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Class	Name	Index No
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ST.HILDA'S SECONDARY SCHOOL

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PRELIMINARY EXAMINATION 2016

PURE GEOGRAPHY

2236/01

Paper 1

Level: Secondary 4 Express

Duration: 1 hour 40 minutes

READ THESE INSTRUCTIONS FIRST

Write your name and index number on all the work you hand in.

Write in dark blue or black pen.

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 **one** question.

Write all answers in the foolscap papers provided.

Candidates are encouraged to 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. 3 for Question 2, Fig. 5a and Fig. 5b for Question 3.

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 5 printed pages, including this cover page

Section A

This question is **compulsory**.

- 1 Some students wanted to find out the impact of tourism on their town. The hypothesis for the investigation is '*tourists who visit the local park have a positive impact on the town*'.

The students used the Internet and found a sketch map of the area around the local park (Fig. 1 below). They decided to design a questionnaire for the residents in this area to assess the impact of tourism.

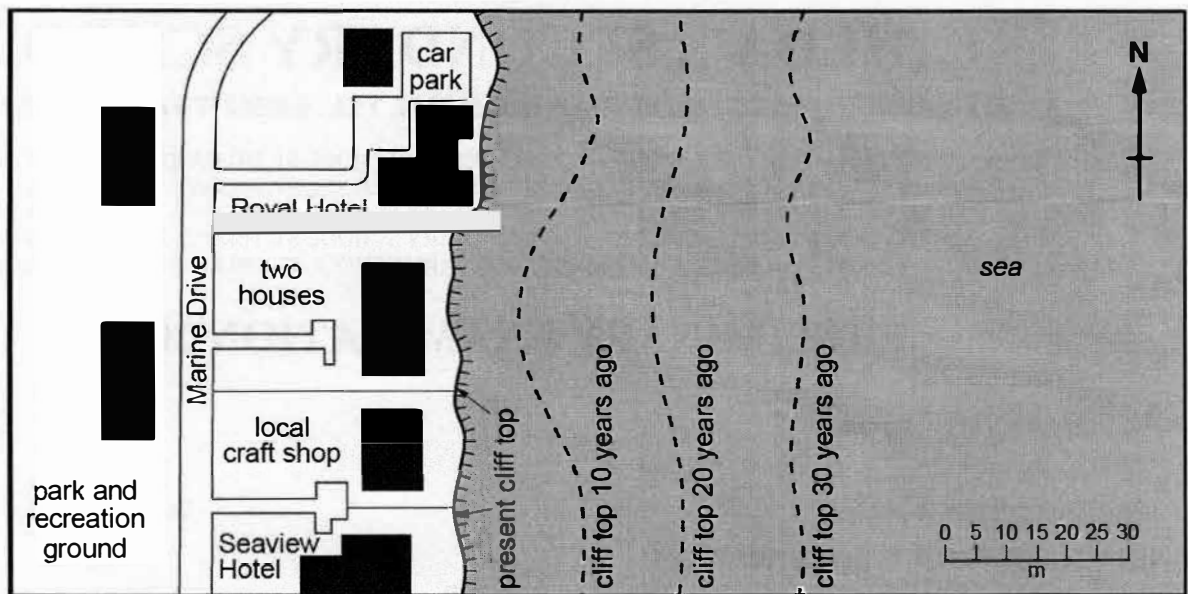


Fig. 1

- (a) What question should the students include in their questionnaire to identify their interviewee? [1]
- (b) Name and describe a suitable sampling method to select 50 residents to complete the questionnaire. Give two advantages of the sampling method. [4]
- (c) Suggest why the students should conduct their interviews with the residents in the evenings. [2]

- (d) The results of the questionnaire are shown in Table 1 below.

		Strongly Agree (4)	Agree (3)	Disagree (2)	Strongly Disagree (1)
Residents' views on impacts of tourism	Improved security	46%	30%	20%	4%
	Improved amenities	36%	36%	23%	5%
	Increase in litter	16%	15%	29%	40%
	Increase in noise / traffic	43%	40%	15%	2%

Table 1

Using information in Table 1, the students were able to obtain an aggregate score for each of the impact by using a formula. An example of how the aggregate score is obtained for 'Improved security' is shown below:

$$(46\% \times 4) + (30\% \times 3) + (20\% \times 2) + (4\% \times 1) = \underline{3.18}$$

Draw a suitable graph to show the aggregate scores for all of the impacts of tourism. [3]

- (e) What conclusions can the students make about the hypothesis '*tourists who visit the local park have a positive impact on the town*'? Support your answer with evidence from Table 1. [3]
- (f) Suggest how the students could improve the reliability of their investigation. [3]
- (g) One student suggested that the length of stay of the tourists who drove could be related to the ease of parking in their town. The students then designed another questionnaire and interviewed some self-driving tourists from Royal Hotel and some self-driving tourists from Seaview Hotel. The results of their interview are shown in Table 2 below.

		%
Length of stay in town	Only 1 day	42
	2-3 days	38
	4-7 days	17
	More than one week	3
Opinions about parking in town	Very difficult	80
	A little difficult	15
	No problem	5

Table 2

How far does the information in Table 2 support the student's suggestion? [3]

- (h) Lastly, the students decided for their next field investigation to find out if the coastal process taking place at the cliff is due to destructive waves, and its impacts on the town. Describe, in detail, how they may carry out this new investigation. [6]

Section B
Answer **one** question.

2(a) Study Fig. 2 below which shows a sketch of a coastline.

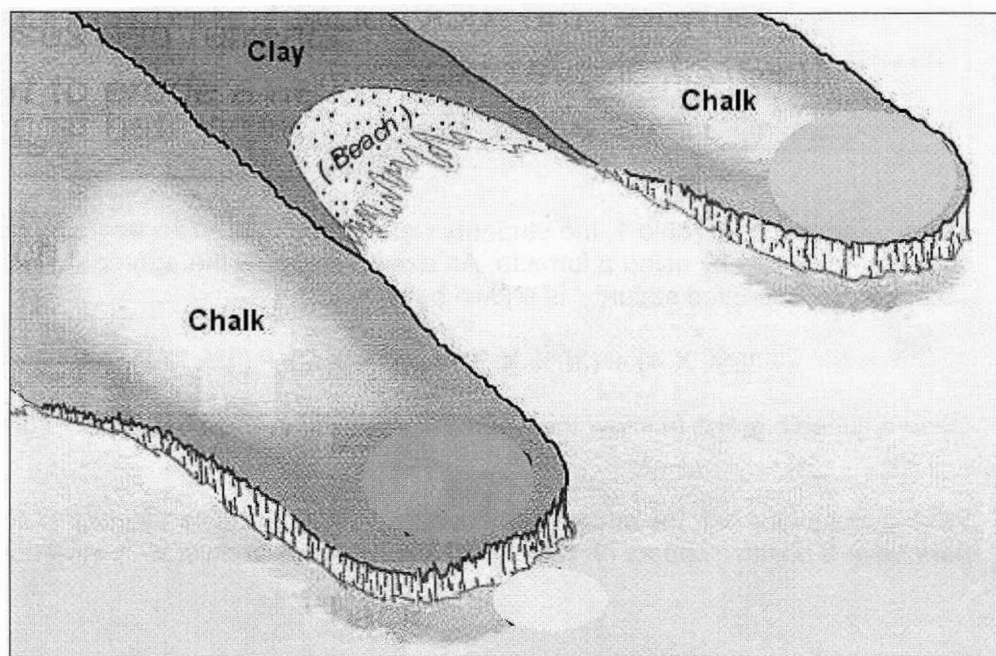


Fig. 2

- (i) Describe the shape and appearance of the coastline. [3]
- (ii) Using evidences from Fig. 2, explain the processes that had caused the shape of the coastline. [5]
- (b) Explain the factors that affect wave energy. [3]
- (c) Study Fig. 3 (Insert) which shows a coastline before and after the implementation of a new coastal management strategy. [3]
- Using information from Fig. 3, describe the new coastal management strategy and explain why it is necessary. [6]
- (d) *"The threats to the mangrove or coral reef ecosystem are difficult to manage."*
- How far do you agree with this statement? Explain your answer. [8]

3(a) Fig. 4 below shows a coastal feature.

