

Anglo - Chinese School
(Independent)



PRELIMINARY EXAMINATION 2018
YEAR FOUR EXPRESS

GEOGRAPHY
PAPER 1

2236/01

Friday

3 August 2018

1 hour 40 minutes

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write your Index Number on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Section A

Answer Question 1.

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.

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

This document consists of **8** printed pages, **1** blank page and
an Answer Cover Sheet.

[Turn Over

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Section A

This question is compulsory.

- 1 (a) A group of students wanted to investigate why the Mangrove Park attracts many visitors. Their investigation was conducted on a weekend morning in the month of June.

Some students conducted interviews with visitors by positioning themselves along a bridge at location A (Fig. 1A), while the rest positioned themselves at a covered rest area at location B (Fig. 1B).

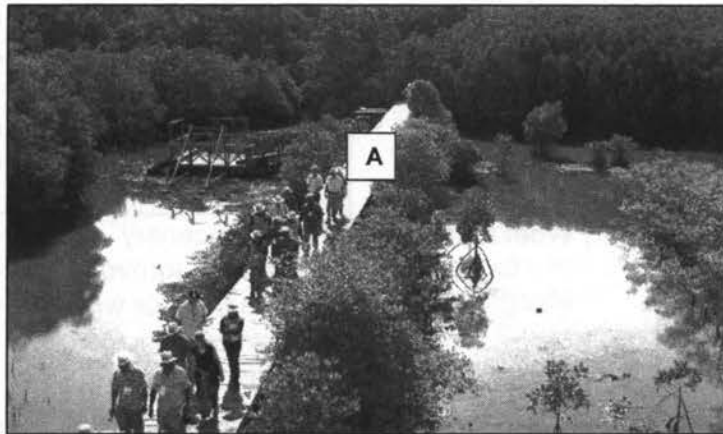


Fig. 1A



Fig. 1B

- (i) Identify which location, A or B, is more suitable to conduct an interview with the visitors and explain your answer. [2]
- (ii) Justify a suitable sampling method for the investigation. [2]

[Turn Over

- (iii) The questionnaire consists entirely of all multiple-choice questions.

What are the advantages and limitations of having this type of questions in a questionnaire?

[4]

- (iv) Fig. 2 shows the questionnaire with the results of the interviews.

	Questions	Options	Results
Q1	Gender	<ul style="list-style-type: none"> • Male • Female 	<ul style="list-style-type: none"> • 35 • 15
Q2	What is your age-group?	<ul style="list-style-type: none"> • 20 years and under • 21 to 30 years • 31 to 40 years • 41 to 50 years • Above 50 years 	<ul style="list-style-type: none"> • 10 • 15 • 15 • 5 • 5
Q3	What attracts you to visit the Mangrove Park?	<ul style="list-style-type: none"> • Nice scenery • The mangroves • The birds or wildlife • Part of package tour 	<ul style="list-style-type: none"> • 15 • 20 • 10 • 5
Q4	What are your suggestions to improve the facilities in the Mangrove Park?	<ul style="list-style-type: none"> • More toilets • More benches along the walking trail • Need more shops to sell souvenirs and drinks • Need more dustbins 	<ul style="list-style-type: none"> • 5 • 5 • 16 • 24

Fig. 2

Using the responses from Question 3, draw a pie-chart to show what attracts visitors to the Mangrove Park.

[3]

- (v) Describe some ways to improve the reliability of data collected.

[3]

[Turn Over

- (vi) An increase in visitors to the Mangrove Park has had a negative impact on the area. The students wanted to investigate if this was true.

Using the results from the interview questionnaire, suggest a suitable hypothesis statement and describe two ways how the students can carry out the investigation.

[3]

- (b) The students also wanted to compare the wave frequencies at two locations along the coast near the Mangrove Park.

- (i) Describe how the students would collect the data for the investigation.

[4]

- (ii) Fig. 3 shows some mangrove trees along the coast near the Mangrove Park.



Fig. 3

Draw a field sketch of the area shown in Fig. 3. Annotate your sketch to identify and describe how mangroves are able to adapt to their environment.

[4]

[Turn Over

Section B

Answer **one** question from this section.

- 2 (a) Study Fig. 4, which shows an excerpt of an article about the Great Barrier Reef.

Climate change remains the most serious threat to the Great Barrier Reef. It is already affecting the Reef and is likely to have far-reaching consequences in the decades to come.

(Adapted from <https://www.ehp.qld.gov.au/state-of-the-environment.html/>)

Fig. 4

With reference to Fig. 4,

- (i) explain how climate change is a 'threat to the Great Barrier Reef'. [2]
- (ii) explain why the loss of coral reefs could have 'far-reaching consequences'. [3]
- (iii) describe the environmental conditions which encourage the growth of coral reefs. [3]
- (b) Study Fig. 5, which shows coastal features, W and X.

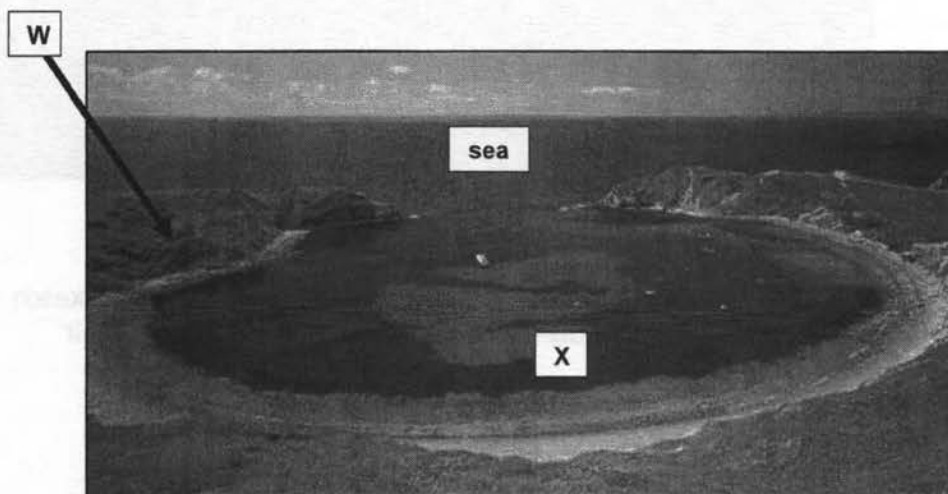


Fig. 5

With the aid of well-labelled diagrams, describe the formation of coastal features, W and X.

[3]

[Turn Over

(c) Describe the formation of a beach, and explain how beach material and weather condition can affect the slope of a beach.

[6]

(d) 'There are more limitations than benefits of hard engineering coastal protection measures'.

To what extent do you agree with this statement? Use examples to support your answer.

[8]

- 3 (a) Study Fig. 6, which shows some of the attractions in Phuket, Thailand and Fig. 7, which shows tourist arrivals to Phuket from 2004 to 2013.

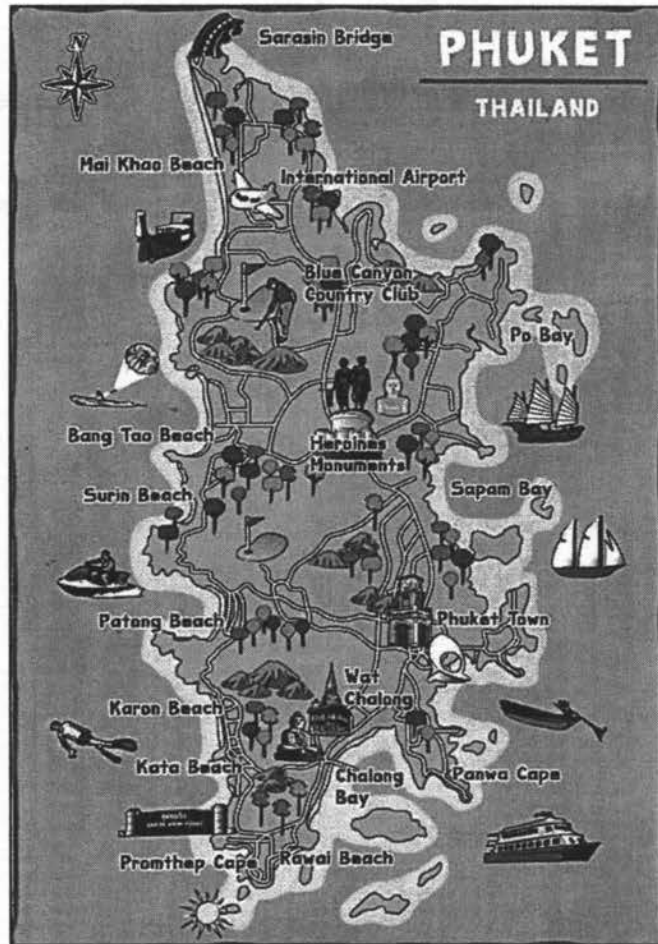


Fig. 6

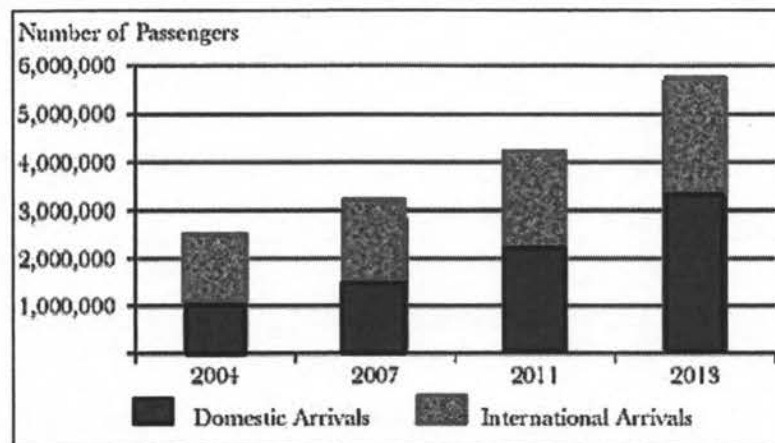


Fig. 7

(Source: <http://www.pattayamail.com/wp-content/uploads/2014/04/t2-Phuket2.jpg>)

[Turn Over

- (i) Using information from Fig. 6 and 7 only, explain how Phuket can offer different opportunities for tourist activities. [3]
- (ii) Describe the trend of visitor arrivals to Phuket from 2004 to 2013. [3]
- (iii) Account for the trend of international visitor arrivals to Phuket from 2004 to 2013. [4]
- (iv) Suggest some ways to minimise negative impacts of tourism to the natural attractions in Phuket. [3]
- (b) Describe two human activities that have led to the decline of both mangroves and coral reefs. [4]
- (c) 'Natural disasters are the main cause of fluctuations in tourism numbers of the Less Developed Countries (LDCs).'
- To what extent do you agree with this statement? Use examples to support your answer. [8]

END OF PAPER

Anglo - Chinese School
(Independent)



PRELIMINARY EXAMINATION 2018
YEAR 4 EXPRESS

ANSWER COVER SHEET

GEOGRAPHY
PAPER 1

2236/01

Friday

3 August 2018

1 hour 40 minutes

Index Number: _____

Please indicate the Question Number attempted in the box below.

