
- Take the average of 3 readings at least for each point

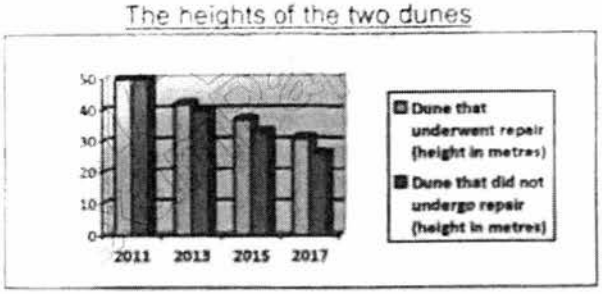
Award 1m for each valid point.

b)

	2011	2013	2015	2017
Dune that underwent repair (height in metres)	50	42	37	31
Dune that did not undergo repair (height in metres)	50	40	33	26

Table 1

With reference to Table 1, use a bar chart to represent the heights of the two dunes featured in Fig. 1, from 2011 to 2017 [3]



c) (i) Over the years, the management has also realised that the dune they rehabilitated did not erode at as quick a rate as the other dune in their park. This difference can be observed in Fig. 1.

Suggest a hypothesis that describes the relationship between the rate of erosion of the sand dunes and the location of the dunes. [1]

The further away from the visitor centre, the slower the rate of erosion./ The nearer to the the visitor centre, the faster the rate of erosion.

Award 1m for each valid point.

10

	(ii) Explain the reason that led you to come up with this hypothesis.	[2]
	The visitors enter the dune park from the visitor centre side and most visitors will pass by the dune on that side. Not all visitors will make it to the other dune and hence, the fewer visitors there are, the less treading on the sand dunes there will be and this reduces the rate of erosion. Award 1m for each valid point.	
d)	A few years later, the management decides to implement the strategy in a). They then wanted investigate the effectiveness of the strategy and so they decided to carry out a bi-polar survey. The bi-polar survey was carried out on a Saturday afternoon and 50 dune park goers were asked to fill in the bi-polar survey. Fig. 2 shows a sample of the bi-polar survey used by the managers.	

	-3	-2	-1	1	2	3	
Strategy is ineffective in preventing erosion.							Strategy is effective in preventing erosion.
Strategy is expensive to build.							Strategy is a cost-effective way of protecting the beach.
Strategy is unsightly.							Strategy does not detract from the scenic beauty of the beach.

Fig. 2

	(i) To carry out the survey, the students moved around in a large group at the same time. After carrying out the surveys in one section of the dune park, they then moved on to the next. Explain the advantage and disadvantage of conducting surveys in this manner.	[2]
	Advantages: • One advantage of conducting surveys in this manner is efficiency – the students should be able to work together and get the surveys done more quickly. • One advantage of conducting surveys in this manner is they can get a large sample at one location – if a large sample size is required, the students can get more responses since all the students are there at the same time to conduct the surveys Disadvantages: • However, there will likely be errors because the surveys at different	

locations would be carried out at different times of the day
- It might be more efficient for the students to split up rather than stick together in a group
- Also, if there are too many students and too few tourists, they will likely be some researchers with nothing to do.

Award 1m for each valid point.

(ii) Evaluate the criterion used in the bi-polar survey by commenting on the phrasing of the criterion. [2]

- Beach goers would not be able to assess if the strategy is effective or not as they have no technical knowledge.
- They also would not know the cost of the strategy.

Award 1m for each valid point.

(iii) Describe how the bi-polar survey should be carried out so the results can be more accurate. [5]

- Come up with a range which is from -3 to 3
- Write in a table and come up with a list of criteria
- Criteria should not be vague or open to interpretation. If possible, standardise the criteria by taking picture of what you mean. For example, -1 represents a fixed quantity so that both respondents and investigator have the same idea
- Example of the list of criteria include pollution, noise, litter , cost, effectiveness and human traffic
- Choose a sampling method (either random or systematic) and survey 30 to 50 people.
- Record the responses and a plot out a bipolar graph to analyse your survey results.

Award 1m for each valid point.