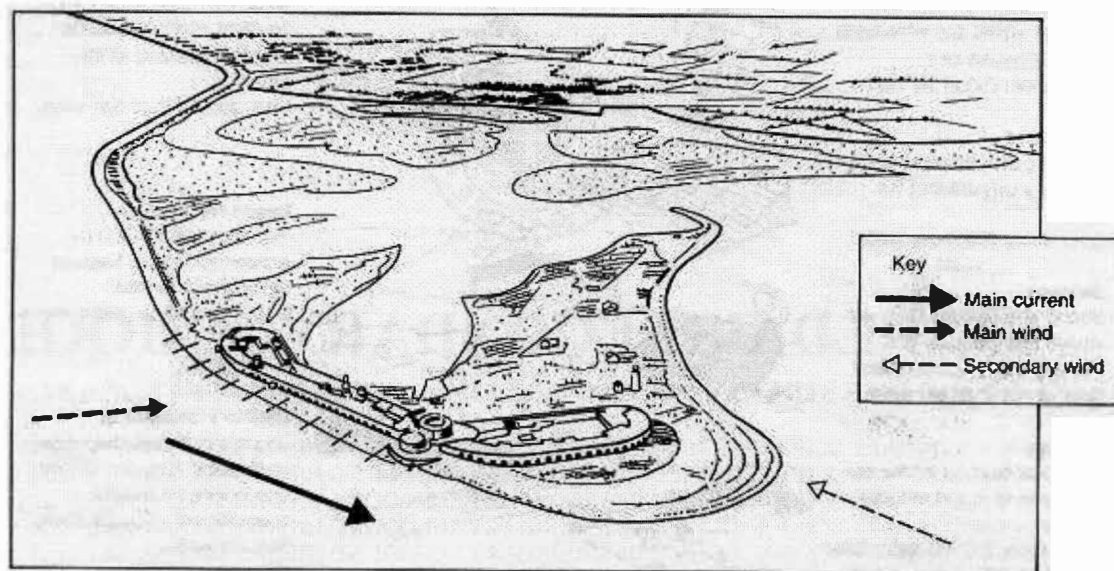


Fig. 4

- (i) Describe the coastal feature. [3]
- (ii) Using evidences from Fig. 4, explain the processes that led to the formation of the coastal feature. [5]
- (b) Explain how waves break on a coast. [3]
- (c) Fig. 5a (Insert) shows information about Italy. Fig. 5b (Insert) shows a photograph of Rome, a city in Italy. [6]
- Using information from Fig. 5a and 5b, describe and explain the factors that make Italy a popular tourist destination. [6]
- (d) *"Developments in technology are more important than demand factors to the growth of tourism."* [8]
- How far do you agree with this statement? Explain your answer. [8]

~ End of Paper ~

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PRELIMINARY EXAMINATION 2016

PURE GEOGRAPHY

2236/01

Paper 1

Level: Secondary 4 Express

Duration: 1 hour 40 minutes

INSERT

READ THESE INSTRUCTIONS FIRST

The Insert contains Fig. 3 for Question 2, Fig. 5a and Fig. 5b for Question 3.

This document consists of 3 printed pages, including this cover page

ST HILDA'S PRELIM EXAM 2016
Sec 4Exp Pure Geography

[Turn over

2236/01 PRELIM EXAM 2016
Sec 4Exp Pure Geography

Fig. 3 for Question 2 (c)

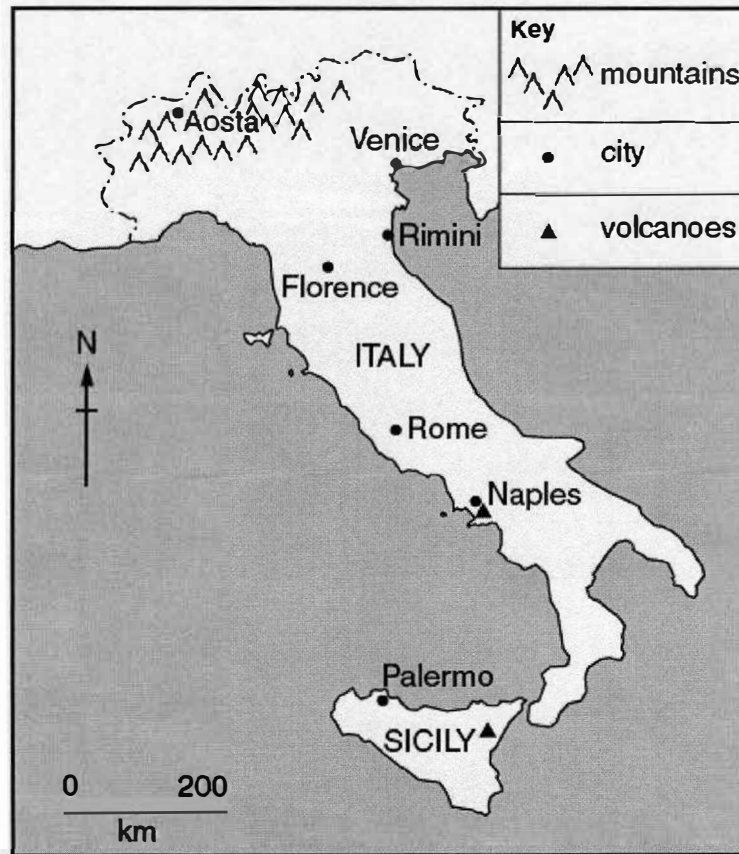
Before new strategy



After new strategy



Fig. 5a and Fig. 5b For Question 3 (c)



Credits

Fig. 3 <http://www.capemay.com/Editorial/january09/>

.html

Fig. 5b <http://www.vimehotels.com/en/rimini-vime-hoteles.html>

St. Hilda's Sec School
Sec 4Exp Pure Geography
Answers to Prelim 2016 Paper 1

1

(a) ACCEPT POSSIBLE ANSWERS

- "Are you a resident here?"

(b)

- Random sampling
- Generate random numbers and select the interviewee
- +ve reduce biasness
- +ve get a range of people to respond

OR

- Systematic sampling
- Select every nth person
- +ve reduce biasness
- +ve quicker, saves time

(c) ACCEPT POSSIBLE ANSWERS

- People are not rushing to school or work
- More people will be at home / at the park
- It is cooler to do interview in the evening

(d) ACCEPT ANY SUITABLE GRAPH

E.g.: Simple Bar Graph

- Correct axes x/y showing 'Impacts' / 'Aggregate Score' (1m)
- Correct plotting of all values (2m)
- Correct plotting of 1-3 values (1m)

(e)

- Hypothesis is supported to a large extent
- % of residents who strongly agreed & agreed for 1* 2 impacts are >50%
- Most residents do NOT find an increase in litter (which means it is a +ve)
- However, most residents DO agree that there is increase in noise / traffic (only 17% strongly disagreed / disagreed)
- Include more impacts

(f) ACCEPT POSSIBLE ANSWERS

- Interview more residents
- Look for residents who had been living in the town for a longer period, not those recently moved in
- Conduct the interview a few more times, over a longer period of time

(g) ACCEPT POSSIBLE ANSWERS

- Hypothesis 'Tourists stay longer when they find parking is easy'.
- Support, as 80% tourists found difficulty in parking and 80% tourists stay for 3 days or less.
- May not support, as there is no evidence to suggest that the same 80% gave the correlated responses.
- May not support, as the number of tourists interviewed may not be significant (more than 30) for reliability.
- May not support as investigation is only conducted once

(h) ACCEPT POSSIBLE ANSWERS

- State a possible hypothesis / relationship between the position of the cliff and the impact on the town
- To investigate destructive waves, count the number of waves/crests/troughs over 5 minutes, take average
- Destructive waves → 10-14 per minute
- To find out impact of coastal process on town, interview residents, ask the how they have been affected over the past 30 years e.g.: house pricing
- Or interview shop owners / hotel owners, ask how their businesses have been affected over the past 30 years e.g.: no. of tourists visiting the shop / hotel
- Or do internet search to find out how house pricing / no. of tourists etc has changed over the past 30 years

2(a)**(i)**

- Uneven coastline
- Presence of headlands & bay
- (Sandy) beach has been formed in the bay
- Cliffs with steep face at headland

(ii)

- Alternate bands of more resistant / hard rocks (chalk) and less resistant / soft rocks (clay) are arranged at right angles to the coast.
- The less resistant / soft rocks get eroded faster
- Thus curve inwards as bays.
- The remaining more resistant / hard rocks extending into the sea are called headlands.
- Due to wave refraction, waves diverge or curve along the bays.
- Wave energy spreads out and weakens. Deposition takes place and sandy beaches are formed.

