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ST JOSEPH'S INSTITUTION

**PRELIMINARY EXAMINATION 2017
(SECONDARY 4)**

GEOGRAPHY

2236/01

Paper 1

18 August 2017

Additional Materials

Insert

Writing Paper

Topographical Map

**1 hr 40 minutes
(8.00am – 9.40am)**

READ THESE INSTRUCTIONS FIRST

Write your Class, index number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
Do not use paper clips, highlighters, glue or correction fluid.

Section A

Answer Question 1.

Section B

Answer **one** question.

Write all answers on the writing paper 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.

Insert contains

Fig. 1 for Question 1(a).

Fig. 2 for Question 1 (b).

Table 3 for Question 1(c).

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 **10** printed pages, including the Cover Page and Insert.

[Turn over]

Section A

This question is compulsory.

- 1 Students who lived in Thailand were interested in the development of tourism at Chiang Mai, a city in the north of the country. They decided to investigate why tourists came to Chiang Mai and what impact tourism had on people who lived in the city. Their two hypotheses were:

Hypothesis 1: Physical attractions brought more tourists to Chiang Mai than human attractions.

Hypothesis 2: Tourism has a positive rather than negative impact on people who live in Chiang Mai.

- (a) The students decided to use the questionnaire, shown in Fig. 1 (Insert), to investigate Hypothesis 1.
- (i) The answers to Question 1 (Which continent do you come from?) are shown in Table 1 below.

Table 1
Answers to Question 1
Continent & Number of tourists

Continent	Number of tourists
Asia	26
Africa	4
Oceania	8
Europe	14
North America	12
South America	6
Total	70

What conclusions can you make from Table 1 about the origin of tourists visiting Thailand?

[2]

- (ii) The answers to Question 2 (What are the main physical attractions you are visiting whilst in Chiang Mai?) and Question 3 (What are the main human attractions you are visiting whilst in Chiang Mai?) are shown in Table 2.

Table 2
Answers to Questions 2 and of tourist questionnaire

Q2 Physical Attractions	Number of visits made
Mae Kiang waterfall	35
Doi Inthanon mountain	48
Fang hot springs	17
Botanical Gardens	12
Elephant camp	34
Orchid and butterfly farms	6
Ob Luang gorge	18
Total	
Q3 Human Attractions	Number of visits made
Hill tribe villages	23
National museum	10
Shopping at night bazaar	45
Buddhist temples	37
Bhubing Palace	6
Muang Kung earthenware village	11
Royal pagodas	8
Total	

What type of graph can best show the answers to questions 2 and 3? Describe how you would draw this type of graph.

[3]

(iii) What are some of the limitations of asking Questions 2 & 3 in trying to test Hypothesis 1?

[3]

(iv) Was their Hypothesis 1: **Physical attractions brought more tourists to Chiang Mai than human attractions proven?** Support your answer with evidence from Table 2.

[2]

(b) The students used a different questionnaire to investigate the impact of tourism on people who lived in Chiang Mai. The questionnaire is shown in Fig. 2 (Insert).

(i) The students used a systematic sampling technique to obtain answers to their questionnaire. Suggest how they might have done this and state 2 advantages of using this technique.

[3]

(ii) Do you think that it was a good idea to ask people for their first and second choices for Questions 2 and 3 in the survey? Explain your decision.

[2]

- (c) The answers to Question 2 (What do you think are the main positive impacts of tourism in Chiang Mai?) and Question 3 (What do you think are the main negative impacts of tourism in Chiang Mai) are shown in Table 3 (Insert).

The students devised this simple formula to work out which impacts were most important.

Positive impact: More jobs and income

1st choice $27 \times 2 = 54$

2nd choice $15 \times 1 = 15$

Total score 69

- (i) Use this formula to work out the total score for air pollution. Show all working. [1]
- (ii) What conclusion can you make about Hypothesis 2: Tourism has a positive rather than negative impact on people who live in Chiang Mai? Support your decision with evidence from Table 3 (Insert 3) [2]
- (iii) What did the local people consider to be the 2 most negative impacts of tourism? Suggest reasons why they did so. [3]
- (d) Describe how the students could carry out fieldwork to investigate the impact of traffic congestion. [4]

Section B

Answer one question from this section.

2. (a) Fig. 3 shows a scene at a beach.