Question No	Marks Obtained
1	
Total	/ 50

[Turn Over

Anglo-Chinese School
(Independent)



**PRELIMINARY EXAMINATION 2018
YEAR 4 EXPRESS**

GEOGRAPHY
PAPER 2

2236/02

Monday

30 July 2018

1 hr 30 min

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your index number 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.

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.

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 document consists of **9** printed pages, **1** blank page and an Answer Cover Sheet.

[Turn over

Section A

Answer one question from this section.

1. (a) Study Fig. 1, which shows information about selected earthquakes.

Location	Year	Magnitude measured on Richter Scale	Number of deaths
USA	1964	9.2	125
Indonesia	2004	9.0	283,000
China	2008	8.0	87,000
Iran	1990	7.7	50,000
Taiwan	1999	7.7	3,000
Pakistan	2005	7.6	73,000
Turkey	1999	7.6	17,000
USA	1989	7.1	69
Japan	1995	6.9	5,500
USA	1994	6.7	57
Italy	2009	6.3	308
India	1993	6.2	9,500
Afghanistan	2002	6.1	1,000

Fig. 1

- (i) Do earthquakes of higher magnitudes cause more deaths? Support your answer with data from Fig. 1. [3]
- (ii) Suggest reasons for the variation in the number of deaths caused by earthquakes listed in Fig. 1. [5]

- (b) Study Fig. 2, which provides information about the impacts of a volcanic eruption in Iceland.

Iceland's volcanic eruption benefits tourism (25th April 2010)

Iceland's latest volcanic eruption is coming to an end and the unexpected tourist boom that lifted this country's financial fortunes may be ending too.

Last month, the Eyjafjallajokull volcano began erupting again after almost 200 years, threatening floods and earthquakes but drawing thousands of adventurous tourists to the site where ash and red-hot lava was coming from a crater between two glaciers.

Thousands of people have made the trip to the volcano, 120 kilometres east of Reykjavik, since the eruption began on March 20th. Many people have made a small fortune taking them there, by bus, snowmobile, "superjeep" and even helicopter.

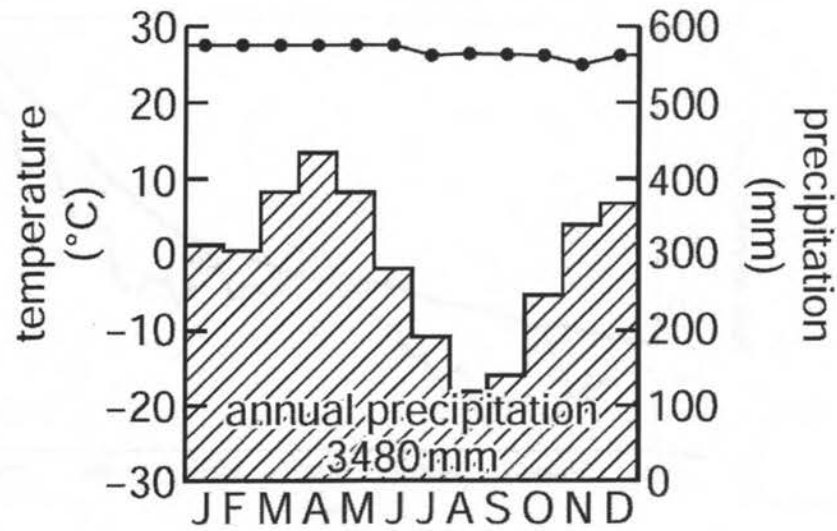
Charter airline Iceland Express says its business has risen by 20% since the eruption, and the Icelandic Tourist Board says 26 000 overseas visitors came to the country in March, a record for a quiet month when it is still winter in Iceland.

(source: © ADAPTED: http://news.yahoo.com/5/ap/20/00412/ap_am_bi_ge/eu_iceland_volcano_tourism)

Fig. 2

- (i) Explain how the eruption of the Eyjafjallajokull volcano benefitted the Icelandic tourist industry. [2]
- (ii) In what ways, other than tourism, may people benefit from living close to a volcano? [3]
- (iii) Explain how volcanic eruptions can cause problems for people. [4]
- (c) "Volcanic activity occurs at all tectonic plate margins."
Do you consider this statement to be true? Explain your answer. [8]

2. (a) Study Fig. 3, a climate graph of a weather station located near the equator.



(source: K. Brooks, *Physical Geography: Process and System*; Hodder Arnold H&S; 1985; 034035951X)

Fig. 3

Describe the climate shown in Fig. 3.

[3]

- (b) Fig. 4 shows the concentration of carbon dioxide (CO₂) and the average annual surface temperature of the Earth from 1880 to 2005.

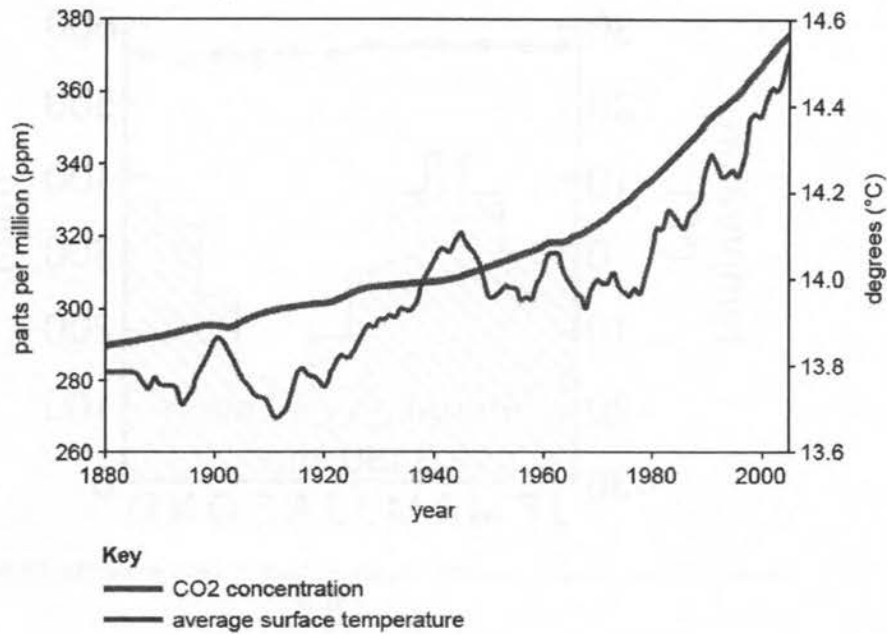


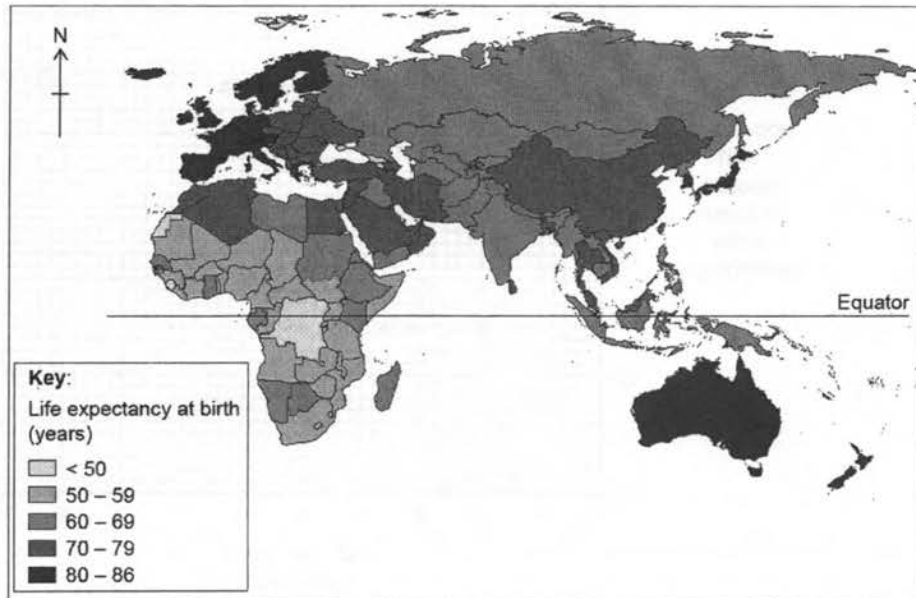
Fig. 4

- (i) Compare the trend in carbon dioxide concentration with the trend in the average annual surface temperature of the Earth shown in Fig. 4. [4]
- (ii) Describe the causes of the increase of carbon dioxide in the atmosphere and explain how this increase could bring about changes in the surface temperature of the Earth. [5]
- (c) With reference to relevant examples, describe and explain how temperatures are influenced by distance from the sea. [5]
- (d) With reference to studies made, discuss the relative importance of short-term and long-term responses to a natural hazard or disaster. [8]

Section B

Answer one question from this section.

3. (a) Fig. 5 is a map showing the life expectancy at birth for countries other than those in the Americas.



[Source: Reprinted from WHO: Life Expectancy, http://www.who.int/gho/mortality_burden_disease/life_tables/situation_trends/en, accessed 2015]

Fig. 5

- (i) Describe the pattern of life expectancy shown in Fig. 5. [4]
- (ii) Define the term 'life expectancy' and explain how it can be used as an indicator of health of a country. [3]
- (b) Outline what is meant by the term 'degenerative diseases' and describe the global distribution of 'degenerative diseases'. [4]

- (c) Study Fig. 6, which shows information about GNP per capita and access to clean water in ten LEDCs (Less Economically Developed Countries).