(b)

- Wind speed – faster the wind blows, the greater the energy
- Wind duration – longer the wind blows, the greater the energy
- Fetch – the greater the fetch, the greater the energy

(c)

- New strategy – **Beach nourishment**
- Constant replenishment of sand (from external source) to a beach
- Sand may come from another beach or dredged from sea floor
- Old strategy – **Groynes**
- Suggests that beach has been eroded by longshore drift (& old strategy had not worked)
- Hence sand needs to be replenished to improve beach quality and protect coast

(d)

Relevant points: Only accept threats / pressures to EITHER mangrove OR coral reef
 I.e.: Need not be BOTH

Students MUST address whether the threats / pressures are DIFFICULT to manage

I.e.: Cannot merely describe / explain what the threats / pressures are, otherwise max. L2/4

Strategy (E.g.)	Description (WHERE?)	Successes	Limitations
Encouraging coral reef growth (Ihuru, Maldives)	▪ Conserve coral reefs and restore damaged ones ▪ Create artificial reefs by placing steel /	• Coral reefs weaken wave energy by reducing speed of waves approaching coast	▪ Need years to establish coral reef ecosystem ▪ Not all coastal regions can support coral reefs
What's coral reef			

ecosystem? • Masses of corals growing in tropical shallow seas Distribution • Between the tropics E.g.: SEA Environmental conditions (Fig 1.56) Pressures (Fig 1.59) • Overcollection • Fishing methods • Recreational use of coast • Coastal development • Climate change	concrete on sea floor WHERE? - Along coast	• Enhance fishing opportunities • <u>Healthy</u> coral reefs can help protect coasts • E.g.: In 2004 Indian Ocean Tsunami, coral reefs provided buffers to weaken wave energy <u>Other value of coral reefs</u> • Provide habitat for marine creatures • Tourist attractions	(limited to only tropical shallow seas) • Can be severely damaged by severe storms • Require constant effort to reduce water pollution (as discharging of sewage and other waste into the sea pollutes the sea and can threaten the growth of coral reefs) • To succeed in a long run, need cooperation from public, fishermen, industries, government
Planting mangroves (Parts of Aceh) What's mangrove ecosystem? • Tropical / sub-tropical plants that are halophytes (salt-tolerant) Distribution Between the tropics, along low lying, sheltered coasts with muddy and waterlogged land E.g.: Southeast Asia, Australia, W Africa, tropical areas of the Americas Adaptation • Leaves – special salt glands to secrete excess salt • Fruits –floating fruits; tube-like fruits • Roots – pencil roots; prop roots; kneed roots Pressures (Fig 1.69) • Demand for fuel wood and charcoal • Conversion to other land uses • Coastal development • Rising sea level	WHERE? - Along coasts	• Roots can absorb energy of incoming waves • Roots help to trap sediments, bind loose soil and reduce coastal erosion • <u>Extensive</u> areas of mangroves can reduce the loss of life and damage caused by tsunamis • E.g.: In 2004 Indian Ocean Tsunami, mangroves planted by one of the villages in Tamil Nadu, India slowed down the waves. Much of the land around the village was flooded, but the village itself suffered minimal damage • Extends and enlarges beach seawards as mangroves grow seawards <u>Other value of mangroves</u> • Provide breeding ground and habitat for marine creatures • Provide wood and non-wood forest products • Improve water quality – natural filters	• Need years to establish mangrove ecosystem • Not all coastal regions can support mangroves (limited to only tropical / sub-tropical sheltered areas) • Depth of coast may become shallower affecting coastal transportation and port activities • <u>Narrow</u> mangrove strips provide limited coastal protection against tsunamis • When uprooted or snapped off at mid-trunk and swept inland, can cause extensive property and life damage • Young mangroves are fragile, thus mangrove planting require cooperation of locals who need to prevent their farm animals from grazing on mangrove plantations

L1 (0-3) • Answer will be generalized or with minimal support if any given at all. • Reasoning may be rather weak and expression may be unclear. • Basic answer that has little development, lack examples or other evidences / sketchy examples. L2 (4-6) • Disagreement / agreement will be supported by appropriate detail. Or, both disagreement & agreement considered but with patchy support. • Good reasoning and logic in parts of answer with good expression in places. • Not a full answer, some examples or other evidence presented in at least 1 place in answer. L3 (7-8) • Both disagreement & agreement are considered and well supported. • Reasoning is clear and with good expression. • Comprehensive answer, supported by sound knowledge. Examples or other evidence extensive. (E.g.: 'I agree, coral reefs have been cleared for boat channels, or damaged by poison or spear fishing. It is difficult to manage as the locals may not see the value of conserving coral reefs when their livelihood as boatmen or fishermen is at stake. Banning these activities may be costly and inefficient. However, the management is not impossible, as governments can try to limit these activities. In Wakatobi National Park in Indonesia, zones have marked off to prevent commercial fishing. Therefore, marine reserves can be set up and threats to coral reef ecosystems can then be managed or reduced.')
3 (a) (i) • Spit • A long narrow ridge of sand (formed by longshore drift) • One end attached to the main land (ii) • Main / longshore current formed by main wind / waves that approach coast at an angle • Materials are transported along the coast by combo of longshore current & beach drift aka longshore drift • When there is an abrupt change in the direction of coastline, the longshore drift will continue • The materials are deposited as they enter the water • Overtime, these materials accumulate above the water. A spit is formed • A hook may develop at the end of the spit due to secondary wind / waves
(b) • As wave moves in shallow water, its base slows down due to friction • Wave height increases, wave length decreases • Wave crest becomes steeper and topples over
(c) ACCEPT POSSIBLE ANSWERS • Italy has many places of scenic beauty such as the mountains in Aosta • Also volcanoes e.g.: in Sicily • And coasts e.g.: Rimini • With many developed cities such as Venice, it will attract tourists with places of good facilities / education facilities / theme parks • It will have many places with rich culture / history / architecture such as Rome • It will even have places of dark tourism e.g.: Naples (Pompeii ruins)

(d)

Relevant points:

Only accept comparison between Demand & Developments in Technology

Developments in technology	Demand factors
Better & affordable transport - Great improvements in safety, shorter travelling time, cheaper costs - Air transport made affordable by budget airlines E.g.: Jetstar Asia, Tiger Airways	Disposable income - The amount of money available for an individual to spend, or save, after taxes - Rapid economic growth (e.g.: in China, India) has increased disposable income, allowing people to travel
More air routes & agreements - Increased air routes & agreements made various parts of the world more accessible, better connected - Open skies agreement, deregulation helped growth of global tourism E.g.: IATA	Leisure time - A part of a day, week, year without work commitments aka relaxation time - Increase in leisure time due to shorter working weeks, more public holidays & more paid annual leave - With more income + paid leave, may be more inclined to travel
Ease of access to information Information more readily available & accessible, updated E.g.: e-services: online booking of tours and tickets	Changing lifestyle - Travelling has become a form of relaxation - People live longer & are more physically fit to travel frequently i.e.: healthy retirees such as 'grey' nomads in Australia

L1 (0-3)

- Answer will be generalized or with minimal support if any given at all.
- Reasoning may be rather weak and expression may be unclear.
- Basic answer that has little development, lack examples or other evidences / sketchy examples.

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- Not a full answer, some examples or other evidence presented in at least 1 place in answer.

L3 (7-8)

- Both disagreement & agreement are considered and well supported.
- Reasoning is clear and with good expression.
- Comprehensive answer, supported by sound knowledge. Examples or other evidence extensive.
- (E.g.: 'I agree to some extent as better & affordable transport like budget airlines has helped its growth. Open sky agreements make air routes direct, contributing to lower costs in air travel. Thus, more people are able to afford air travel than before. However, the demand factors are as or more important. Without the time to travel, or the money to spend on travelling after paying off one's essentials, an individual will not be compelled to do so no matter how cheap is the airfare offered.')

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PRELIMINARY EXAMINATION 2016

PURE GEOGRAPHY

2236/02

Paper 2

Level: Secondary 4 Express

Duration: 1 hour 30 minutes

READ THESE INSTRUCTIONS FIRST

Write your name and index number on all the work you hand in.

Write in dark blue or black pen.

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 **one** question.

Section B

Answer **one** question.

Write all answers in the foolscap papers provided.

Candidates are encouraged to support their answers with the use of relevant examples.

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Insert contains Fig. 4 for Question 2.

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 this cover page

Section A
Answer **one** question.