(iv) Describe and explain where would be the most suitable location to conduct the bi polar survey so as to hit their target audience. [2]

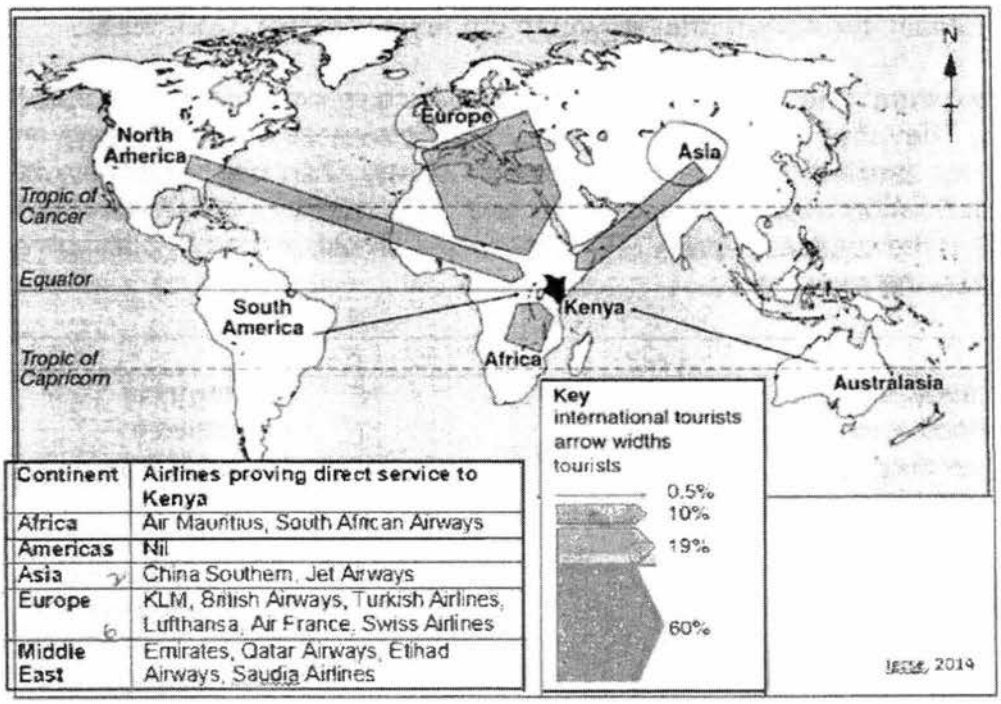
- The exit of the sand dune park would be a suitable location
- This is where the highest human traffic will pass by so that the students can catch visitors just before they leave and will also be able to talk to those who have actually visited the dune park

Award 1m for each valid point

Section B

Choose one question only.

2. Study Fig. 3 which shows information about providing direct service to Kenya from different continents.



Continent	Airlines proving direct service to Kenya
Africa	Air Mauritius, South African Airways
Americas	Nil
Asia	China Southern, Jet Airways
Europe	KLM, British Airways, Turkish Airlines, Lufthansa, Air France, Swiss Airlines
Middle East	Emirates, Qatar Airways, Etihad Airways, Saudia Airlines

Fig. 3

(a) With the help of Fig . 3, describe and **explain the** difference in tourist arrivals to Kenya from Europe and Asia. [5]

- Europear tourists are 6 times [60%] more than Asian tourists [10%]
- Proximity: Europe is closer to Kenya than most of Asia – so more time needed to travel to Kenya for Asians, which would be a discouraging factor for going there.
- Europe is closer to Kenya than most of Asia and so the cost of traveling there will be lower as well
- There are 6 airlines connecting Europe to Kenya while only 2 for Asia.
- This decreases connectivity/accessibility and increases cost [due to non-competition] for Asia. Hence, fewer Asians travel to Kenya.
- The language proficiency(English) of European tourists is higher as compared to Asian tourists and more similar to that in Kenya

Award 1m for each valid point.

(b) Fig. 4 shows the tourist attractions in Hong Kong.