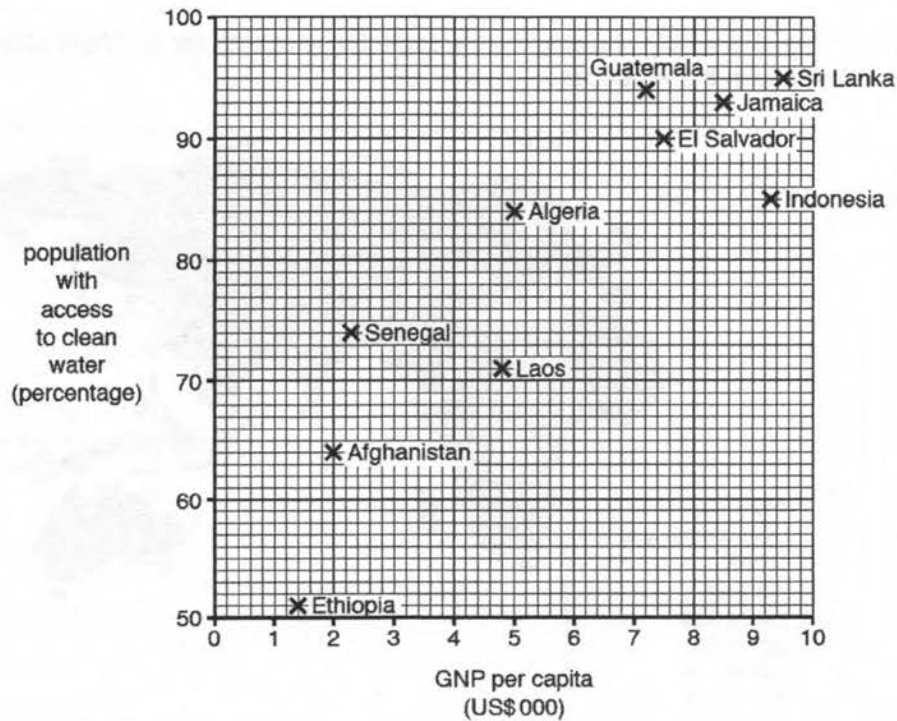
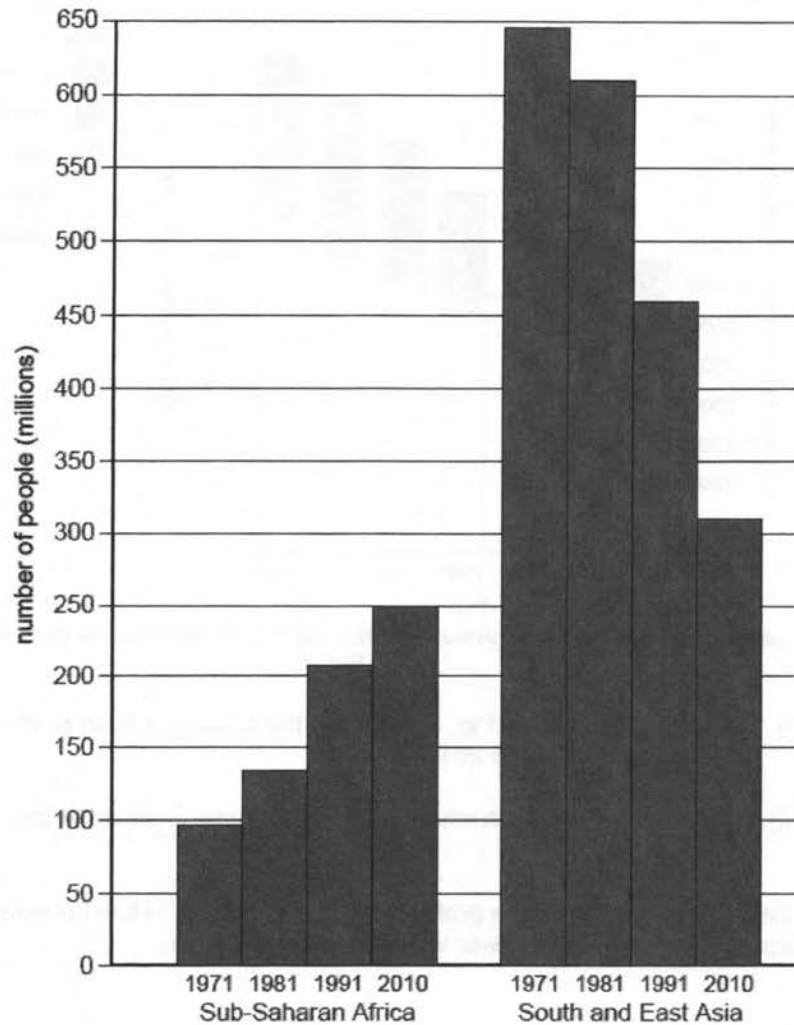


Fig. 6

- (i) Describe the general relationship between GNP per capita and the percentage of the population with access to clean water. Use statistics in your answer. [2]
- (ii) Explain why providing a reliable supply of clean water may increase life expectancy. [4]
- (d) 'Climate change is the most important cause of global food shortage.' How far would you agree? Support your answer with relevant examples. [8]

4. (a) Study Fig. 7, which shows the number of people who are undernourished in Sub-Saharan Africa and in South and East Asia.

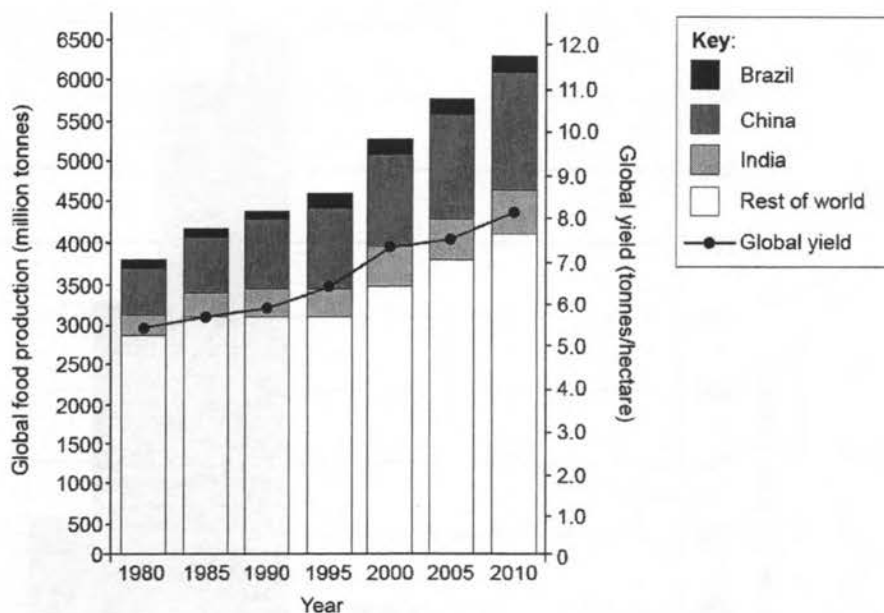


*People are undernourished when their food intake provides less than their minimum energy requirements.

Fig. 7

- (i) Compare the trends in Sub-Saharan Africa and South and East Asia between 1971 and 2010. Support your answer with dates and statistics from Fig. 7. [3]
- (ii) Explain how food shortages can be caused by the natural environment. [4]
- (iii) With reference to examples, describe the effects of food shortages on the health of the people living in Less Developed Countries. [4]

- (b) Fig. 8 is a graph showing changes in global food production and global yields of food crops from 1980 to 2010.



[Source: adapted from Ellen MacArthur Foundation, (2013), *Towards the Circular Economy 2*, page 22]

Fig. 8

- (i) With reference to Fig. 8, describe the change in food production in India from 1980 to 2010. [3]
- (ii) Explain one way in which the yield of some food crops can be increased. [3]
- (c) 'Technology will solve the problem of food shortage.' How far would you agree? Support your answer with relevant examples. [8]

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Anglo-Chinese School
(Independent)



PRELIMINARY EXAMINATION 2018
YEAR 4 EXPRESS

GEOGRAPHY
PAPER 2

2236/02

Monday

30 July 2018

1 hr 30 min

ANSWER COVER SHEET

Index Number: _____

Write the number of the question you have attempted in the box below:

Question No		Marks obtained
Section A		
Section B		
Total		/50

**SUGGESTED ANSWER TO YR 4 GEOGRAPHY CORE PAPER ONE
PRELIMINARY EXAM 2018**

- 1 a(i) **Identify which location, A or B, is more suitable to conduct an interview with the visitors and explain your answer.** [2]

- Location B is more suitable since it is a covered area where visitors can be more comfortable to be interviewed
- Location A is located at an open area where it is uncomfortable for visitors to be interviewed due to the narrow bridge

(award 1 mark each for 2 correct points on location A and/ or B)

-
- (ii) **Justify a suitable sampling method for the investigation.** [2]

- systematic sampling where the interviewees are selected according to a regular pattern example interviewing every 5th visitor
- systematic sampling will remove biasedness

(or random sampling where interviewees are selected randomly without any pattern)

(award 2 marks for well-elaborated 2 points on systematic or random sampling)

-
- (iii) **What are the advantages and limitations of having this type of questions in a questionnaire?** [4]

Advantages

- convenient for interviewees to answer since it is easier to complete due to the available options
- easier for students to do analysis

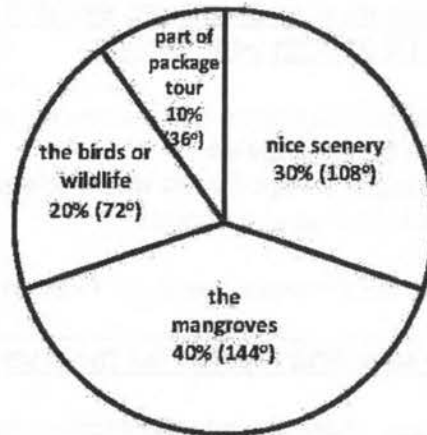
Limitations

- questionnaire do not allow interviewees to elaborate on their answers since they only have few options to choose
- do not allow other type of options for answers

(award 2 marks for any 2 points on advantages and 2 marks for any 2 points on limitations of closed-ended type questions)

- (iv) Using the responses from Question 3, draw a pie-chart to show what attracts visitors to the Mangrove Park.

[3]



- award 2 marks for correct drawing of sectors of 108° for nice scenery (30%), 144° for mangroves (40%), 72° for birds or wildlife (20%), 36° for part of package tour (10%)
- award 1 mark for correct labelling of all the sectors
- award 1 mark for correct description of the symbols used for the 4 sectors in the legend (optional)

- (v) Describe some ways to improve the reliability of data collected.

[3]

- students should conduct interview with the visitors on more days instead of just one weekend in June
- should conduct interviews with more visitors, instead of 50 visitors only
- conduct interviews at entrance of the Park or at more locations

(award 1 mark each for well-explained 3 points on ways to improve reliability)

- (vi) Using the results from the interview questionnaire, suggest a suitable hypothesis statement and describe two ways how the students can carry out the investigation.

[3]

- hypothesis : With increase in visitors, there is an increase in litter (example of statement)
- students can take photographs to show the increase in litter around the area
- students can conduct perception survey with the locals asking them on their opinion if there is more litter due to increase in visitors

(award 1 mark for correct hypothesis statement and 2 marks for correct explanation of 2 ways to do the investigation, based on the hypothesis statement)

b) Describe how the students would collect the data for the investigation. [4]

(i)

- Using a stopwatch, students should count the number of waves that break on the shore at one of the location over a period of time such as for 5 minutes
 - record the number of breaking waves on a recording sheet
 - repeat the process a few times to obtain the average number of waves per time period on the recording sheet
 - students will then conclude if the waves is constructive (6 to 8 per minute) or destructive (10 to 14 per minute)
 - students will repeat the whole process at the other location
 - they will then compare between the 2 locations in terms of wave frequencies
- (award 1 mark each for any well-elaborated 4 points on the description)

(ii) Draw a field sketch of the area shown in Fig. 3. [4]

Annotate your sketch to identify and describe how mangroves are able to adapt to their environment.