1(a) Fig.1 shows the monthly temperature and rainfall of a location in the tropics.

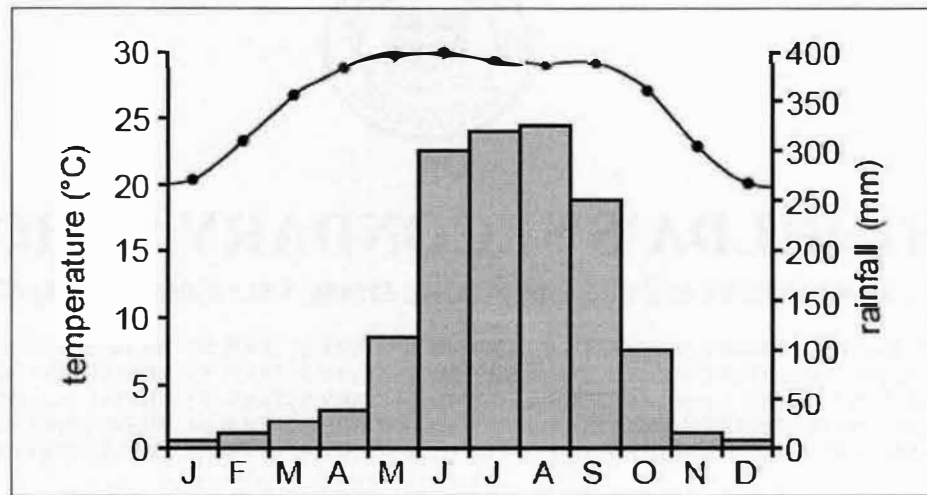


Fig. 1

- (i) With the help of Fig. 1, identify and describe the climate of this location. [5]
- (ii) Account for the variation in the rainfall throughout the year. [5]

- (b) Study Fig. 2 below which shows the greenhouse effect, as well as some human activities.

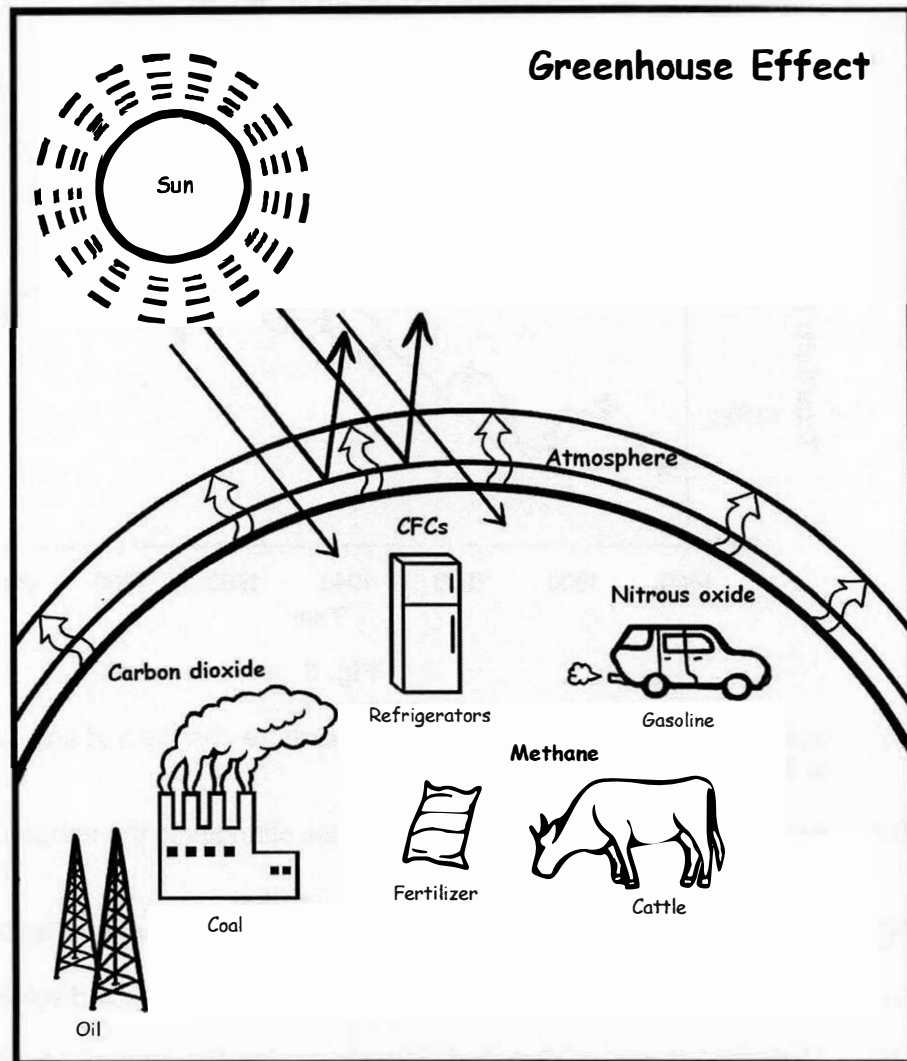


Fig. 2

With the help of Fig. 2, explain what 'enhanced greenhouse effect' is and its anthropogenic causes.

[7]

- (c) "The physical impacts of tropical cyclones are difficult to mitigate."

How far do you agree with this statement? Explain your answer with examples.

[8]

2(a) Refer to Fig. 3 which shows the changes in global temperature.

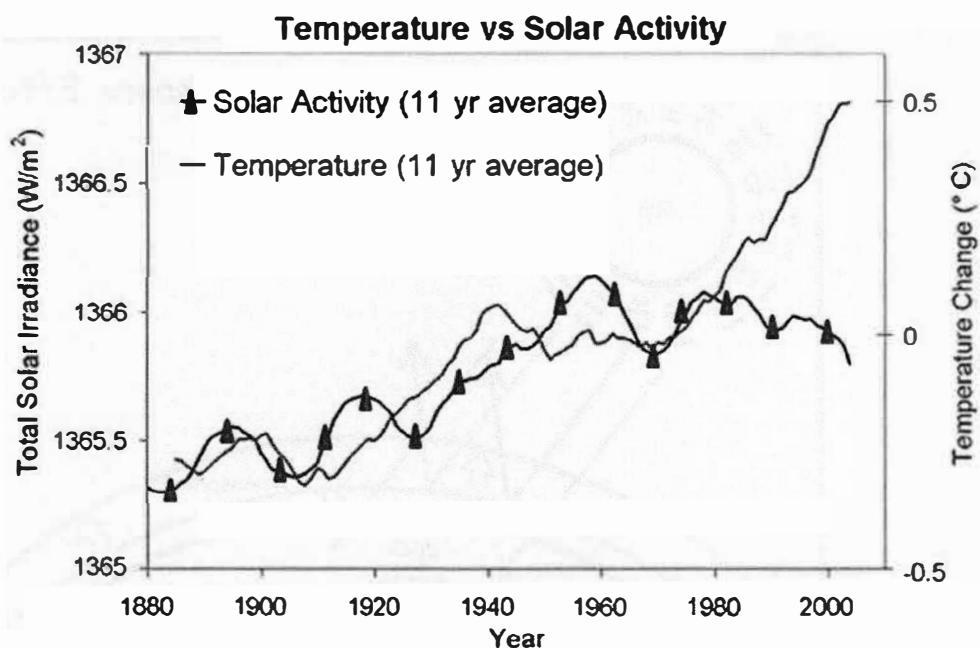


Fig. 3

- (i) Describe the relationship between temperature change and solar activity from 1880 to 2000. [3]
 - (ii) Explain how natural processes can cause changes to the temperature of the world. [4]
- (b) Fig.4 (Insert) shows the World Map and the distribution of earthquakes and volcanoes.
- (i) Use Fig. 4 to account for the distribution of earthquakes and volcanoes. [5]
 - (ii) With the aid of a well-labelled diagram, explain the process and landform that can be found at Y. [5]
- (c) *"The impact of earthquakes is more effectively mitigated by short-term measures."*
- How far do you agree with this statement? Support your answer with evidence. [8]

Section B

Answer one question.

- 3(a)** Study Fig.5 which shows the adoption of Genetically Modified (GM) crops in the United States (US) from 1996 to 2005.