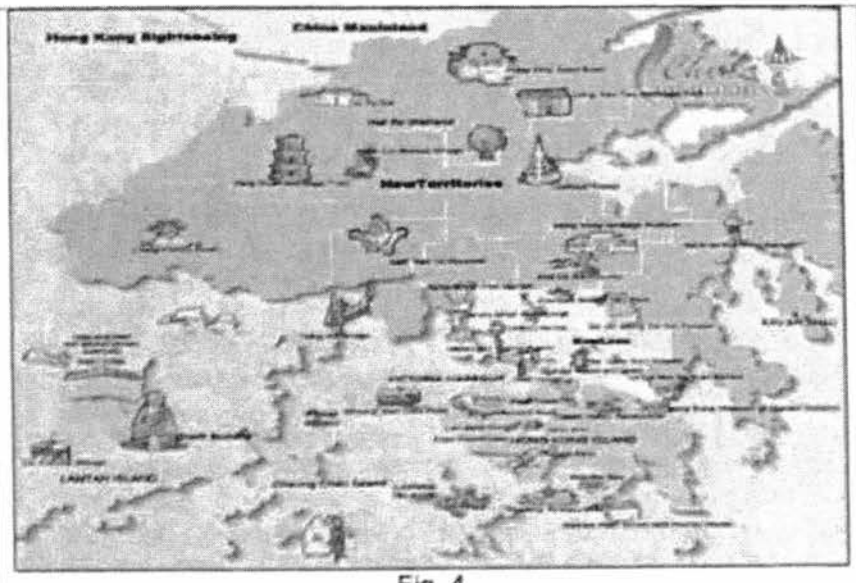


Fig. 4

With reference to Fig. 4, locate and explain 3 key tourist attractions that support the different types of tourism. [3]

- Giant Buddha:Tourists visit to learn more about Buddhism or Culture (Pilgrimage tourism/ cultural tourism).
- Ocean Park/ Teddy Bear Kingdom: Theme park where tourists visit for recreation activities
- Temple Street Night Market/ Ladies Market: Tourists visit for shopping purposes
- Expo Promenade. MICE where tourists visit for exhibitions for conventions
- Hong Kong Heritage Museum: tourists visit t know more about the history or culture of Hong Kong
- Lookout Tower: tourists visit to look at the scenic beauty of Hong Kong

Award 1m for each valid point.

(c) The graph below shows that the global average temperature of the earth.

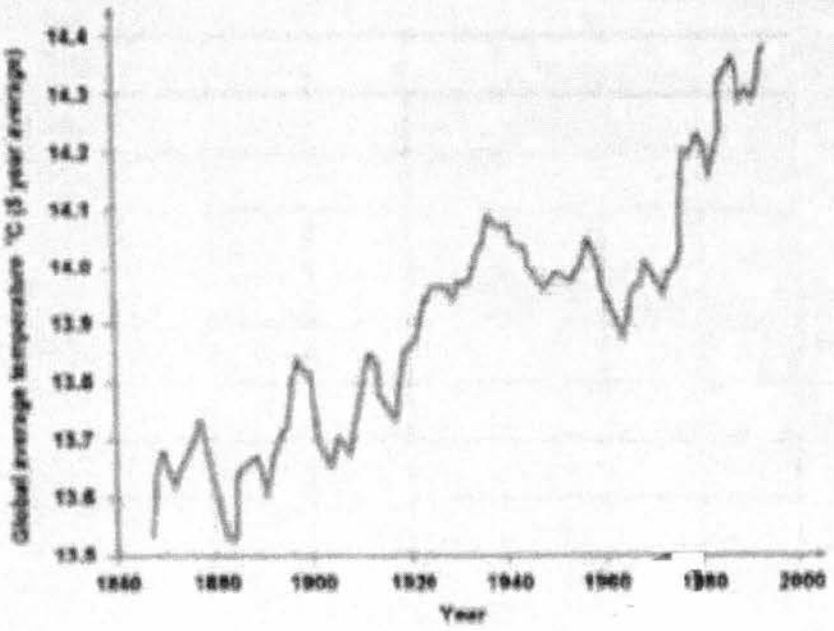


Fig. 5

(i) With reference to Fig 5, describe the trend of the global average temperature of the earth from 1860 to 2000. [3]

- Fluctuating but overall, increasing trend from 13.5'C to 14.4 'C
- Largest increase : 0.35 (1919-1939)/ largest decrease: 0.25 (1879-1881)
- 1960 onwards: The Temperature increased at a faster rate

Award im for each valid point

(ii) With Reference to a specific example, explain how the trend observed in c(i) will affect coral reef ecosystems. [3]

- Rapid changes in sea temperatures and sea levels may be faster than the ability of the reefs and their associated life forms to adjust
- Coral bleaching occurs when higher sea temperatures result in the loss of algae; this causes the coral to turn completely white or be bleached
- Preliminary results of a survey in May this year found all the reefs looked at in the Maldives, in the Indian Ocean, were affected by high sea surface temperatures. Around 60% of all assessed coral colonies, and up to 90% in some areas, were bleached.