- award 1 mark for correct field-sketch drawing of the mangrove
- award 1 mark for correct labelling of the sea and coast in the sketch
- award 1 mark for correct labelling and annotation of prop roots and its uses to anchor the tree securely to the muddy coast
- award 1 mark for correct labelling and annotation of leaves with special salt glands to secrete excess salt

2 (a) With reference to Fig. 4, explain how climate change is a 'threat to the Great Barrier Reef'. [2]

(i)

- with increase in ocean temperature, coral bleaching might occur
- coral bleaching occurs when water is too warm, corals will expel their microalgae living in their tissues causing corals to turn white or 'bleached', corals will soon die due to lack of nutrition

(award 2 marks for any 2 well-explained points on how climate change affects coral reefs)

(ii) Explain why the loss of coral reefs could have 'far-reaching consequences'. [3]

- with loss of coral reefs, coasts will not be protected from coastal erosion
- and habitat for marine lives such as small fishes will be lost
- many people depend on coral reefs for living will lose their jobs such as tour guides for tourists on cruises to see corals

(award 3 marks for any 3 well-explained points on uses of coral reefs)

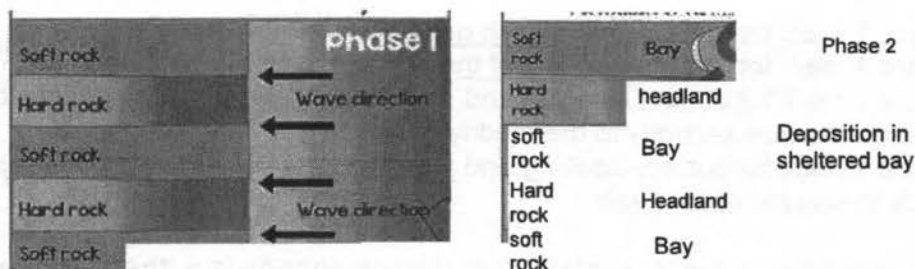
[Turn Over

(iii) Describe the environmental conditions which encourage the growth of coral reefs. [3]

- surface temperature not exceeding 18 deg Celsius
- water should be 10 to 60 metres deep
- need clear, silt free water
- average seawater salinities of 30 to 38%
- not strong storm waves
- need water with low nutrient content

(award 3 marks for any 3 well-explained points on conditions for growth of coral reefs)

(b) With the aid of well-labelled diagrams, describe the formation of coastal features, W and X. [3]



W is headland and X is a bay

- headlands are formed when the sea erodes a section of coast with alternating bands of hard and soft rock
- The bands of soft rock, such as sand and clay, erode more quickly than those of more resistant rock, such as chalk
- This leaves a section of land jutting out into the sea called a **headland**
- The areas where the soft rock has eroded away, next to the headland, are called **bays**

(award 1 mark for correct drawing of well-labelled diagrams on formation of headland and bay, 2 marks for well-explained 2 points on formation of headland and bay)

(c) Describe the formation of a beach, and explain how beach material and weather condition can affect the slope of a beach. [6]

Formation of a beach

- formed when deposited materials carried by waves are accumulated in a zone along the coast
- the materials on the beach vary in size from fine sand to pebbles.

How beach material affects slope of beach

- beach with finer sediments have gentler slope
- beach with larger size sediments have steeper slope

How weather condition affects slope of beach

- during calm conditions, constructive waves deposit more materials on the beach forming gentler-sloping beach
- during strong winds, destructive waves erode and remove materials from the beach forming steeper-sloping beach

(award 2 marks for well-explained formation of a beach and 2 marks for any 2 well-explained points on how weather condition and beach materials affect slope of beach)

(d) 'There are more limitations than benefits of hard engineering coastal protection measures'. 8]

To what extent do you agree with this statement? Use examples to support your answer.

eg. Hard engineering Seawall

- made of concrete, built parallel to the coast
- benefits: reduce erosion by absorbing wave energy and reflecting incoming waves
- benefits: more long-lasting, does not need constant maintenance
- limitations: seawall might collapse in the long run due to accumulation of eroded materials at the base of the wall
- limitations: costly to build and maintain, constant repairs have to be made to prevent breakdown and collapse
- limitations: destroys natural beauty of the beach
- eg. Seawall at Marina Bay in Singapore is expensive to build and maintain but has been effective in preventing coastal erosion

eg. Hard engineering – Breakwater

- artificial barriers built offshore, parallel to the coast or with one end attached to the coast and other end in the sea
- benefits: breakwater breaks the force of oncoming waves, thus reduce coastal erosion
- benefits: creates zone of calm water behind them, area can be used as sheltered harbor
- limitation: only areas behind the breakwaters are protected, breakwaters not able to protect the coast if the waves are too strong
- limitation: breakwaters are expensive to build and maintain
- eg. There are many breakwaters at East coast beach in Singapore to protect the coast

[Turn Over

Eg. Hard engineering – Gabions

- they are rectangular wire mesh cages packed tightly with cobbles or crushed rocks, they are placed parallel to the coast to prevent erosion
- benefit: cheaper than seawall
- limitation: wire cages need constant maintenance as they are easily corroded by seawater or gets rusty
- limitation: can be unsightly at the coast or some people can be injured by the cages at the beach
- eg. Gabions along Changi beach in Singapore help to prevent short term erosion

Level 1 (0-3 marks)

- Listing of benefits and/ or limitations of hard engineering coastal protection measures, no detailed description
- No locations or examples given
- Very general answer with not much development
- No supported reasons

Level 2 (4-6 marks)

- Detailed explanations of limitations **OR** benefits of at least 2 types of hard engineering coastal protection measures
- Few examples of locations given
- Brief statements on whether there are more limitations or benefits of hard engineering measures
- Answer written in essay form but with poor organization and are not in proper paragraphs

Level 3 (7-8 marks)

- Detailed explanations of benefits **AND** limitations of at least 2 types of hard engineering coastal protection measures
- Many examples of specific and detailed locations given
- Clear statements of whether there are more limitations or benefits of hard engineering measures
- Answer written in essay form, with good organization in paragraphs, well- balanced conclusion

3 a(i) Using information from Fig. 6 and 7 only, explain how Phuket can offer different opportunities for tourist activities. [3]

- there are many beaches such as Patong or Karon beach and Po Bay to attract tourists who love to swim or sun tan
- there are few temples such as Wat Chalong to attract tourists who wants to learn more on the religion
- visitors interested in history can visit the Heroines Monument

(award 3 marks for any well-explained 3 tourist attractions with names from Fig. 7, max 2 marks for answer without name of places)

(ii) Describe the trend of visitor arrivals to Phuket from 2004 to 2013. [3]

- increase in domestic arrivals by 2.2 million
- increase in international arrivals by 3.6 million
- increase in total arrivals by 3.5 million

(award 1 mark each for 3 points on increase in arrivals using data from graph)

(iii) Account for the trend of international visitor arrivals to Phuket from 2004 to 2013. [4]

- more international visitor arrivals due to cheaper exchange rate of Thai baht that makes items cheaper in Phuket
- more budget airlines to Phuket airport, more visitors find it cheaper to travel to Phuket
- more visitors experiencing winter season in their home countries might be interested to visit Phuket to enjoy the hot climate and recreational activities at the bay and sea
- more visitors interested to see the scenery of natural attractions in Phuket such as stacks, caves and beaches

(award 4 marks for any 4 well-explained points on the reasons, with relevant examples from Phuket)

(iv) Suggest some ways to minimise negative impacts of tourism to the natural attractions in Phuket. [3]

- more signage to remind beach goers not to litter at the beach and in the water to prevent pollution
- more control on number of boats on cruises to prevent too much water pollution from oil spills from the boats
- tour guides can keep reminding tourists not to litter or damage any marine lives

(award 3 marks for any 3 well-explained relevant points on ways to prevent negative impacts in Phuket)

[Turn Over

- (b) **Describe two human activities that have led to the decline of both mangroves and coral reefs.** [4]

- land reclamation from coastal development will increase sediments to the sea, for example when parts of the coast is reclaimed for houses, the construction process will increase sediments that will destroy corals and led to clearance of mangroves
- water pollution from untreated sewage or chemical fertilisers washed into the sea will destroy corals and mangroves along the coast

(award 2 marks each for well-explained 2 points on human activities that destroy both mangroves and corals)

- c) **Natural disasters are the main cause of fluctuations in tourism numbers of the Less Developed Countries (LDCs).** [8]
To what extent do you agree with this statement? Use examples to support your answer.

Diseases outbreak

- outbreak of diseases in the country may affect tourist arrivals who fear getting the disease thus lowering tourist arrivals
- eg. during the SARs outbreak in 2003, fewer tourists visited Hong Kong since they fear of getting the disease

Natural disaster

- volcanic eruption and earthquakes in a country might lower tourist arrival for safety reasons
- eg. fewer tourists visited Bali after eruption of volcano in Lombok due to the thick ash that caused the closure of Bali airport

Unfavourable political conditions

- civil unrest, riots will discourage tourists from visiting the country for fear of safety
- eg. Fewer tourists to Bangkok during the 'red shirt, blue shirt' protests in 2013

Level 1 (0-3 marks)

- Listing of natural disasters or other reasons for fluctuation in tourism with no detailed description
- No locations or examples given
- Very general answer with not much development
- No supported reasons

Level 2 (4-6 marks)

- Detailed explanations of how natural disasters **OR** other reasons cause fluctuation in tourism
- Few examples of locations given from the LDCs
- Brief statements on whether natural disaster is the main cause or other reason is the main cause
- Answer written in essay form but with poor organization and are not in proper paragraphs

Level 3 (7-8 marks)

- Detailed explanations of how natural disasters **AND** other reasons cause fluctuation in tourism
- Many examples of specific and detailed locations given from the LDCs
- Clear statements of whether there natural disaster is the main cause or other reasons is the main cause
- Answer written in essay form, with good organization in paragraphs
- Well- balanced conclusion

Section A

Answer one question from this section.