Adoption of GM crops in the US (1996 to 2005)

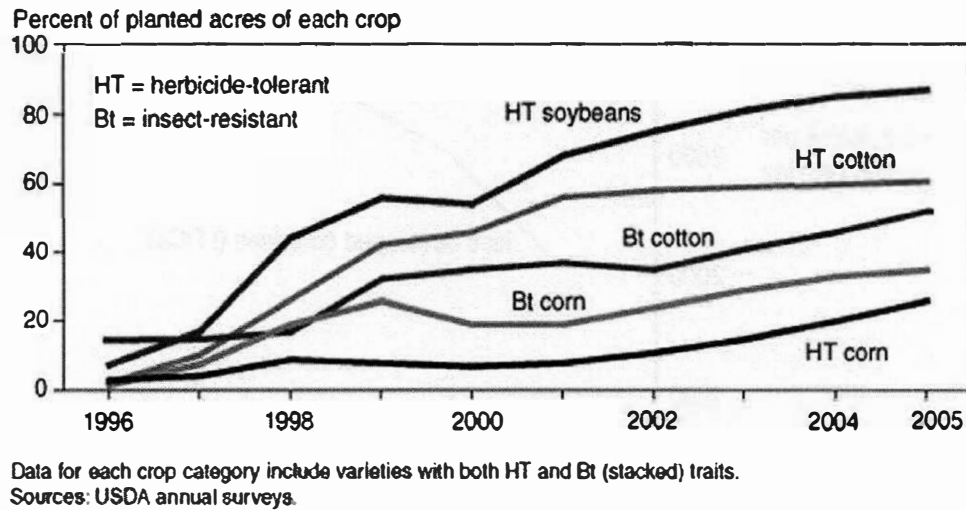


Fig. 5

- (i) Describe the trend in the adoption of GM crops in the US from 1996 to 2005. [5]
- (ii) Comment on some problems that may arise from the trend described in 3(a)(i). [5]

- (b) Fig. 6 shows the average food consumption in developed countries (DCs) and less developed countries (LDCs) from 1965 to 2015.

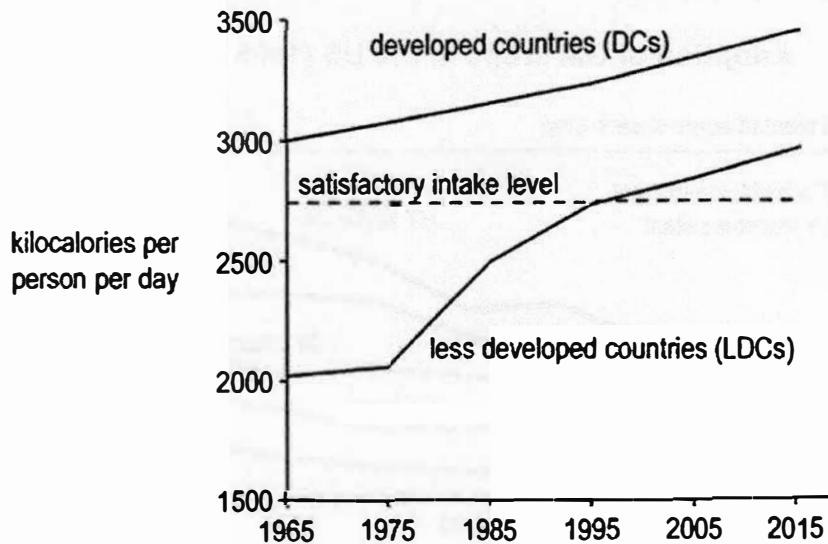


Fig. 6

With reference to Fig. 6, compare the average food consumption for DCs and LDCs from 1965 to 2015.

[3]

- (c) Explain the impacts of HIV/AIDS on less developed countries and its population.

[4]

- (d) *"The economic reasons have a greater effect than social and cultural reasons in variation of food consumption between DC and LDC."*

How far do you agree with this statement? Explain your answer.

[8]

- 4(a) Study Fig. 7a and 7b below, which shows information about HIV/AIDS in 2014 and 2015 respectively.

Global summary of the AIDS epidemic 2014		
Number of people living with HIV in 2014	Total	36.9 million
	Adults	34.3 million
	Women	17.4 million
	Children (<15 years)	2.6 million
People newly infected with HIV in 2014	Total	2.0 million
	Adults	1.8 million
	Children (<15 years)	220 000
AIDS deaths in 2014	Total	1.2 million
	Adults	1.0 million
	Children (<15 years)	150 000

Fig. 7a

Global summary of the AIDS epidemic 2015		
Number of people living with HIV in 2015	Total	36.7 million
	Adults	34.9 million
	Women (15+)	17.8 million
	Children (<15 years)	1.8 million
People newly infected with HIV in 2015	Total	2.1 million
	Adults	1.9 million
	Children (<15 years)	150 000
AIDS deaths in 2015	Total	1.1 million
	Adults	1.0 million
	Children (<15 years)	110 000

Fig. 7b

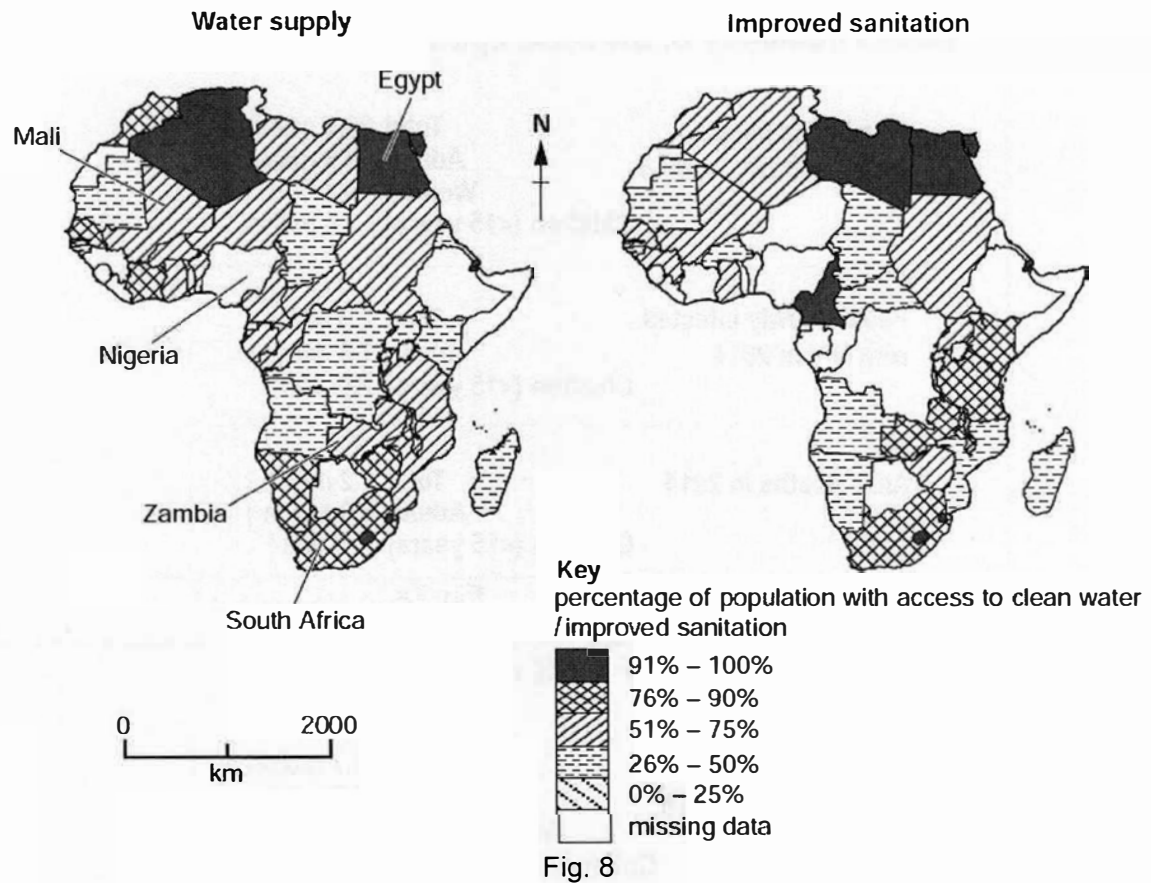
With reference to Fig. 7a and 7b, describe the changes in the HIV/AIDS statistics between 2014 and 2015.

[5]

- (b) Describe the social and economic factors that affect the health of people in developed countries.

[5]

- (c) Study Fig.8 below which shows the percentage of the population which has access to clean water supply and improved sanitation in Africa.