Award 1m for each valid point.

	(iii) Describe the likely consequences to coastal communities if the coral reefs were to be wiped out by 2050.	[3]
	• Livelihood: Corals play a crucial role in supporting natural ecosystems i.e. more than 25 per cent of the earth's marine fish species. Fisheries contribute to GDP e.g Bahamas , Fiji • More prone to disaster and loss of land as corals absorb wave energy generated in the open seas by protecting the adjacent land mass from erosion e.g. Bahamas, Maldives • Less natural resources: Corals provide medicine for some major diseases like cancer and HIV e.g. Indonesia, Bahamas, Fiji Award 1m for each valid point.	
(d)	'Tourism destroys tourism.' How far do you agree? Use examples to support your answer.	[8]

Tourism destroy tourism - negative impacts of tourism
BUT tourism also helps/boost tourism - positive impatcs of tourism

Impacts OF tourism ON Tourism
Need ti link back to question and talk about the impacts on tourism itself

Need to explain how tourism leads to the point/ factor and then how the point/ factor affects tourism

Does not destroy	Destroy
Employment opportunities o Growth of tourism load to increase in the number of tourism related jobs, offering many employment opportunities either directly linked or indirectly linked to the tourism sector, such as hotels, transportation, tour agencies. o In 2011, the tourism industry employed over 235 million people worldwide (6–8 % of all the jobs in the world) o Thus people are able to earn an income (often higher income) and as such, they have more purchasing power	Leakage of Income o A Large portion of revenue from tourism is sometimes lost as leakage, especially in LDCs. o Leakage occurs when revenue earned from tourism is paid to other countries for the import of goods and services needed to meet the needs of tourists o Thus, the country will earn less income and as such, they have less money for developing the tourism infrastructures and attractions in their country, causing future tourism to fall

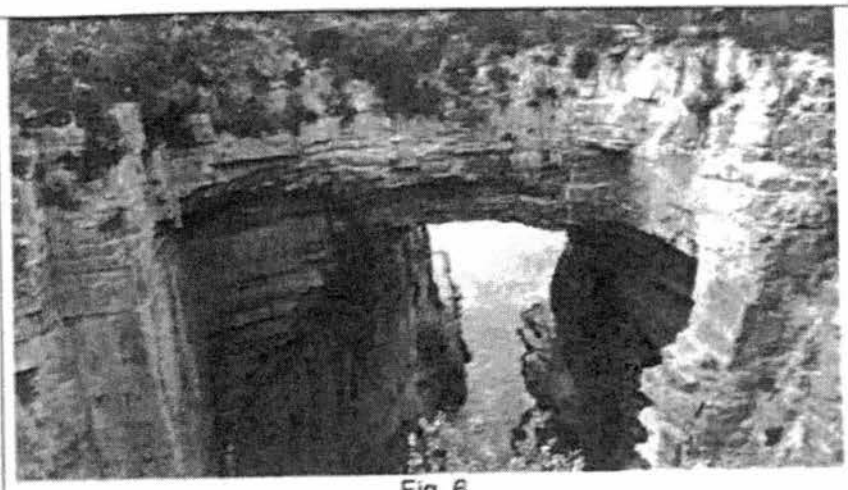
	to travel in future, causing future tourism to rise.	Example: Phuket, Thailand Travellers may use the services of foreign-owned businesses and buy imported items ▪ Some of the profits made by local businesses are sent to another country to pay for imports ▪ Money that does not stay in the local economy may bring few benefits to local businesses and workers
	Infrastructure development o Infrastructure development such as transport and communication networks serve the local communities as they enhance tourism, such as roads linking airports to the city and other tourist sites. Sports venues and infrastructure built for major sporting events like the Olympics are useful to the host country even after the event o The development of roads and expansion of airport (due to growth in tourism), this will further aid in the boost of future tourism as the country is more accessible and it has enough capacity to hold a higher number of visitors. As such more visitors will be willing to travel to the country, increasing future tourism. o Developing the infrastructure also create employment for local workers especially during the construction process. Thus they earn an income (often higher income) and as such, they have more purchasing power to travel in future, causing future tourism to rise.	**Underuse of facilities** o Money from tourists normally pays for the cost of maintaining such facilities o Underused facilities can be costly to maintain o Facilities may become neglected when there are few tourists. o As the facilities are poorly or not maintained, tourists will not want to visit, causing tourism to fall further and for the facilities to continue to remain neglected. o example: Venue for Summer Olympic Games In Beijing ▪ Venues allegedly deteriorating years after the Olympics ▪ Some were renovated to become more profitable, ▪ e.g. Beijing National Aquatics Center was renovated into a water park ▪ Only one-third of major sports venues in China have managed to break even o Shortage of services ▪ Tourist infrastructure may require the use of large amounts of land, water and power ▪ This could lead to a shortage of services, e.g. water supplies or power in non-