1	(a)	Study Fig. 3, which shows information about selected earthquakes.																																																									
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	(i)	Do earthquakes of higher magnitudes cause more deaths? Support your answer with data from Fig. 3.	[3]																																																								
		<ul style="list-style-type: none"> - Yes: earthquakes of high magnitude could cause a lot of deaths; - E.g. Indonesia in 2004 had a magnitude of 9.0 and killed 283000 people; - No: no obvious link between magnitude and number of deaths caused/no obvious pattern; - E.g. the largest magnitude earthquake in the USA measured 9.2 and caused 125 deaths; - yet 9500 deaths were caused in India by a quake of lower magnitude (6.2); - etc. - NB: identification of two examples without statistics but with effects max 1. - Max. 2 no data. - 3 @ 1 mark 																																																									
	(ii)	Suggest reasons for the variation in the number of deaths caused by earthquakes listed in Fig. 3.	[5]																																																								
		Do not attribute, your reasons are suggestions – not factual, unless u know for a fact!																																																									
		<ul style="list-style-type: none"> - Population density <ul style="list-style-type: none"> o Number of people living in the area o Earthquakes in sparsely populated areas are likely to affect fewer people than in densely populated areas o Thus, an earthquake in a city can cause more casualties and damage than one in the countryside - time of occurrence 																																																									

		<ul style="list-style-type: none"> ○ Determines where people are and what they are doing ○ This will affect people's chances of survival in an earthquake ○ If it occurs when most people are sleeping, there is higher chance of them being trapped in their houses and more deaths may occur <p>-</p> <ul style="list-style-type: none"> - level of preparedness <ul style="list-style-type: none"> ○ Amount of preparation taken by the authorities and citizens can help make the occurrence of earthquakes more manageable ○ E.g. evacuation plans, trained rescue workers, <u>range of action plans</u> - distance from the epicentre <ul style="list-style-type: none"> ○ Damage is more severe when an area is closer to the epicentre - type of soil <ul style="list-style-type: none"> ○ Where sediments are loose and unconsolidated, seismic waves are amplified and structures built can be damaged due to liquefaction ○ When the ground becomes unstable and saturated soil flows like a liquid ○ E.g. Christchurch's 2011 earthquake saw many buildings and houses being abandoned due to liquefaction - Secondary effects <ul style="list-style-type: none"> ○ E.g. undersea could cause tsunami/e.g. coastal flooding (dev); - quality of housing/building materials; - and 'earthquakes proofing' - emergency services; - level of economic development/LEDC v MEDC; - Depth of focus; - 5 @ 1 mark or development 	
	(b)	Study Fig. 4, which provides information about the impacts of a volcanic eruption in Iceland.	
		<p>Iceland's volcanic eruption benefits tourism (25th April 2010)</p> <p>Iceland's latest volcanic eruption is coming to an end and the unexpected tourist boom that lifted this country's financial fortunes may be ending too.</p> <p>Last month, the Eyjafjallajökull volcano began erupting again after almost 200 years, threatening floods and earthquakes but drawing thousands of adventurous tourists to the site where ash and red-hot lava was coming from a crater between two glaciers.</p> <p>Thousands of people have made the trip to the volcano, 120 kilometres east of Reykjavik, since the eruption began on March 20th. Many people have made a small fortune taking them there, by bus, snowmobile, "superjeep" and even helicopter.</p>	

	<p>Charter airline Iceland Express says its business has risen by 20% since the eruption, and the Icelandic Tourist Board says 26 000 overseas visitors came to the country in March, a record for a quiet month when it is still winter in Iceland.</p> <p>(source: © ADAPTED: http://news.yahoo.com/5/ap/20/00412/ap_am_bi_ge/eu_iceland_volcano_tourism).</p> <p style="text-align: center;">Fig. 4</p>	
	(i) Explain how the eruption of the Eyjafjallajokull volcano benefitted the Icelandic tourist industry.	[2]
	<ul style="list-style-type: none"> - attracted tourists/there were more tourists; - work for people or examples of activities which create work; - money/income into the country/more business/multiplier effect/foreign currency; - increased awareness of Iceland/its attractions <p>- 2 @ 1 mark</p>	
	(ii) In what ways, other than tourism, may people benefit from living close to a volcano?	[3]
	<ul style="list-style-type: none"> - Fertile soils/high yields of crops; - Geothermal power; - Mining/quarrying of volcanic rocks or appropriate example; - Health benefits e.g. hot springs/water with minerals etc <p>3 @ 1 mark</p>	
	(iii) Explain how volcanic eruptions can cause problems for people.	[4]
	<ul style="list-style-type: none"> - death/injuries; - ash/fumes make it difficult to breathe/breathing problems; - destruction of property/houses/homes/buildings/cities or towns destroyed; - high cost of rebuilding; - need to evacuate; - loss of crops/loss of livestock/destroys farmland/destruction of food supplies; - disruption of road/rail communications; - disruption/cancellation of flights/aircraft cannot fly through ash; - work place destroyed/people out of work; - contamination of water supply; - visibility reduced from lack of sunlight or ash cloud etc <p>- 5 @ 1 mark or development</p>	
	(c) "Volcanic activity occurs at all tectonic plate margins." Do you consider this statement to be true? Explain your answer.	[8]
	<ul style="list-style-type: none"> - Volcanoes can be formed at either divergent or convergent plate margins but not at collision margins between two continental plates or at conservative margins. 	

	<ul style="list-style-type: none"> - Explanation for this difference will be in terms of the nature of the plates (e.g. density) and whether subduction occurs. - At divergent margins, upwelling of magma will produce volcanic landforms. - Where ocean plates meet a continental plate or two ocean plates meet, subduction will occur with melting to produce magma which then may force its way to the surface. - Where two ocean plates meet, volcanic arcs may be produced. - Where an ocean and continental plate meet, the basaltic magma will be altered by the more acidic rocks of the continent producing more explosive volcanic landforms. - But do not expect such detail for good marks. - NOTE: the role of convection currents is needed <p>Level 1 (0 – 3 marks)</p> <ul style="list-style-type: none"> - <i>At this level answers will be generalised or with minimal support if any given at all</i> - <i>Reasoning rather weak and expression may be unclear</i> - <i>A basic answer that has little development</i> - <i>Answers lack examples or other evidence, or it is so sketchy that it adds little support to the answer</i> <p>Level 2 (4 – 6 marks)</p> <ul style="list-style-type: none"> - <i>Disagreement supported by appropriate detail</i> - <i>Good reasoning and logic in parts of the answer with good expression in places</i> - <i>Some examples or other evidence will be presented to support answers in at least one place in the answer</i> <p>Level 3 (7 – 8 marks)</p> <ul style="list-style-type: none"> - <i>Answers will be comprehensive and supported by sound knowledge</i> - <i>disagreement considered and well supported</i> - <i>Reasoning is clear and logical with good expression of language</i> - <i>Examples and evidence to support answers will be extensive</i> 	
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2.	(a)	<p>Study Fig. 1, a climate graph of a weather station located near the equator.</p> <div data-bbox="510 207 1181 642" style="text-align: center;"> <p>temperature (°C)</p> <p>precipitation (mm)</p> <p>annual precipitation 3480mm</p> <p>J F M A M J J A S O N D</p> </div> <p>(source: K. Brooks, <i>Physical Geography: Process and System</i>; Hodder Arnold H&S; 1985; 034035951X)</p> <p style="text-align: center;">Fig. 1</p>	
Describe the climate shown in Fig. 1.			[3]
		<ul style="list-style-type: none"> - High average annual temperature (25-28°C) - Small annual range of temperature (2-3°C) - High annual precipitation (3480mm) - Well-distributed precipitation (rf every month) - Reference to statistics/data must be made (no reference, max 2m) - THIS IS NOT MONSOON 	
(b)		<p>Fig. 2 shows the concentration of carbon dioxide (CO₂) and the average annual surface temperature of the Earth from 1880 to 2005.</p> <div data-bbox="383 1181 1324 1823" style="text-align: center;"> <p>parts per million (ppm)</p> <p>degrees (°C)</p> <p>year</p> <p>Key</p> <p>— CO₂ concentration</p> <p>— average surface temperature</p> </div> <p style="text-align: center;">Fig. 2</p>	

	(i) Compare the trend in carbon dioxide concentration with the trend in the average annual surface temperature of the Earth shown in Fig. 1.	[4]
	<ul style="list-style-type: none"> - both rise over the period - although the CO₂ does so more smoothly from 290 parts per million to 370 ppm - surface temps rise more erratically from 13.8 to c.14.5 - both show a greater rate of increase after 1980 - need to use figures and compare trends - If two separate accounts – max 2 marks. 	
	(ii) Describe the causes of the increase of carbon dioxide in the atmosphere and explain how this increase could bring about changes in the surface temperature of the Earth.	[5]
	<p>Describe causes (max 2 marks):</p> <ul style="list-style-type: none"> - increase in deforestation - burning of fossil fuels - natural occurrence, e.g. volcanic eruptions <p>Explain resultant changes in surface temperature/global warming</p> <ul style="list-style-type: none"> - Couched in terms of the enhanced greenhouse effect. - Greenhouse gases, of which CO₂ is one, allow SWR (Short wave radiation) / visible light / solar radiation through - GHG are good absorbers of LWR (Long Wave radiation) / outgoing terrestrial radiation, heat is thus trapped and the atmosphere is warmed - This is a normal process, but increases in GHG, resulting from human activities – the enhanced greenhouse effect – will lead to a progressive warming of the earth's atmosphere and particularly the lower layers. - human activity causes GHG, e.g. CO₂, to be released at a far greater rate than that of natural emissions of GHG 	
	(c) With reference to relevant examples, describe and explain how temperatures are influenced by distance from the sea.	[5]
	<ul style="list-style-type: none"> - The sea heating and cooling more slowly than land influences the temperatures of inland and coastal areas. <p>Maritime effect</p> <ul style="list-style-type: none"> - Effect that large ocean bodies have on the climate of coastal areas - Summer: air over sea is cooler than air over land as land heats up faster than sea; cooler air over sea helps lower the temperature of coastal areas, making it cooler than inland areas - Winter: air over sea remains warmer than air over land as sea cools slower; warmer air over sea helps increase the temperature of coastal areas, making it warmer than inland areas - Effect: coastal areas experience cooler summers and warmer winters; i.e. smaller annual temperature range, than inland areas <p>Continental effect</p> <ul style="list-style-type: none"> - Effect that continental surfaces have on the climate of inland areas - Inland areas are further from the sea and the temperatures of these areas are not influenced by the sea 	