With reference to Fig. 8,

- (i) Compare the population with access to clean water, with that of population with access to improved sanitation. [5]
- (ii) 54% of the population in Nigeria has access to clean water. 35% has access to improved sanitation. Suggest the impacts on the development of the country. [2]
- (d) *"The spread of malaria in less developed countries is worsened by climate change."*
- How far do you agree with this statement? Explain your answer. [8]

~ End of Paper ~

Credits

Fig. 2 <http://www.education.com/worksheet/article/greenhouse-effect-coloring/>

Fig. 7 <http://www.who.int/hiv/data/en/>

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PRELIMINARY EXAMINATION 2016

PURE GEOGRAPHY

2236/02

Paper 2

Level: Secondary 4 Express

Duration: 1 hour 30 minutes

INSERT

READ THESE INSTRUCTIONS FIRST

The Insert contains Fig. 4 for Question 2.

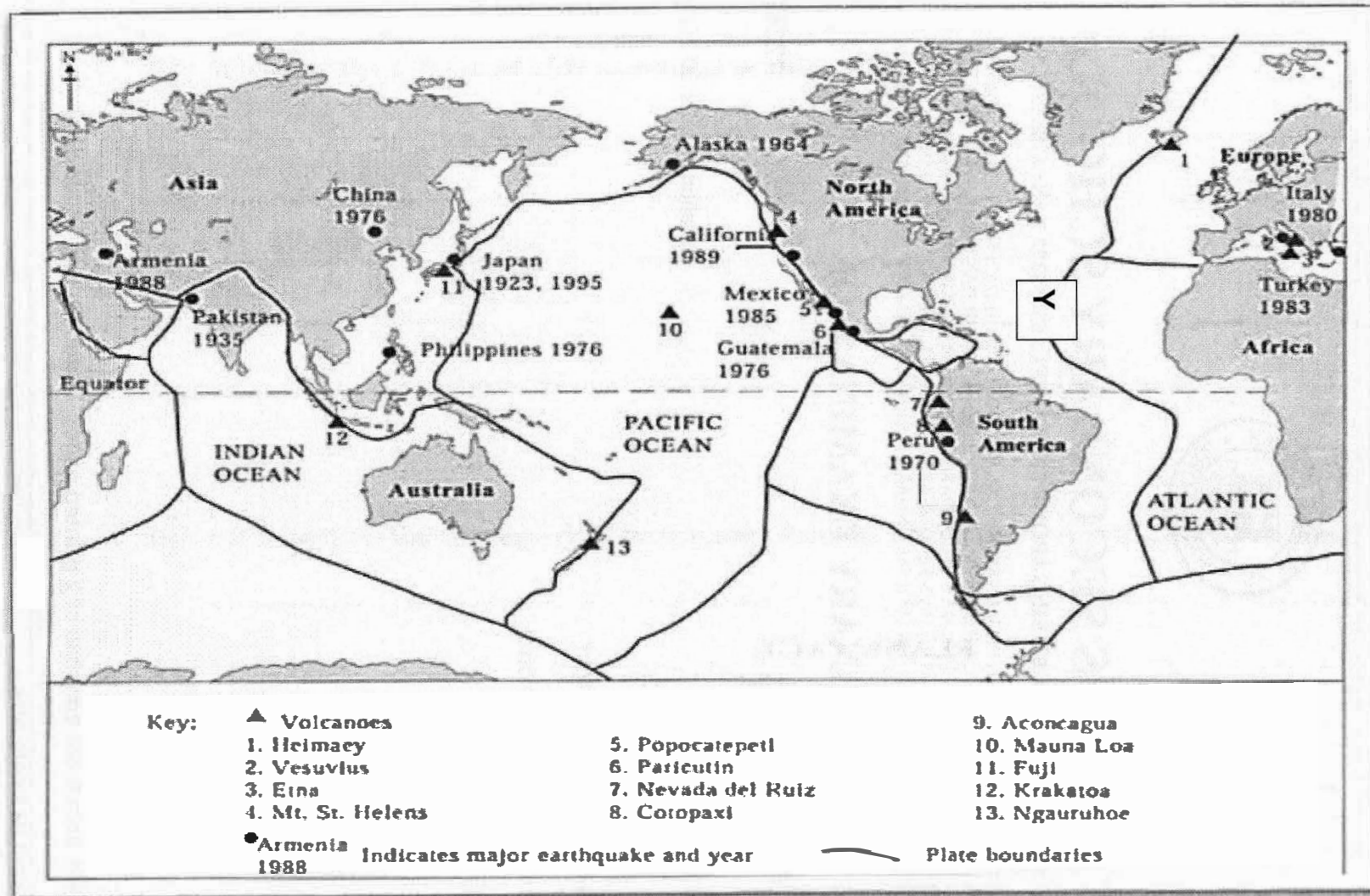
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ST HILDA'S PRELIM EXAM 2016
Sec 4Exp Pure Geography

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2236/02 PRELIM EXAM 2016
Sec 4Exp Pure Geography

Fig. 4 for Question 2



St. Hilda's Sec School
Sec 4Exp Pure Geography
Answers to Prelim Exam 2016 **Page 2**

1(a)

(i)

Identify:

- Monsoon

Describe (at least 1 point for temp/rainfall):

- High annual temperature of $>20^{\circ}\text{C}$
- Temperature range of 10°C
- Highest temperature in June (30°C), lowest in December (20°C)
- High total rainfall of 1500mm
- Seasonal rainfall, wet season in JJAS, dry season in NDJF

(ii)

Account for:

- | | |
|--|--|
| <ul style="list-style-type: none"> • JUNE – SEPTEMBER, Summer in NH, Winter in SH • As air moves from high pressure area (SH) to low pressure area (NH), the spinning of the earth causes winds to be deflected – Coriolis effect • → Southwest Monsoon • Heavy rain in India & Bangladesh as wind picks up moisture – • HOT & WET SEASON | <ul style="list-style-type: none"> • OCTOBER – FEBRUARY, Winter in NH, Summer in SH • As air moves from high pressure area (NH) to low pressure area (SH), the spinning of the earth causes winds to be deflected – Coriolis effect • → Northeast Monsoon • Little / No rain in India & Bangladesh as wind is over land – • COLD & DRY SEASON |
|--|--|

(b)

EGH:

- increase in concentration of greenhouse gases in the atmosphere
- leading to rise in global temperatures
- as more radiation gets absorbed (instead of escaping into space)

Causes:

- Burning fossil fuels (oil, coal, nat. gas) / Increase in world's usage of fossil fuels for industries, transportation
- Highest contributor of GHG (e.g.: CO_2 , NO_2)
- Agriculture / cattle & rice farming
- 3rd highest producer of GHG (e.g.: methane)
- Industries / by-products when goods are produced
- GHG (e.g.: CFCs for refrigerators, halo alkane for aerosols, NO_2 for fertilisers) released

(d)

Relevant points:

- Agreement that it is difficult to mitigate physical impacts by storm surges, wind and rain i.e.: damage to structures, making it difficult to transport food, clean water & medicine to affected areas E.g.: 2004 Hurricane Ivan damaged buildings & shifted shorelines in Alabama, USA

- However, disagreement that it is difficult to mitigate as damage to structures can be reduced by measures

Strategy (E.g.)	Description (WHAT?)	Successes	Limitations
Land use control (Sri Lanka)	- Place restrictions on how land can be used - Discourage development in vulnerable areas e.g.: coasts by imposing higher taxes	Protected zones where no development can take place serve as barrier against storm surges & flooding	- Requires much time and manpower - Compensation is costly. Private owners may be reluctant to move. - Control of land use is difficult in cities of developing countries with rapidly growing populations e.g.: people may build their houses illegally without approval
Floodplain management (Cairns, Australia)	- Maps to show land use in flood-prone areas - Ensure new developments in floodplains are not prone to floods and reduce damage in already developed floodplains - Provide evacuation plans in case of floods	- Prevents buildings being built in low-lying areas prone to flooding - Allows people to react appropriately	- Control of land use is difficult in cities of developing countries with rapidly growing populations e.g.: people may build their houses illegally without approval - Floods often occur when least expected. People are often not prepared and thus drown
Reducing vulnerability of infrastructure (I houses: Florida, USA) (Dykes: Apia, Samoa)	- Designing buildings resistant to wind & water damage - Regular inspection of river embankments & coastal dykes - Locating utility lines underground	- Reduce damage to buildings - Protect coastline - Ensure services are maintained during and after cyclones	- Expensive to construct such buildings & convert existing buildings to include wind & water-resistant features - Poorer places in the world may not be able to afford such technology - Costs of building and maintaining the defences high - Defences interfere with nature and are aesthetically unappealing

L1 (0-3)

- Answer will be generalized or with minimal support if any given at all.
- Reasoning may be rather weak and expression may be unclear.
- Basic answer that has little development, lack examples or other evidences / sketchy examples.