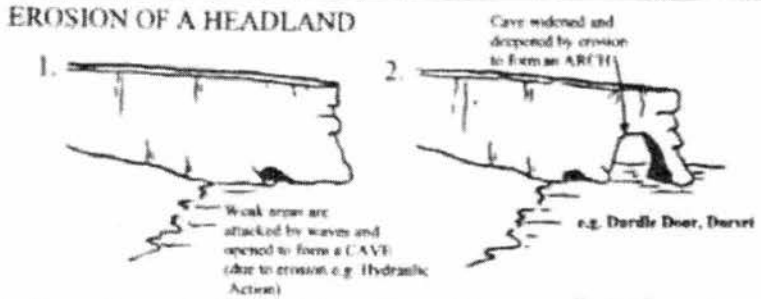
	tourist areas
Growth in income o Tourism growth can lead to growth in income for individuals and a country o As a result, they have more purchasing power to travel in future, causing future tourism to rise. o Or, country has more revenue, thus more money to invest in tourism infrastructures and facilities, as a result, attracting more tourists in future. Example: Fishermen on Pamilacan Island, Philippines ▪ Local tour companies hire fishermen to help them view and swim with whale sharks ▪ Fishermen can expect additional income on top of their fishing livelihood. ▪ Tour companies will experience an increase in revenue ▪ Overall increase in revenue for the country through taxes collected from the fishermen and tour companies ▪ Tourism receipts generate large revenue for many countries ▪ In 2011, worldwide tourism receipts exceeded US$1 trillion	**Seasonal unemployment** o Certain tourist activities depend on climatic conditions o Countries may experience regular fluctuations in tourist numbers o People in tourism-related jobs have to find other sources of income when employment is temporarily unavailable o Thus income is not stable, they will be more unwilling to travel, causing a decline in tourism *Example: Sapporo, Japan* ▪ Receives a large number of visitors from December to February, many of whom engage in winter sports, e.g. *skiing, snowboarding* ▪ Mountain ski resort operators employ more people during winter to cater to the high tourist demand ▪ In other reasons, workers return to other jobs, (e.g. *farming*) or move away temporarily until the next tourist season

Accept any other positive/Negative impacts listed : Environmental and Sociocultural

Level 1 (0-3m)	Level 2 (4-6m)	Level 3 (7-8m)
Brief explanation of factors	Somewhat detailed explanation of at least 2 factors	Very Detailed explanation of at least 3 factors

Discuss either only benefits or limitations	Discuss some benefits and/or limitations Includes only 1 category of factor (E.g. economic)	Discuss both benefits and limitations AND Includes min 2 categories of factor (E.g. economic/ social/ environmental)
No examples are used to support factor	Supported with general examples	Supported with specific examples

3.	Fig. 6 is an attraction of a natural landform found along the coast in Tasman National Park, Tasmania, Australia.	
	 Fig. 6	
(a)	(i) Describe the characteristics of the landform seen in Fig. 6.	[2]
	• Curved at the top • Supported by two sides but gap in the center where the sea is below • Jagged/ Rough Edges • Vegetation on the top Award 1m for each valid point	
	(ii) Identify the natural landform and with aid of a diagram, describe how it may have been formed over time.	[5]
	• Arch *Reserve 1m for identification of landform.* • Destructive waves erode both sides of the base of a headland; • by hydraulic action and abrasion; • **undercutting** it to form a cave; • wave action causes hollowing of a cave as the back walls join together;	



Award 1m for each valid point. Maximum 4 marks. If no accompanying diagram is drawn, max of 3 marks.

(b) Explain how coastal areas can be managed in a sustainable manner. [3]

- Limiting damaging activities that interrupt the functioning of natural systems.
- These activities may include clearing mangroves for fish farms or agricultural land, dumping waste into coastal areas and construction facilities for ports or hotels which place the natural features at the coast.
- Protect Coastal Resources by preventing resources from being exploited or depleted
- This can be achieved by limiting the area where people can obtain that resource or limit the amount of the resource that can be extracted.