	<ul style="list-style-type: none"> - Effect: inland areas experience warmer summers and colder winters; i.e. larger annual temperature range, than coastal areas <p>e.g. Anchorage and Fairbanks (1 km vs 420 km, ATR 20°C vs 40°C)</p> <ul style="list-style-type: none"> - Answers may include a well annotated diagram. 													
(d)	With reference to studies you have made, discuss the relative importance of short-term and long-term responses to a natural hazard or disaster.	[8]												
	<p>Level 1 (0 – 3 marks)</p> <ul style="list-style-type: none"> - responses are likely to be descriptive accounts of some short-term and long-term responses - Answer lacks development - Answer lacks examples, lacks supporting evidence <p>Level 2 (4 – 6 marks)</p> <ul style="list-style-type: none"> - either a more detailed explanation of the importance of short-term and long-term responses for a named disaster, or some explicit discussion of their relative importance - examples presented to support answer, either for short-term or long-term response <p>Level 3 (7 – 8 marks)</p> <ul style="list-style-type: none"> - expect both: more detailed explanation of the importance of short-term and long-term responses for a named disaster, and explicit discussion of their relative importance - examples presented to support answer will be extensive <p>Short-term responses</p> <ul style="list-style-type: none"> • take place over a few hours, days and weeks • might involve: search and rescue; provision of essential medical care; provision of emergency food and water supplies; handling status of affected area (combating the threat of disease); setting up emergency shelters; establishing communications to the outside world; calling for humanitarian aid (alerting relief agencies). <table border="1"> <thead> <tr> <th>Short-term response</th> <th>implementation</th> <th>successes</th> <th>limitations</th> </tr> </thead> <tbody> <tr> <td>Search and rescue casualties</td> <td>People trapped under collapsed buildings are quickly located and freed</td> <td> <ul style="list-style-type: none"> • Survivors found after being trapped for a couple of weeks without food • E.g. 2011, Tohoku (Japan); sniffer dogs and heat sensors deployed and many trapped were rescued </td> <td> <ul style="list-style-type: none"> • Limited time of 72 hours to find and rescue trapped survivors as they are unlikely to survive beyond that without food and water </td> </tr> <tr> <td>Provide medical aid, food and water</td> <td> <ul style="list-style-type: none"> • Provide treatment, clean drinking </td> <td> <ul style="list-style-type: none"> • Immediate aid provided helps survivors </td> <td> <ul style="list-style-type: none"> • Medical supplies, food and water may not be </td> </tr> </tbody> </table>	Short-term response	implementation	successes	limitations	Search and rescue casualties	People trapped under collapsed buildings are quickly located and freed	<ul style="list-style-type: none"> • Survivors found after being trapped for a couple of weeks without food • E.g. 2011, Tohoku (Japan); sniffer dogs and heat sensors deployed and many trapped were rescued 	<ul style="list-style-type: none"> • Limited time of 72 hours to find and rescue trapped survivors as they are unlikely to survive beyond that without food and water 	Provide medical aid, food and water	<ul style="list-style-type: none"> • Provide treatment, clean drinking 	<ul style="list-style-type: none"> • Immediate aid provided helps survivors 	<ul style="list-style-type: none"> • Medical supplies, food and water may not be 	
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		<ul style="list-style-type: none"> water to survivors Prevent spread of diseases and dehydration Helps survivors cope with the disaster 	<ul style="list-style-type: none"> E.g. 2002, Afyon (Turkey); Turkish Red Crescent Society delivered 20,000 tents, 50,000 blankets, 3,000 heaters 	<ul style="list-style-type: none"> sufficient, results in unrest E.g. 2010, Haiti: loot and fighting broke out as people fought for food and supplies
	Handling status of affected area	<ul style="list-style-type: none"> Declare affected areas as 'emergency zones' Specialised authority assigned to provide immediate aid to people, restore emergency services 	<ul style="list-style-type: none"> Basic humanitarian needs taken care of, e.g. food, water, shelter E.g. 2002, Afyon (Turkey), Crisis Management Centre led by Ministry of Interior mobilised and coordinated relief within first few hours after the earthquake 	<ul style="list-style-type: none"> Some countries not experienced E.g. 2010, Haiti's first major earthquake since 1860; emergency relief lacked coordination and proper supervision; difficult to provide aid
	Set up emergency shelters	<ul style="list-style-type: none"> Set up tents Provide shelter for the homeless 	<ul style="list-style-type: none"> Temporary shelters provide survivors a place to carry on with their lives E.g. 2001, Afyon (Turkey) where tents housed homeless; helped to re-establish sense of community amongst survivors 	<ul style="list-style-type: none"> Living conditions may be poor; lead to people dying E.g. Haiti: outbreak of cholera killed almost 4000 people in the tent cities
	calling for humanitarian aid	<ul style="list-style-type: none"> Local and foreign governments offer money, medical or food aid Financial support to rebuild devastated areas 	<ul style="list-style-type: none"> Can help rebuild affected area E.g. 2010 Haiti: governments donated US\$2.5b and pledged US\$1.3b NGOS, e.g. World Vision and the International Red Cross also moved into affected areas to help 	<ul style="list-style-type: none"> Aid may be late or not delivered; trucks may be looted E.g. 2011 Turkey: trucks were looted before they reached the affected areas

Long-term responses

- go on for months and years after a disaster; involve rebuilding of affected areas
- might include: rebuild and improve infrastructure (e.g. long-term shelter, rebuilding destroyed houses, schools, hospitals etc); provision of healthcare; re-establishing the local economy; undertaking protective measures and educating the local community in case of a future disaster; establishing monitoring stations to warn/help predict of a future hazard; improve health options (e.g. counselling)

Long-term response	implementation	successes	limitations
Rebuilding and Improve infrastructure	<ul style="list-style-type: none"> • Rebuild and improve on infrastructure and amenities after disaster • Stricter building codes ensures higher safety levels 	<ul style="list-style-type: none"> • Authorities develop stricter building codes to ensure infrastructure restored at higher safety levels • E.g. after 1995 Kobe earthquake, Japan spent billions developing technology to build more earthquake-resistant buildings 	<ul style="list-style-type: none"> • Reinforced buildings do not protect against tsunamis; additional protection, e.g. breakwaters needed • E.g. 2010, Chile was struck by tsunami despite having many earthquake-resistant buildings
Provision of healthcare / Improve health options	<ul style="list-style-type: none"> • Health options, e.g. long-term counselling as loss of loved ones, homes, jobs can cause long-lasting trauma • To help injured victims or psychologically disturbed victims restore their livelihoods 	<ul style="list-style-type: none"> • Identify and address problems early • E.g. 2011, Christchurch (NZ): problems of anxiety and depression were identified and health workers were deployed 	<ul style="list-style-type: none"> • Challenging to improve health conditions, e.g.. Restore resilience
Compensate people who lose land and property	<ul style="list-style-type: none"> • Through insurance / direct payments to people who lost land and property 	<ul style="list-style-type: none"> • Compensation helps people find alternative places to settle down • E.g. Japanese insurance plans authorised by 	<ul style="list-style-type: none"> • Compensation often insufficient and may not cover cost of damage

			government to compensate people who lose their land and property	
	Ensure affected areas recover	<ul style="list-style-type: none"> Steps taken to ensure recovery of economy 	<ul style="list-style-type: none"> Government stimulates economy through various measures E.g. 2011, Christchurch (NZ): direct cash payments made to individuals to allow them to buy necessities; this provides income to traders E.g. repair and buildings programmes for homes and infrastructure provides employment and income for workers and traders 	<ul style="list-style-type: none"> Recovery of economy may take long time as huge sums of money needed to rebuild infrastructure and economy E.g. 2008, Sichuan (China): 3 years to rebuild; US\$123b to reconstruct schools, hospitals, homes
	<p>Possible conclusion:</p> <ul style="list-style-type: none"> short-term responses may be more important, to reduce the immediate threats to loss of life and re-establishing the local economy whereas long-term responses are important in a different way (long-term development) and more problematic, involving continued aid, restructuring and investment into the area, which may not be forthcoming, especially in poorer countries. may also discuss the importance of making adaptation integral to the long-term strategy in order to build resilience. 			

Section B

Answer one question from this section.

3.	(a)	Fig. 5 is a map showing the life expectancy at birth for countries other than those in the Americas.	
		<p>Key: Life expectancy at birth (years)</p> <ul style="list-style-type: none"> < 50 50 – 59 60 – 69 70 – 79 80 – 86 	
		<p>[Source: Reprinted from WHO: Life Expectancy, http://www.who.int/gho/mortality_burden_disease/life_tables/situation_trends/en, accessed 2015]</p>	
		Fig. 5	
		(i) Describe the pattern of life expectancy shown on Fig. 5.	[4]
		<ul style="list-style-type: none"> • low (50–59 years) life expectancy in much of Africa • lowest (<50 years) in central Africa • highest life expectancy (80–86 years) in Western Europe / Japan / Australasia • high (70–79 years) in Southeast Asia/North Africa/E. Europe • moderate (60-69 areas) Russia/Central Asia/India/South Asia. <p>Allow other valid points (e.g. anomalies)</p> <p>Reference to data is required for max 4m No reference, max 3 m</p>	
		(ii) Define the term 'life expectancy' and explain why it can be used as an indicator of health of a country.	[3]
		<ul style="list-style-type: none"> - Average number of years from the time of birth that a person can expect to live - High life expectancy is often found in DCs while low life expectancy is often found in LDCs - High life expectancy in DC may be attributed to adequate nutritious food, proper hygiene and sanitation / low life expectancy in LDC may be attributed to lack of nutritious food, proper hygiene and sanitation 	

(b)	Outline what is meant by the term 'degenerative diseases' and briefly describe the global distribution of 'degenerative diseases'.	[4]
	<ul style="list-style-type: none"> - Diseases where affected tissues or organs deteriorate over time - Because of life style choices, eating habit, bodily wear and tear, or genetic causes - Primarily in developed countries - but also in some socio-economic groups within less developed countries 	

(c)	Study Fig. 6, which shows information about GNP per capita and access to clean water in ten LEDCs (Less Economically Developed Countries).	
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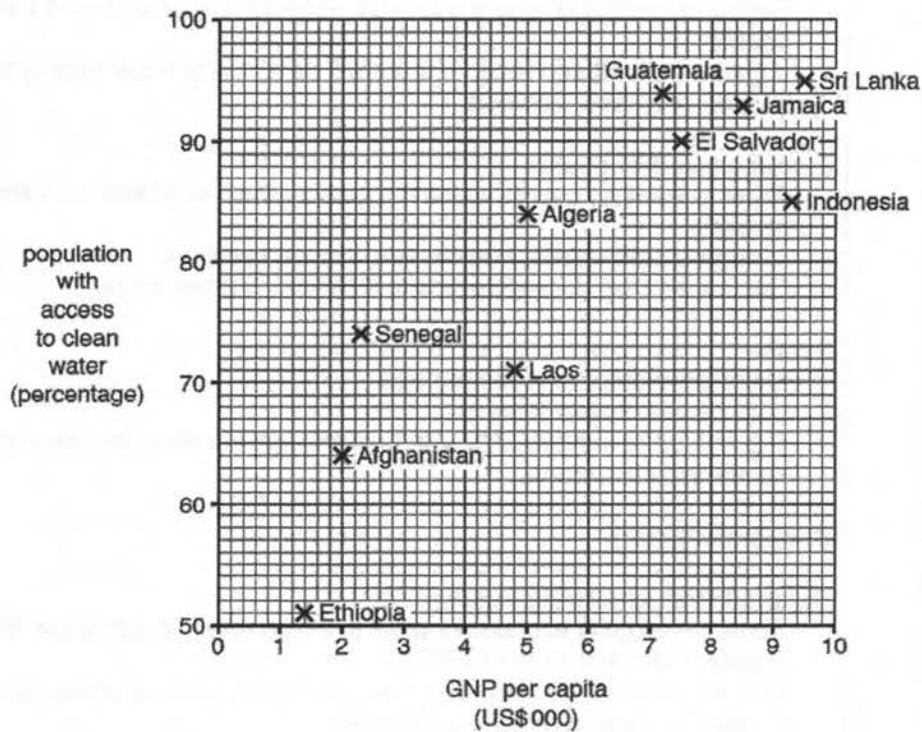


Fig. 6

(i)	Describe the general relationship between GNP per capita and the percentage of the population with access to clean water. Use statistics in your answer.	[2]
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- Countries with higher GNP per capita have a higher percentage with access to clean water/positive relation;
- comparative statistics for two countries to illustrate relationship.