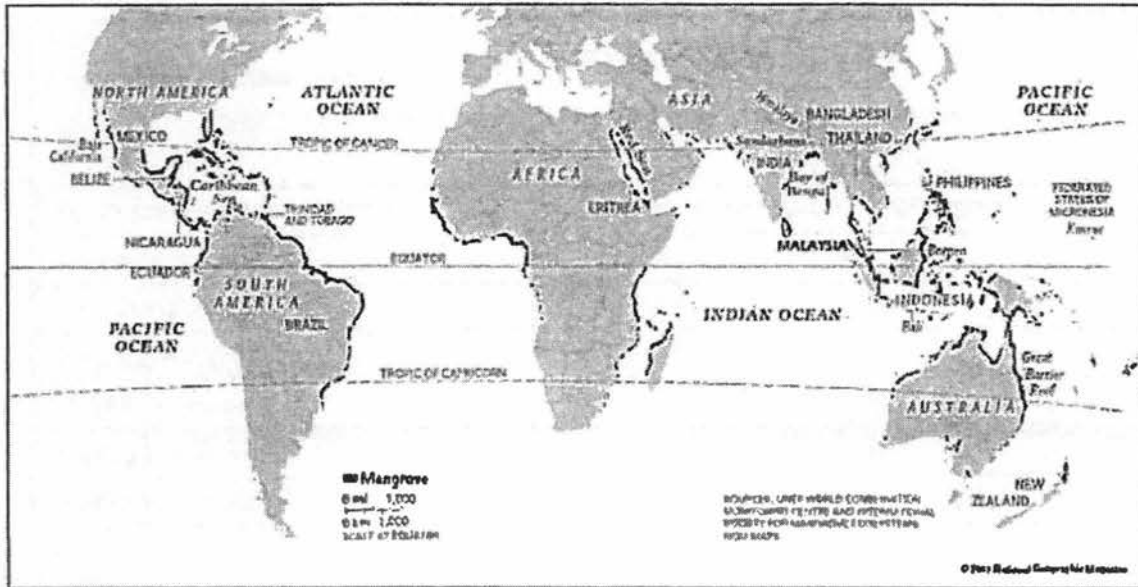


<http://www.signsgoldcoast.com.au/signage/safety-wayfinding-signs>

Fig. 3

- (i) Describe the type of waves associated with signs seen in Figure 3. [3]
- (ii) Evaluate any 2 appropriate coastal protection measures that may be used in this area to protect the beach. [5]

(b) Fig. 4 shows the distribution of mangrove forests around the world.



<http://resourcemanagement.thefieldworker>
Fig. 4

- (i) Describe and explain the global distribution of mangroves. [4]
- (ii) What are the natural and human threats to mangrove forests? [5]
- (c) "The loss of mangroves and coral reefs will have more devastating consequences to the economy than the environment."
How far do you agree? Use examples to support your answer. [8]

- 3 (a) Study the 1: 25 000 map extract of Tamarin (Mauritius).

Using map evidence, explain why area bounded by Northings 81 to 91 and eastings 82 to 84 is suitable for tourism. [5]

- (b) Tables 4 and 5 show some tourism statistics for the country of New Zealand.

Table 4

Overseas Visitor arrivals for 2013 - 2016							
	2013	2014	2015	2016	2014	2015	2016
					Annual % change		
Oceania	1,311,872	1,359,120	1,415,588	1,514,080	3.6	4.2	6.9
Asia	528,624	575,200	681,568	814,640	8.8	18.5	19.5
Americas	264,576	285,664	307,024	348,192	8.0	7.5	13.4
Other	88,880	98,048	88,624	89,472	10.3	-9.6	1.0
Total	2,611,377	2,752,257	2,947,901	3,255,463	5.4	7.1	10.4

<http://www.tdc.co.tt/index.php>

Table 5

Total Tourism Expenditure by tourists				
Year	Total Tourism Expenditure \$ (million)	Annual percentage change	Gross Domestic Product \$ (million)	International tourism as a % of total exports
2013	26 947	1.3	62 766	15.8
2014	28 039	4.1	67 002	15.4
2015	30 935	10.3	67 514	17.9
2016	34 699	12.2	70 144	20.7

<http://www.tdc.co.tt/index.php>

- (i) Describe and suggest reasons for the trend of visitor arrivals to New Zealand from 2013 to 2016. [4]
- (ii) With reference to Tables 4 and 5, explain how tourism is a boon and a risk to the New Zealand economy. [4]
- (c) Explain, with the use of examples, how budget airlines have contributed substantially to the growth of tourism. [4]
- (d) "Tourism activities are having a devastating effect on the environment." How far do you agree? Use examples to support your answer. [8]

Insert

Fig. 1 for Question 1(a).