Award 1m for each valid point.

(c) Fig. 7 below shows a coastal management strategy found at Hanasaki harbor in Japan.

Fig. 7

	(i) The coastal management strategy in Fig. 7 is actually a variation of one of the strategies you have learnt. Identify and describe what the strategy is.	[3]
	• Tetrapod • Concrete structures that help to dissipate wave energy • Tetrapods allow water to pass around them rather than hit against them so no powerful backwash is generated, which reduces the possibility of tetrapods being damaged by waves. Award 1m for each valid point.	
	(ii) With reference to examples you have learnt, describe and explain one instance of success and one limitation of the aforementioned strategy in (i).	[2]
	• Crescent City, a town on the coast of northern California, has used tetrapods for many years to defend against coastal erosion and to reduce the impact of **tsunamis**, which occurred 31 times between 1933 and 2008. • **Okinawa, Japan**: People living there find it an eyesore as the **pristine beaches** and unaltered shoreline have been ruined by **the** presences of tetrapods, especially in the Southern half of **the** island. **Award** 1m for each valid point	
	(iii) Identify one other **coastal** management **strategy which is** constructed from the same material as **the strategy in (i) and** explain one instance of success and **one limitation of the** second strategy.	[3]
	• Seawalls are constructed **to protect coastlines** against wave attack by absorbing wave energy. Most seawalls are made of concrete or stone and are built parallel to the coast. They have been constructed in thousands of locations throughout the world. • East Coast Park, Singapore: Initially, a 4,500-metre stretch of seawall was built to protect the reclaimed land. A strip of fill made of old alluvium was left in front of the seawall to allow deposition to occur, forming beaches. • Drakes Island, England: A seawall collapsed due to erosion occuring at its base. OR • Breakwaters help break the force of oncoming waves. They can be built either parallel to the coast or with one end	

attached to the coast. When constructed offshore, breakwaters can create a zone of calm water behind them. Materials are then deposited and build up in this zone of calm water to form beaches.

- Almeria, Spain: Breakwaters successfully protected the coast from erosion.
- Portland Harbour, England: The breakwaters built resulted in erosion and flooding which affected properties, beaches and communication infrastructure.

Also accept Groynes if students write.

Award 1m for each valid point.

(d) 'The threats that mangroves face will overcome their abilities to adapt and survive in their saline coastal environments.'

How far do you agree? Use examples to support your answer. [8]

Will overcome	Ability to adapt and survive
Water pollution Peru: Urban and manufacturing activities result in untreated or partly treated urban and manufacturing wastes being dumped into coastal waters. The pollution of coastal waters can overwhelm the delicate balances of mangrove ecosystems.	**Filter pollutants** → Ultra Filtrators (ROOTS): Burguiera. Sonneratia and Rhizophora. Also store salt in their leaves so they can be shed.
Rising sea level Gulf of Thailand: Rising sea levels, together with extreme storm activity, is likely to occur in future if climate change accelerates. Mangroves will have trouble colonising areas further inland despite sea level rise as they will be in competition with human activities such as farming and the construction of sea defences.	**High intensity full sunlight (tropical zones)** →Leaves of mangroves thick and leathery to withstand heat **Annual rainfall (1500 - 3000 mm)** → Leaves of mangroves waxy with drip tips to allow excess water to drip off **They are typically found along low-lying coasts and river estuaries, in anaerobic (oxygen poor) soils.** Roots of mangrove (Rhizophora

		apiculate) → Stabilise the plant in the unstable mud → Help obtain sufficient oxygen (Avicennia/ Sonneratia) → Take in water from the soil **Other ways of how mangroves adapt to an environment surrounded by water: Flowers and Fruits** ➔ Fruits germinate on tree, long and sharp so can fall and anchor in the soil immediately e g Bruguiera ➔ Buoyant fruits (float in water) so they can float away to new coastal areas ➔ Colourful flowers to attract insects to pollinate flowers	
	Level 1 (0-3m) • Brief mention of point/factor/method • No/little examples given • One –sided argument Level 2 (4-6m) • Greater elaboration - detailed elaboration of point/factor/method • Simplified - Detailed elaboration on threats and adaptations Level 3(7-8m) • Conclusion that clearly showed candidate has answered the question		