(ii)	Explain why providing a reliable supply of clean water may increase life expectancy.	[4]
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- reduction of water borne disease/diarrhoea; such as typhoid/cholera, etc.;
- less dehydration/water is needed for life/without water people die;
- water required for cooking of food; so less malnutrition;
- less need to carry water for large distances;
- less time wasted so people can grow more crops;
- better sanitation/hygiene;
- irrigation of crops/water for livestock, etc.

(d)	'Climate change is the most important cause of global food shortage.' How far would you agree? Support your answer with relevant examples.	[8]
	<p>Introduction</p> <ul style="list-style-type: none"> - short description of the current situation of the food shortage. - agree or disagree with the statement <p>Physical factors</p> <p>Climate change</p> <ul style="list-style-type: none"> - Projected that when global temp increase, some countries or regions in the world may see their current production decrease by as much as 50% - e.g. Brazil, India, Pakistan, Turkey and parts of the USA - Shrinking of glaciers could reduce food supply over the coming decades - Seasonal melting of glaciers provide water for irrigation during the dry season - If glaciers shrink and recede, there will be a loss of water during the dry season -> smaller harvests <p>Extreme weather events</p> <ul style="list-style-type: none"> - Refer to weather events which may cause the loss of lives or damage to property - Droughts, cold waves, heat waves, tropical cyclones - Can cause crop damage or make it difficult to grow crops <p>Pests</p> <ul style="list-style-type: none"> - Major contributor to food shortage - Wild rabbits, moles, insects - E.g. in Liberia in NW Africa – tens of millions of caterpillars devoured all plants and food crops <p>Economic factors</p> <p>Demand from emerging economies</p> <ul style="list-style-type: none"> - Some developing economies grow at v high rates, in particular, Brazil, Russia, India and China (BRIC) - High increase in food demand from the rapidly growing urban middle class – depleting food inventories, esp. grain <p>Soaring cost of fertilisers and transport</p> <ul style="list-style-type: none"> - Directly affect cost of food - Price of fertilisers increase-> cost of producing food increases - Energy costs- partly responsible for price increase in fertilisers and transport - Modern agr uses petroleum products to fuel farm machinery and transport farm produce - E.g. world crude oil prices increased by 10.3% -> major wheat producer Kazakhstan had to increase the price of wheat exported to neighbouring countries such as Tajikistan - Generally transferred to the consumer – for the poor any increase in price is very hefty <p>Conversion of farmland to industrial crop production</p> <ul style="list-style-type: none"> - Growing crops for industrial use more profitable than growing food crops -> more farmers growing biofuels 	

- Biofuels – fuels that derive energy from biological carbons instead of fossil fuels. E.g. corn, sugar cane, palm oil
- E.g. 25% of all food crops grown in USA became fuel for vehicles instead of food for people – enough to feed 330 mil people in one year

Food policy

- Governments may stockpile food staples to ensure sufficient food supplies during times of emergency.
- Eg. Algeria bought 800 000 tonnes of wheat in 2011 to add to its stockpile. However this has caused several other LDCs to react and do the same. That same week, Saudi Arabia announced plans to double its stockpile and Indonesia agreed to purchase four times the usual amount. This reduced the supply of food staples worldwide and caused global prices to rise, which worsened the problem of food shortage in some LDCs.

Possible conclusion

- which factors affect food supply more?
- Compare the relative importance of the two types of factors
- Possible criteria:
 - extent of their impact on global food supply
 - e.g. in some areas such as East Africa, drought is a major cause, but food shortage worsened by economic factors such as conversion of farmland to industrial crop production
 - how the countries have managed to overcome some of these factors such as physical factors like pests by developing pest-resistant food crops. However, they are still plagued by economic factors such as soaring cost of fertilisers and transport which can be beyond their control.

Level 1 (0 – 3 marks)

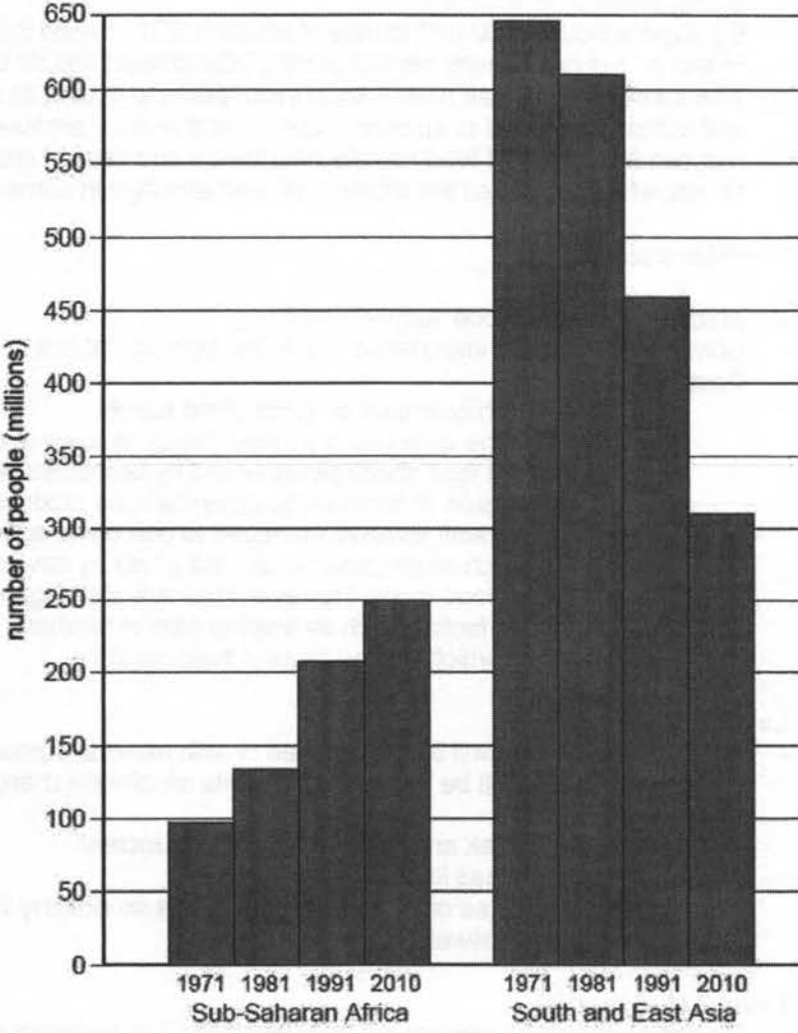
- At this level answers will be generalised or with minimal support if any given at all – there will be general statements on climate change and/or food supply
- Reasoning rather weak and expression may be unclear
- A basic answer that has little **development**
- Answers lack examples or other evidence, or it is so sketchy that it adds little support to the answer

Level 2 (4 -6 marks)

- Disagreement or agreement will be supported by appropriate detail
- Or, both agreement and disagreement are considered, but support is patchy so that the answer is not full (i.e. includes other physical and economic factor(s))
- Good reasoning and logic in parts of the answer with good expression in places
- Some examples (1 to 2 examples) or other evidence will be presented to support answers in at least one place in the answer

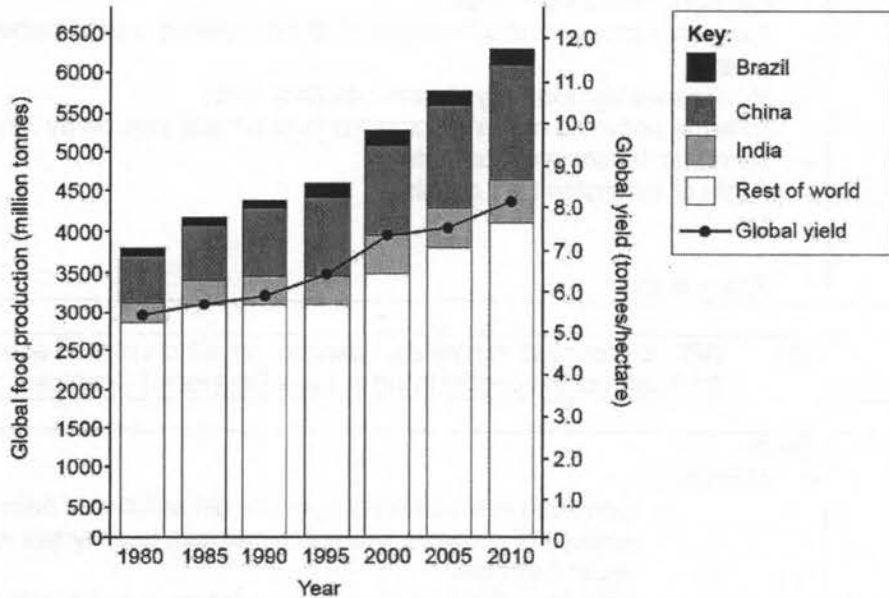
Level 3 (7 – 8 marks)

- Answers will be comprehensive and supported by sound knowledge
- Both agreement and disagreement are considered and well supported
- Reasoning is clear and logical with **good expression of language**
- Examples (2 to 3) or other evidence to support answers will be extensive

4.	(a)	Study Fig. 7, which shows the number of people who are undernourished in Sub-Saharan Africa and in South and East Asia.																
<div style="text-align: center;">  <table border="1" style="margin: auto;"> <caption>Data for Fig. 7: Number of undernourished people (millions)</caption> <thead> <tr> <th>Region</th> <th>1971</th> <th>1981</th> <th>1991</th> <th>2010</th> </tr> </thead> <tbody> <tr> <td>Sub-Saharan Africa</td> <td>96</td> <td>135</td> <td>210</td> <td>250</td> </tr> <tr> <td>South and East Asia</td> <td>640</td> <td>610</td> <td>460</td> <td>310</td> </tr> </tbody> </table> <p>*People are undernourished when their food intake provides less than their minimum energy requirements.</p> <p>Fig. 7</p> </div>				Region	1971	1981	1991	2010	Sub-Saharan Africa	96	135	210	250	South and East Asia	640	610	460	310
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Sub-Saharan Africa	96	135	210	250														
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(i)		<p>Compare the trends in Sub-Saharan Africa and South and East Asia between 1971 and 2010. Support your answer with dates and statistics from Fig. 7.</p>	[3]															
		<ul style="list-style-type: none"> - Reduction of numbers in Asia but increase in Africa; c. 96 – 100 million to 250 million in Africa; - c. 640 – 645 million to c. 310 – 315 million in Asia - NB: Reserve 1 mark for overall pattern/trend. - Any pair from Africa and Asia can be accepted for 2 marks. - 3 @ 1 mark 																