Tourist questionnaire

We are doing a tourism survey as part of our Geography coursework. Please will you answer the following questions?

1. Which continent do you come from?

- | | | |
|----------------------------------|--|--|
| ☐ Asia | ☐ Africa | ☐ Europe |
| ☐ Oceania | ☐ North America | ☐ South America |

2. What are the main physical attractions you are visiting whilst in Chiang Mai?

- | | |
|--|---|
| ☐ Mae Klang waterfall | ☐ Doi Inthanon Mountain |
| ☐ Fang Hot Springs | ☐ Botanical Gardens |
| ☐ Elephant camp | ☐ Orchid and Butterfly farms |
| ☐ Ob Luang Gorge | |

3. What are the main human attractions you are visiting whilst in Chiang Mai?

- | | |
|---|---|
| ☐ Hill tribe villoges | ☐ National museum |
| ☐ Shopping at the night bazaar | ☐ Buddhist temples |
| ☐ Bhubing Palace | ☐ Muang Kung Earthenware village |
| ☐ Royal pagodas | |

Thank you for your time.

Insert

Fig. 2 for Question 1 (b)

Local people questionnaire

We are doing a tourism survey as part of our Geography coursework. Please will you answer the following questions?

1. Do you live in Chiang Mai?

☐

Yes

☐

No

(Finish interview if 'No')

2. What do you think are the main positive impacts of tourism in Chiang Mai?
Number your first and second choices '1' and '2'.

☐

More jobs and income

☐

Improved standard of living

☐

More modern services

☐

Cleaner environment

☐

Improved infrastructure e.g. airport, roads

☐

Reduction in crime

☐

Greater range of goods in shops

☐

Local people have greater global awareness

3. What do you think are the main negative impacts of tourism in Chiang Mai?
Number your first and second choices '1' and '2'.

☐

Noise pollution

☐

Air pollution

☐

Traffic congestion

☐

Increase in crime

☐

Decline of traditional culture and way of life

☐

Increase in litter

☐

Increase in cost of living

☐

Destruction of natural environment for hotels, shops etc.

4. Overall do you think tourism has a positive or negative impact in Chiang Mai?

☐

Positive

☐

Negative

Thank you for your time.

Insert

Table 3 for Question 1(c)

Answers to Questions 2, 3 & 4 of local people questionnaire

Q2 Positive impacts of tourism	First choice	Second choice	Total score using formula
More jobs and income	27	15	69
Improved standard of living	7	12	25
More modern services	2	6	10
Cleaner environment	3	1	7
Improved infrastructure	8	6	22
Reduction in crime	1	12	14
Greater range of goods in shops	6	6	18
Local people have greater global awareness	7	3	17
Total	61	61	

Q3 Negative impacts of tourism	First choice	Second choice	Total score using formula
Noise pollution	4	7	15
Air pollution	16	10	
Traffic congestion	17	14	48
Increase in crime	3	4	10
Decline of traditional culture and way of life	7	5	19
Increase in litter	3	7	13
Increase in cost of living	4	9	17
Destruction of natural environment	7	5	19
Total	61	61	

Q4 Overall impact of tourism	Answers
Positive	53
Negative	8



ST JOSEPH'S INSTITUTION

**PRELIMINARY EXAMINATION 2017
(SECONDARY 4)**

GEOGRAPHY

2236/02

Paper 2

29 August 2017

Additional Materials

Insert

Writing Paper

**1 hr 30 minutes
(8.00am – 9.30am)**

READ THESE INSTRUCTIONS FIRST

Write your Class, index number and name on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
Do not use paper clips, highlighters, glue or correction fluid.

Section A

Answer **one** question.

Section B

Answer **one** question.

Write all answers on the writing paper 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.

Insert contains

Fig. 5A and Fig. 5B for Question 2 (b)

Fig. 9 and 10 for Question 4 (a)

Fig. 11 for Question 4 (b)

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.