L2 (4-6)

- Disagreement / agreement will be supported by appropriate detail. Or, both disagreement & agreement considered but with patchy support.
- Good reasoning and logic in parts of answer with good expression in places.
- Not a full answer, some examples or other evidence presented in at least 1 place in answer.

L3 (7-8)

- Both disagreement & agreement are considered and well supported.
- Reasoning is clear and with good expression.
- Comprehensive answer, supported by sound knowledge. Examples or other evidence extensive.

(E.g.: 'The statement is true to some extent only. A cyclone's energy is can cause damage to buildings even if they are wind or water resistant, like those in New Orleans, USA devastated by Hurricane Katrina. But floodplain management and landuse control, when enforced, can reduce said damage as buildings and infrastructure can be avoided in high risk areas, as in the case of Sri Lanka and Cairns, Australia.')

2(a)**(i)**

- Direct relationship from 1880s to 1980s generally
- + DATA
- BUT, after the 1980s, solar activity went down, but temperature change rises steeply (indirect relationship)
- + DATA

(ii)

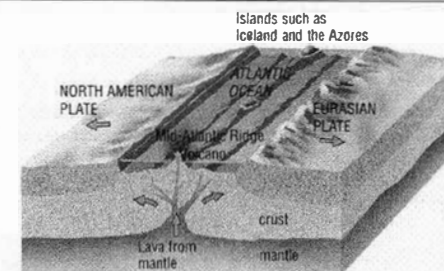
- Presence of sunspots i.e.: higher number of sunspots will cause higher solar activity as the surrounding areas will need to radiate more heat to compensate for the lower temperature of the sunspots
- Global temp. increase
- Volcanic eruptions (Ash + dust + SO₂ which reacts with water to form sulphur-based particles) reflect solar energy back to space
- Global temp. decrease

(b)**(i)**

- Earthquakes & volcanoes are found along or near plate boundaries
- E.g.: the Pacific Ring of Fire
- Plate movements cause slow build-up of stress on rocks found on either side of fault → e/q
- E.g.: plates slide past each other (transform plate boundaries)
- As plates move apart (diverging plates) → volcanic islands e.g.: #1
- As plates move towards each other (converging plates) → subduction volcanoes e.g.: #11

(ii) (Diagram – up to 2 marks)

- When two oceanic plates diverge i.e.: North American Plate and Eurasian Plate
- fractures are formed at the plate boundary
- Magma rises at the zone of divergence
- Mid-oceanic ridge

**(c)****Relevant Points:**

- Need to define 'impact of earthquake' = casualty / death tolls, loss of / damage to buildings or infrastructure, which will then form basis for comparison of s/t vs l/t measures

- Short term mitigation measures

Search and rescue

- People trapped under the collapses buildings are quickly located and freed
- Some survivors are found after being trapped for a couple of weeks without food. E.g.: Tohoku, Japan, 2011. Sniffer dogs and heat sensors were deployed and successfully rescued many who were trapped.
- Limitations: Rescue workers only have 72 hours to find the trapped survivors.

Emergency, food and medical supplies

- Injured are treated and clean drinking water is provided to the survivors.
- The provision of immediate aid helps survivors continue with their lives. E.g. The earthquake in Afyon in 2002, the Turkish Red Crescent Society immediately responded by providing 20 000 tents, 50 000 blankets and 3000 heaters to the region.
- Limitations: Medical supplies, food and water may not be sufficient and this may cause social unrest. E.g.: Earthquake in Haiti, 2010, looting and fighting broke out as people fought for food and medical supplies.

- Long term measures OR ANY OTHER MITIGATION MEASURES

Rebuilding infrastructure

- Infrastructure and amenities are built and improved upon after a disaster.
- Authorities often develop stricter building codes to ensure the infrastructure is restored at a higher safety than before.
- Kobe, Japan in 195 spent billions developing technology to build earth quake resistant building.
- Limitations: Reinforced buildings are not necessarily protected against Tsunamis or future earthquake of higher magnitude. E.g.: Chile's buildings are earthquake resistance but suffered massive damage due to Tsunami.

Provision of Health Care

- Health options such as long term counselling are provided. The loss of loved ones, homes can cause long lasting trauma. E.g.: A year after the earthquake in Christchurch, NZ in 2011, significant problems of anxiety and depression surfaced.
- Limitations: Improving health options can be very challenging. E.g.: many survivors in Haiti earthquake continue to lack access to basic necessities.

L1 (0-3)

- Vague descriptions of short term earthquake mitigation strategies.
- No evaluation of the success and limitations of the measures.
- An answer with little or no development.
- Answers lack examples or other evidence.

L2 (4-6)

- Some descriptions of short term and long term earthquake mitigation strategies.
- Answer shows some evaluation of the success and limitations of the measures.
- Good reasoning and logic in parts of the answer with good expression in places.
- Some examples or other evidence presented.

L3 (7-8)

- Good and appropriate descriptions of both short term and long term earthquake mitigation strategies.
- Answer shows thoughtful evaluation of the success and limitations of the measures.
- Examples are considered and developed in detail and are used appropriately to support answer which creates great coherence in a convincing answer.

E.g.: 'I agree, for instance, short-term measures like providing emergency shelters will help victims better survive during winters when their homes have collapsed during earthquake, as seen in the Afghan Pakistan quake in 2015, which left many homeless. Thus reducing the death toll. However, long term measures such as improving building and infrastructure is more effective, as prevention is always better than cure. Enforcing strict building codes is a better mitigation strategy to reduce casualty and deaths due to potential collapse of buildings.'

3(a)

(i)

- In general, the percent of land planted with GM crops have increased from 1996 to 2005 - compulsory point
- Since 1996, the percent of land planted with HT soybeans have increased from 7% to 85% in 2005, by 78%
- From 1996 to 2005, the percentage of HT cotton grown increased from 2% to about 63%, by 61%
- From 1996 to 1998, the percentage of Bt cotton grown remained constant, but increased from less than 20% to about 50% after 1996
- From 1996 to 2005, the percent of land planted with HT corn has increased from 2% in 1996 to about 25% in 2005, by 23%
- From 1996 to 2005, the percent of land planted with Bt corn has increased from 2% in 1996 to about 30% in 2005

(ii)

- Genetic pollution resulting in loss of biodiversity. If the resistance of GM crops is transferred to wild plants, it can have negative effects on the insects and animals which feed on them, thus reducing biodiversity
- Similarly, the emergence of super weeds which have developed resistance
- Dominance of agribusiness as GM crops require high capital investment so it is only available to big companies and DCs
- Small-scale farmers and LDCs cannot afford GM seeds, widening the gap between the wealthy and the poor farmers
- Potential health risk as incorporating foreign genes into plants may have adverse effect on human health, such as allergic reactions

(b)

- DC increase consumption from 3000 to 3400 kilocalories per person per day, while LDC increase consumption from 2000 to 2950 kilocalories per person per day – compulsory to provide data
- Both DCs and LDCs show an increasing trend from 1965 to 2015.
- The rate of increase is faster for LDCs (47.5%).
- Consumption by DCs is always higher than the LDCs.
- DCs always above satisfactory intake level, but LDCs only reached satisfactory intake level after 1995.

(c)

Socio-demographic (esp. in LDCs)

- Life expectancy & Infant mortality rate: increases deaths, IMR & reduces life expectancy, population size & population growth
- Orphan crisis: orphans are vulnerable to forced labour, being forced into sex industry or recruitment as child soldiers, trauma, stigma & lower standards of living

Economic

- Health care spending: treatment (antiretroviral drugs), screening & antenatal treatment for pregnant women & research requires large amounts of money that could have been spent on other public services
- Slower economic growth: loss of investments due to lack of infrastructure, skilled & healthy workforce

(d)

Relevant points:

- Agreement that economic has an effect on variation / difference in quantity & quality of food consumed, with DCs have higher disposable inc + less affected by food pricing to enjoy both
- Disagreement, social and cultural reasons also affect food consumption patterns. However, need to focus on the reason that contribute to variation i.e.: popn growth
- OR highlight the socio-cultural reasons that do not have effect on variation i.e.: religion

Economic - Disposable income affects food consumption between DCs and LDCs.