	(ii) Explain how food shortages can be caused by the natural environment.	[4]
	<ul style="list-style-type: none"> - Drought: crops won't grow; - Flooding: crops washed away; a lot of rain drowns crops/washes them away; - Hurricanes/cyclones/typhoons: destroy food; - Infertile soils: no nutrients for crops to grow; soil erosion by wind; - Nutrients: leaching of nutrients; - Pests or examples i.e. Locusts; - etc. - 4 @ 1 mark 	
	(iii) With reference to examples, describe the effects of food shortages on the health of the people living in Less Developed Countries.	[4]
	<p>Health:</p> <ul style="list-style-type: none"> - Malnutrition: <ul style="list-style-type: none"> o Condition in which body does not get sufficient / balanced amount of nutrients needed to maintain healthy tissue and organ functions o Results in death or long-term problems in individuals o Condition in which body does not get sufficient / balanced amount of nutrients needed to maintain healthy tissue and organ functions o Results in death or long-term problems in individuals o it is the underlying cause of child deaths associated with diarrhoea, pneumonia, malaria and measles o Cause of 52.5% of all deaths in young children (less than 5 years of age), about 5 million in LDCs o 148 million underweight children (78 m in South Asia, 36 m in Sub-Saharan Africa) o Heavily affected o Affects about 16% of people o Most heavily affected is Sub-Saharan Africa (e.g. 75% of people in Democratic Republic of Congo) - Ill-health <ul style="list-style-type: none"> o Inadequate food consumption results in ill-health o Specific symptoms and consequences may arise from the lack of certain nutrients o E.g. Vitamin A - Visual impairment and blindness, Diarrhoeal diseases and measles; Vitamin C and D - Osteoporosis - Starvation <ul style="list-style-type: none"> o Extreme hunger from a severe lack of food o Extreme form of malnutrition o Body become skeletally thin, organs become permanently damaged, death may result o Starvation is much more common in LDCs due to: <ul style="list-style-type: none"> ▪ Greater number of people living in poverty ▪ Lack or absence of resources to counter effects of natural disasters ▪ Unstable political situation, e.g. <i>rebellions, wars</i> ▪ FAO estimates 98% of people facing starvation are in LDCs 	

- (b) Fig. 8 is a graph showing changes in global food production and global yields of food crops from 1980 to 2010.



[Source: adapted from Ellen MacArthur Foundation, (2013), *Towards the Circular Economy 2*, page 22]

Fig. 8

- (i) With reference to Fig. 8, briefly describe the change in food production in India from 1980 to 2010. [3]

1m: for recognition of increase,
1m: for recognition of step/steps and
1m: for some correct quantification. For example: 250-300m tonnes in 1980 and 500-750m tonnes in 2010

- (ii) Explain one way in which the yield of some food crops can be increased. [3]

Note: yield is not the same as output/production.

Reasons for increases in yield include: increased use of fertilizers; pesticides; irrigation; adoption of high-yielding varieties.

Accept other valid suggestions.

Award [1] for identification of valid factor, [1] for its development, and [1] for a clear link to yield rather than just output.

For example:

- Yield may increase if more farmers apply more or better fertilizers [1] to their crops. This provides plants with extra nutrients [1] and means that they produce more crops off the same area of land [1].

	- Yields (amount produced off a given area of land) [1] may increase if farmers use pesticides more effectively [1] because pests that normally reduce the yield of that crop are reduced or eliminated [1].	
(c)	'Technology will solve the problem of food shortage.' How far would you agree? Support your answer with relevant examples.	[8]
	<p>Technology as a strategy:</p> <p>Storage (Storing food more effectively)</p> <ul style="list-style-type: none"> - the use of refrigerated warehouse storage or refrigerated delivery trucks to keep food fresh for a longer period of time - Crops can be distributed to places further away - In LDCs, farmers make use of simple but effective technologies, e.g. <i>silos</i> (<i>airtight structure for storing crops</i>) <p>Farming Technology (Improving farm productivity)</p> <ul style="list-style-type: none"> - The use of HYVs, irrigation technology, chemical fertilisers and pesticides, and machinery to increase crop yields, e.g. Green Revolution - Food can be grown in places previously unsuitable for agriculture - Farmers have increased crop yield - Reduced dependence on labour due to more efficient farming <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> - Green Revolution – resulted in the rapid increase in the productivity of agriculture through the use of science and technology. - characterised by high-yielding varieties, fertilisers and pesticides, improved irrigation and mechanisation. <ul style="list-style-type: none"> c High-yielding varieties (HYVs): improved strains of crops such as rice, wheat and other cereals that have an increased growth rate; developed through cross-breeding of selected varieties, they have increased resistance to pests and diseases or the ability to grow within a shorter growing season; these varieties require more water and nutrients to sustain their growth; can grow within a shorter growing season so that there can be more harvests in a year; 'Wonder Rice' has a growing season of 100 days as compared to the growth duration of 120 days for the non-HYVs; this rice enabled farmers to produce twice as much grain as traditional varieties; this increase in food productivity meant that there will be more food available to feed the rising population and help to alleviate world hunger and malnutrition. c Irrigation: possible for water to be made available to places which were once too dry for farming, increasing the amount of arable land worldwide; e.g. Great Man-made River in the North African country of Libya has made it possible to grow crops in the Sahara Desert (It is a network of underground pipes, canals, wells, reservoirs and tunnels that draws water from underground aquifers deep in the Sahara Desert). Irrigation methods such as flood irrigation enable water to be delivered to a whole surface, such as rice fields, thus, improvement in irrigation may help to increase the total amount of food produced in the world since more land is now made suitable for the growing of crops, reducing shortage of food. </div>	

Biotechnology (Modifying the characteristics of food crops)

- The science of modifying living organisms such as plants and animals
- When used in the production of food, it is known as genetic modification
- GM crops have a higher yield than non-GM crops. This helps farmers earn a higher income and helps countries to be more self-sufficient in food production.
- Food can be grown in places previously unsuitable for agriculture.

Why do shortages still occur?

- Physical (Extreme weather events, climate change and pests)
- Political (Civil unrest and poor governance)
- Economic (Demand from emerging economies, the soaring cost of fertilizers and transport, and the conversion of farmland to produce biofuel crops)
- Social (Lack of accessibility, inadequate logistics of food distribution and storage, and rapid population growth)

Physical factors

Climate change

- Projected that when global temp increase, some countries or regions in the world may see their current production decrease by as much as 50% - e.g. Brazil, India, Pakistan, Turkey and parts of the USA
- Shrinking of glaciers could reduce food supply over the coming decades
- Seasonal melting of glaciers provide water for irrigation during the dry season
- If glaciers shrink and recede, there will be a loss of water during the dry season -> smaller harvests

Extreme weather events

- Refer to weather events which may cause the loss of lives or damage to property
- Droughts, cold waves, heat waves, tropical cyclones
- Can cause crop damage or make it difficult to grow crops

Pests

- Major contributor to food shortage
- Wild rabbits, moles, insects
- E.g. in Liberia in NW Africa – tens of millions of caterpillars devoured all plants and food crops

Economic factors

Demand from emerging economies

- Some developing economies grow at v high rates, in particular, Brazil, Russia, India and China (BRIC)
- High increase in food demand from the rapidly growing urban middle class – depleting food inventories, esp. grain

Soaring cost of fertilisers and transport

- Directly affect cost of food
- Price of fertilisers increase-> cost of producing food increases
- Energy costs- partly responsible for price increase in fertilisers and transport

- Modern agr uses petroleum products to fuel farm machinery and transport farm produce
- E.g. world crude oil prices increased by 10.3% -> major wheat producer Kazakhstan had to increase the price of wheat exported to neighbouring countries such as Tajikistan
- Generally transferred to the consumer – for the poor any increase in price is very hefty

Conversion of farmland to industrial crop production

- Growing crops for industrial use more profitable than growing food crops -> more farmers growing biofuels
- Biofuels – fuels that derive energy from biological carbons instead of fossil fuels. E.g. corn, sugar cane, palm oil
- E.g. 25% of all food crops grown in USA became fuel for vehicles instead of food for people – enough to feed 330 mil people in one year

Food policy

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- Social (Lack of accessibility, inadequate logistics of food distribution and storage, and rapid population growth).

Other Strategies to overcome food shortage:

- Agricultural: Make farming more sustainable, Increase the efficiency of harvest methods, Maximise the use of farmland on a global scale
- Social: Support local farmers, Control population growth
- Political: Not everyone has equal access to food due to unequal food distribution, Better governance at national and international levels is required

Possible conclusion

- There is much potential for technology to address the problem of food shortage – through increasing the rate of food production through biotechnology and improved farming methods. Food also has longer shelf life through advancement in storage facilities, increasing the amount of food for consumption. However, technology has limitations in solving the problem of food shortage.
- First, world population keeps on growing, especially in the LDCs. The rate of food production may not be able to keep up with the rate of population growth.
- Second, although food production has increased, not everyone has equal access to food due to inequality in SES, and poorer segments of society will have less purchasing power to buy sufficient and nutritious food.
- Third, while technology helps increase food production, damage has been done to the environment, esp in land and water resources. This will make it difficult to maintain the current rate of food production in the long run if land and water resources continue to deteriorate.

	<p>- Thus, despite the use of technology to increase food supply, other strategies are needed, e.g. lower birth rates, better management of land and water resources and sustainable farming techniques.</p> <p>Level 1 (0 – 3 marks)</p> <ul style="list-style-type: none"> ▪ <i>At this level answers will be generalised or with minimal support if any given at all</i> ▪ <i>Reasoning rather weak and expression may be unclear</i> ▪ <i>A basic answer that has little development</i> ▪ <i>Answers lack examples or other evidence, or it is so sketchy that it adds little support to the answer</i> <p>Level 2 (4 – 6 marks)</p> <ul style="list-style-type: none"> ▪ <i>Disagreement or agreement (technology will solve / will not solve) will be supported by appropriate detail</i> ▪ <i>Or, both agreement and disagreement (other considerations) are considered, but support is patchy so that the answer is not full</i> ▪ <i>Good reasoning and logic in parts of the answer with good expression in places</i> ▪ <i>Some examples or other evidence will be presented to support answers in at least one place in the answer</i> <p>Level 3 (7 – 8 marks)</p> <ul style="list-style-type: none"> ▪ <i>Answers will be comprehensive and supported by sound knowledge</i> ▪ <i>Both agreement and disagreement are considered and well supported</i> ▪ <i>Reasoning is clear and logical with good expression of language</i> ▪ <i>Examples or other evidence to support answers will be extensive</i> 	