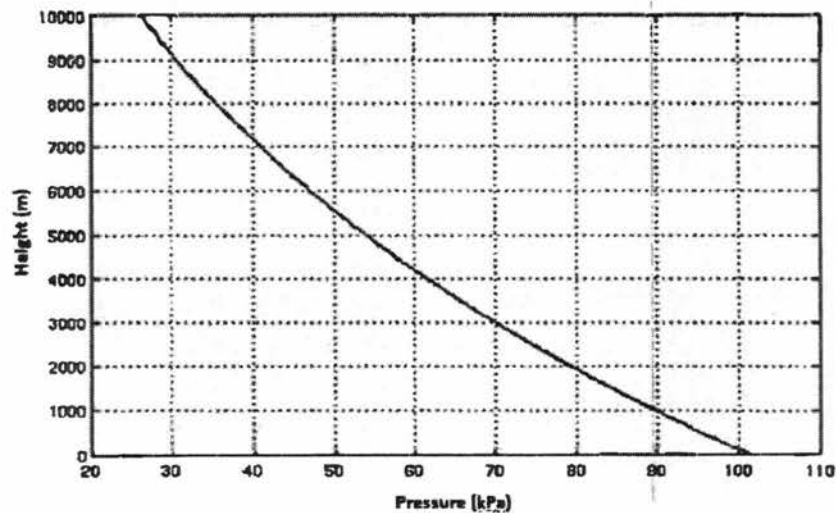
This document consists of 11 printed pages, including the Cover Page and Insert.

[Turn over]

Section A

Answer one question from this section.

- 1 (a) (i) Fig. 1 below shows the relationship between pressure and altitude.

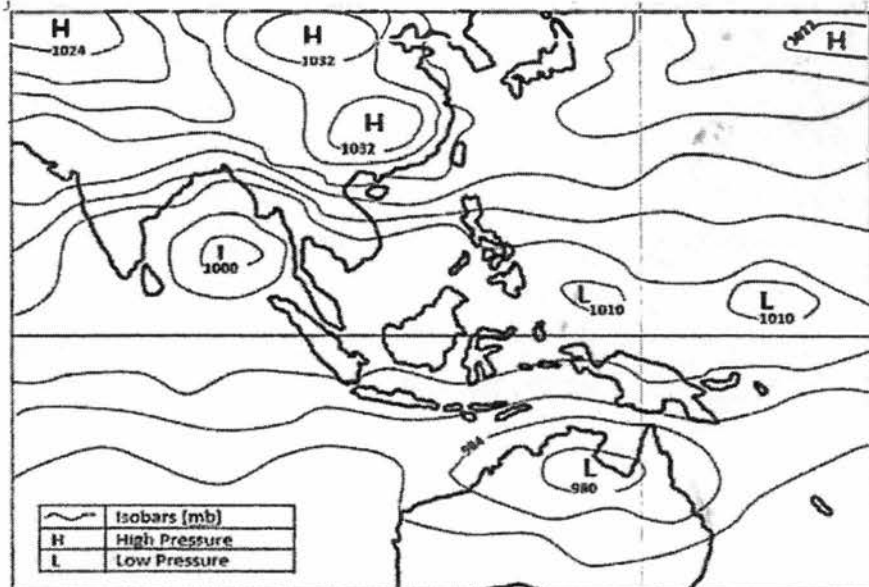


<https://physics.stackexchange.com>

Fig. 1

Describe and explain the relationship between altitude and pressure [3]

- (ii) The simplified isobar map for East Asia and Australia in December is shown in Fig.2 below.