- Disposable income refers to income that is left after taxes are paid. It increases as income increases.
- Due to the increase in income across countries all over the world, food consumption patterns have changed.
- DCs and LDCs have more purchasing power to consume larger amount and variety of food.
- People tend to also consume more meat and less cereals. This is because meat consumption is associated with wealth and status.
- E.g.: When Taiwan experienced economic growth between 1959 and 1991, it was noted that rice consumption declined by half and meat consumption increased four times.
- LDCs spend more (60%) of the increase in income on food as compared to DCs (20%).
- In DCs, with rise of income, people tend to increase their quality of diet by consuming food with more health benefits, like organic food and olive oil.

Pricing of food also causes variation in food consumption.

- LDCs are more affected by food prices than DCs.
- During the food crisis (2006-2008), food prices rose dramatically worldwide.
- Prices of staples rose more than other food groups, thus affecting both DCs and LDCs:
- In LDCs, many were unable to afford staple food. This caused 100 million more people into chronic hunger and poverty. It also caused food riots and street protests.
- In contrast, in DCs, people switched to less expensive options.

Socio-cultural - Food consumption varies according to the religious beliefs of people.

- Certain religions have food practices and restrictions.
- E.g.: In Islamic states, there is high consumption of halal food, and very little or no consumption of pork.
- E.g.: under Buddhism and Hinduism practices, devotees adopt a vegetarian diet or consumption of very little meat. Therefore, countries in South Asia such as Bangladesh, India and Sri Lanka consume the least meat overall.

Due to globalisation, there is an increase in fast food preferences. Many fast food joints have set up, providing quick, takeaway meals.

- Fast food consumption in DCs are high, and the trend is also following in the LDCs as more fast food joints are set up there too.
- E.g.: India is fast becoming a fast food nation with the set-up of fast food chains like McDonald's and Pizza Hut (28% growth per year). Many have chosen to visit these joints rather than local food stalls.
- In DCs, although fast food joints are popular, people are increasingly aware of its harmful effects (obesity) and may make choices to abstain from them.

In DCs, people are increasingly concerned over the way food is being grown. They fear the risks of cancer from the use of pesticides in conventional growing methods, and have chosen to consume organic food instead.

- Organic food refers to food grown without the use of artificial inputs like chemical fertilisers or growth hormones.
- Organic food has been a choice for increasing numbers of people in DCs due to the perceived health benefits.

People's diets will continue to change over time.

- Besides the increasing preference for organic diet, some states also experience emerging trends in food consumption.
- E.g.: Taiwan, which is a rice-eating society, are consuming more wheat (in making bread, cakes and pastries) due to globalisation and migration, which have altered their food preferences.

Migration refers to the movement of people from one place to another permanently.

- Migrants introduce new food to the receiving countries, or result in fusion cuisines, which would include a mixture of their culture and the local culture.
- This would increase the variety of foods available in receiving countries, both in DCs and LDCs.
- E.g.: Korean food has become more popular in Manila (Philippines) due to Korean retirees and more South Korean international students.

Population growth in one of the key drivers in the increasing demand for food worldwide. The world population is estimated to increase from 7 billion in 2012 to 10 billion in 2050.

- Population growth in LDCs is higher than DCs due to higher birth rates. Therefore, there is higher demand for food in LDCs. Global food production will have to meet the increasing needs.

L1 (0-3)

- Answer will be generalized or with minimal support if any given at all.
- Reasoning may be rather weak and expression may be unclear.
- Basic answer that has little development, lack examples or other evidences / sketchy examples.

L2 (4-6)

- Disagreement / agreement will be supported by appropriate detail. Or, both disagreement & agreement considered but with patchy support.
- Good reasoning and logic in parts of answer with good expression in places.
- Not a full answer, some examples or other evidence presented in at least 1 place in answer.

L3 (7-8)

- Both disagreement & agreement are considered and well supported.
- Reasoning is clear and with good expression.
- Comprehensive answer, supported by sound knowledge. Examples or other evidence extensive.

E.g.: 'I agree with the statement, as higher disposable income, an economic reason, does explain why DCs have higher food consumption & greater variety in food consumed. Pricing of food affects LDCs more, as seen in the food crisis in 2008, when the increase in price of staple food led to shortage & riots in LDCs such as Egypt, not experienced in DCs. This is due to the fact that the disposable income of people in LDCs is not only lower, a greater proportion of it is spent on food. However, a social reason that has a huge effect in causing the variation is population growth. As long as the higher population growth in LDCs outstrips food production, food consumption will remain lower.'

4 (a)

- Decrease in no. of people living w HIV & AIDS deaths
- By 0.2 million and 0.1 million respectively
- The decrease for both are attributed to children (-0.8 million, -40 000)
- Increase in people newly infected, attributed to adults (1.8 to 1.9 million)
- There is improvement among children as no. newly infected has decreased (-70 000)

(b) (At least 2 points from each factor)

Social	Diet	Preference for higher quality food (e.g.: organic food, olive oils) More food choices available and more able to afford more non-staples like proteins Able to obtain drinkable water Higher consumption of non-staples than staples Obesity more prevalent than LDCs
	Lifestyle choices	Able to afford and buy nutritious food or supplements Lower level of physical activity & fewer smokers than LDCs
	Education	Trained teachers and schools, higher education opportunities High literacy rates Greater awareness of the importance of personal health
Economic	Poverty & Affluence	People are more affluent because of more jobs opportunities Fewer people below poverty line
	Investment in h/c & access to services	More people are able to afford health care Easy access to health services Higher dr-patient ratios, patient-bed ratios than LDCs

(c)

(i)

- 5 countries had both 91-100% of popn w access to clean water & improved sanitation
- E.g.: Egypt and 2 countries (Swaziland & Lesotho) in the S
- Only S Africa that has both 76 – 90% of popn w access to clean water & improved sanitation
- 3 countries with both 51-75% of popn with access to clean water & improved sanitation
- E.g.: Mali
- 4 countries has both 26-50% of access to clean water & improved sanitation
- No countries with 0-25%

- More countries w/o data for improved sanitation, than w/o data for access to clean water e.g.: Horn of Africa
- (ii) ACCEPT POSSIBLE ANSWERS
- Popn likely to have poor health & low productivity, affecting economy
- Low life expectancy & high IMR, less people in the workforce to attract foreign investments

(d)

Relevant points:

Agreement i.e.: Climate change: ↑temp, rainfall, RH, more intense monsoons

↑temp - (i) shorten dvmt time of parasites i.e.: mosquitoes become active & infectious sooner

(ii) reduce life cycle of mosquitoes i.e.: more mosquitoes to spread malaria

↑ rainfall – more pools of water, more breeding grounds i.e.: more mosquitoes to spread

↑ RH – increase lifespan for mosquitoes i.e.: more 'time' to spread

More intense monsoons / post-monsoons: high rainfall during wet season strongly correlated with high increase in malaria in India esp. in urban areas where long-lasting pools of stagnant water are created

Disagreement i.e.: heavy rains may flush out breeding grounds, droughts reduce breeding areas
Socio-economic

-Overcrowded living conditions: encourages speed & ease of spread

-Lack of proper sanitation: stagnant pools of waste water near settlements are breeding grounds for mosquitoes

-Limited provision of & access to health care: shortage of drs, lack in rural areas & cost of malaria treatment (ACT) e.g.: In India, 6 drs: 10,000 pax, 4% GDP on health care spending & concentrated in urban areas, ACT unaffordable to poor

Other challenges

-Health care: malaria parasites develop resistance to anti-malarial drugs

-Population movement: difficult to monitor the increased volume & speed of movement; poor border control & access to travel advisories

-Forest clearance: deforested areas & flooded rice fields provide suitable habitats for mosquitoes to breed; reduces predators of mosquitoes

L1 (0-3)

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L2 (4-6)

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L3 (7-8)

- Both disagreement & agreement are considered and well supported.
- Reasoning is clear and with good expression.
- Comprehensive answer, supported by sound knowledge. Examples or other evidence extensive.

(E.g.: 'I agree, as increased in RH increases the lifespan of Anopheles mosquitoes & thus spread of diseases, making it hard to control. However, socio-economic reasons have a part in the problem. Overcrowded living conditions encourage speed & ease of spread and many in LDCs do not have a better living option due to limited economic means.'))