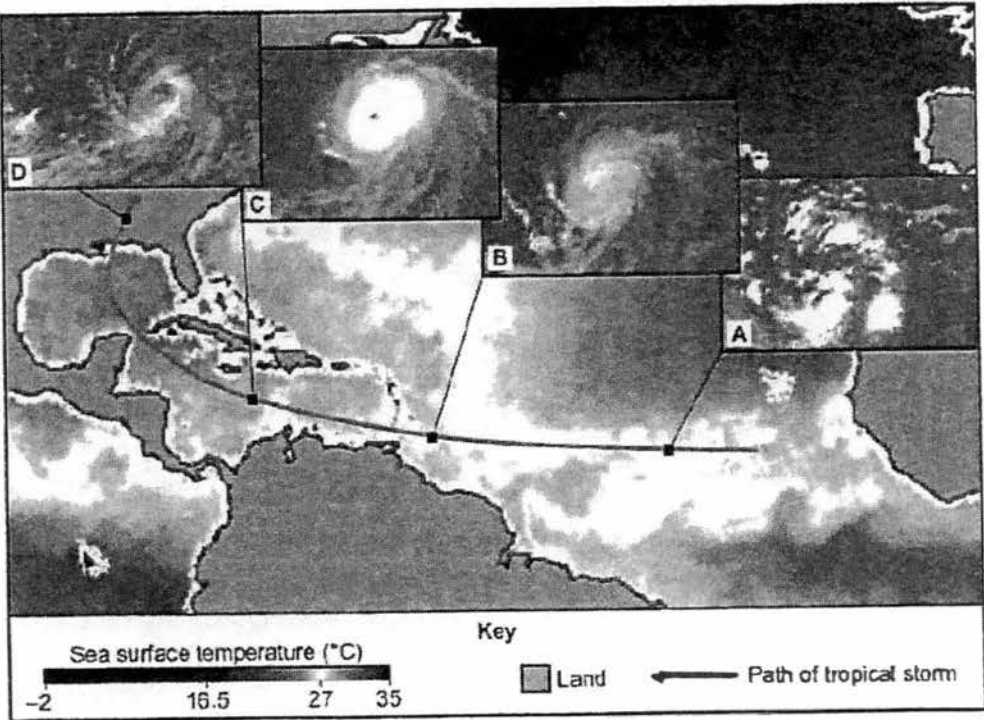
Adapted: <http://www.vagaries.in/2012>

Fig. 2

Based on the information in Fig. 2, account for the high and low pressure cells in the region shown and the likely wind pattern that will form.

[5]

- (b) Explain how the presence of cloud cover can affect the daily temperature range. [4]
- (c) Study Fig. 3, which shows the path of a tropical storm.



Source: © Commonwealth of Australia (2008), Bureau of Meteorology
Fig. 3

- With the help of Fig. 3, explain the development of the tropical storm from A to D. [5]
- (d) 'National measures are more effective than international agreements in reducing the impact of climate change'.
To what extent do you consider this statement to be true? Use examples to support your answer. [8]

- 2 (a) Study Fig. 4A, which shows the location of Moscow and Singapore and Fig. 4B, which shows the climographs of these 2 cities.

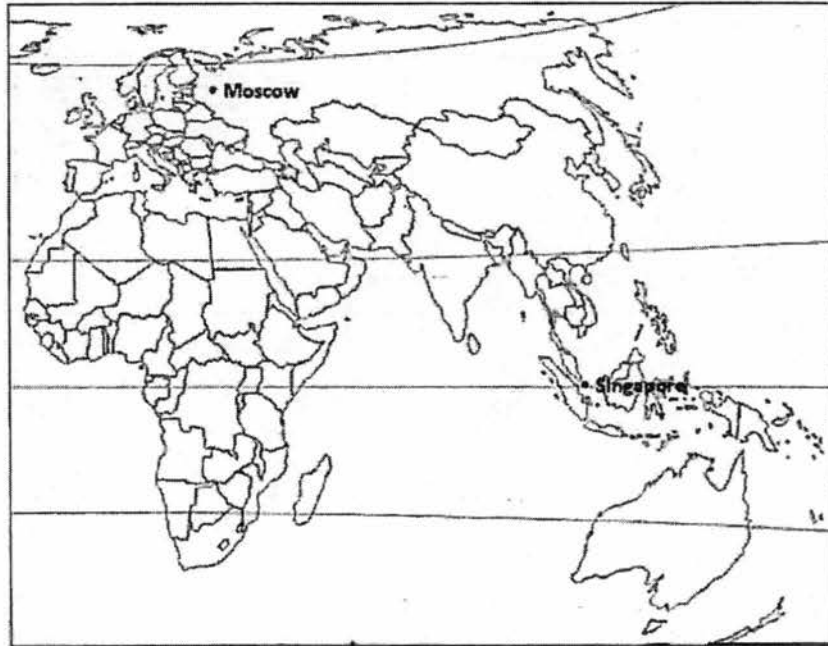
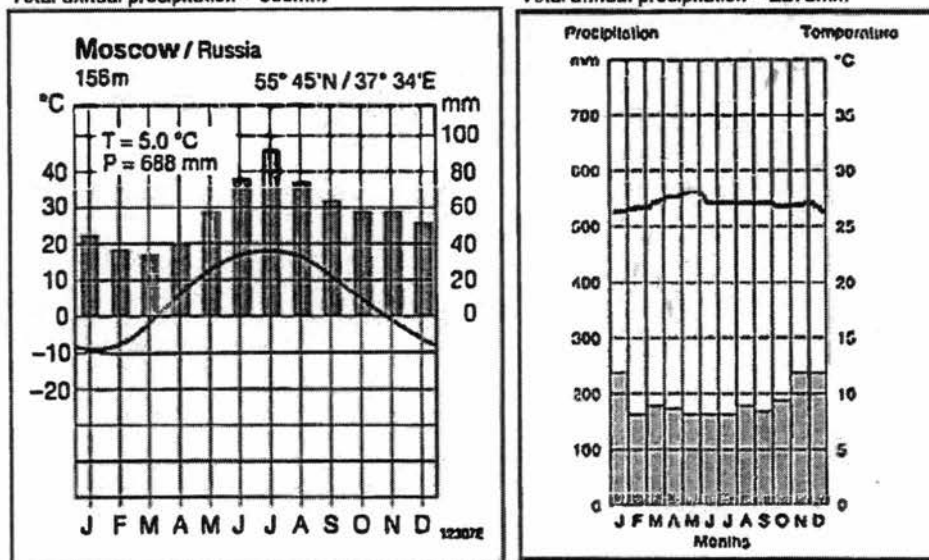


Fig. 4A

Moscow: 55°N 37°E
Mean annual temperature = 5.0°C
Total annual precipitation = 688mm

Singapore: 1.3°N 103°E
Mean annual temperature = 26.9°C
Total annual precipitation = 2275mm



<https://en.climate-data.org>

Fig. 4B

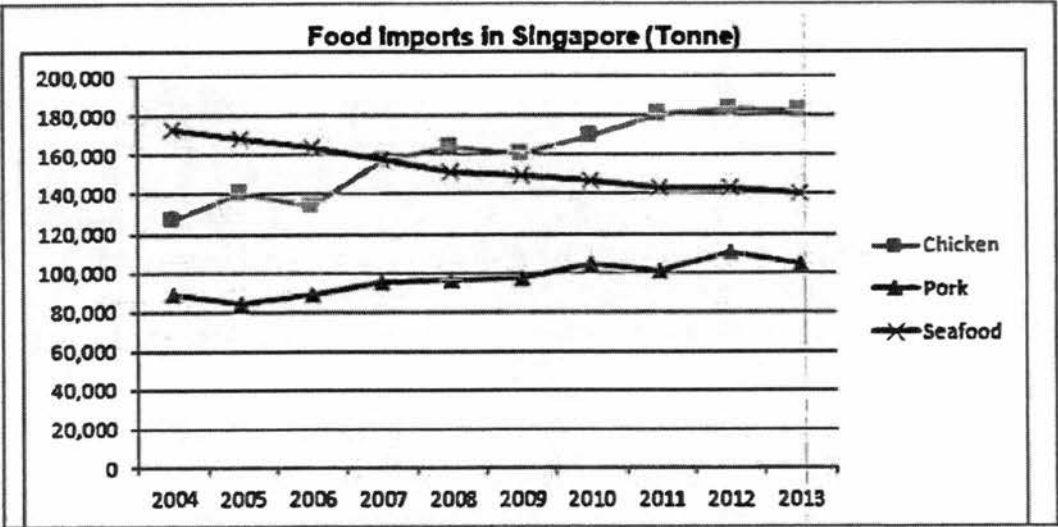
- (i) With reference to Fig. 4A and Fig. 4B, compare the rainfall and temperature of Moscow and Singapore.

- (ii) Account for the temperatures of Moscow and Singapore. [4]
- (b) Study Fig. 5A (Insert), which shows a volcanic hazard risk map for an area in California in the United States of America (USA) and Fig. 5B (Insert), which is a write-up on the Lassen Volcanic National Park.
- (i) Based on the information in Fig. 5A and Fig. 5B, what type of volcano will likely form in the area shown? Explain your answer. [4]
- (ii) With reference to Fig. 5A and Fig. 5B and studies you have made, describe the type and level of risk for towns like Westwood and Burney as compared to Old Station and Viola. [5]
- (c) "Since earthquakes are hard to predict, it is better to invest in response measures than preparedness measures."
To what extent do you consider this statement to be true? Use examples to support your answer. [8]

Section B

Answer one question from this section.

3. (a) (i) Fig. 6 shows the amount of meat and seafood imported into Singapore from 2004 to 2013.



Source: Agri-Food and Veterinary Authority of Singapore
Fig. 6

With reference to Fig. 6, compare and account for the trends in demand for chicken, pork and seafood in Singapore. [5]

- (ii) The targets for local production of 3 key food items are shown in Fig. 7 below.

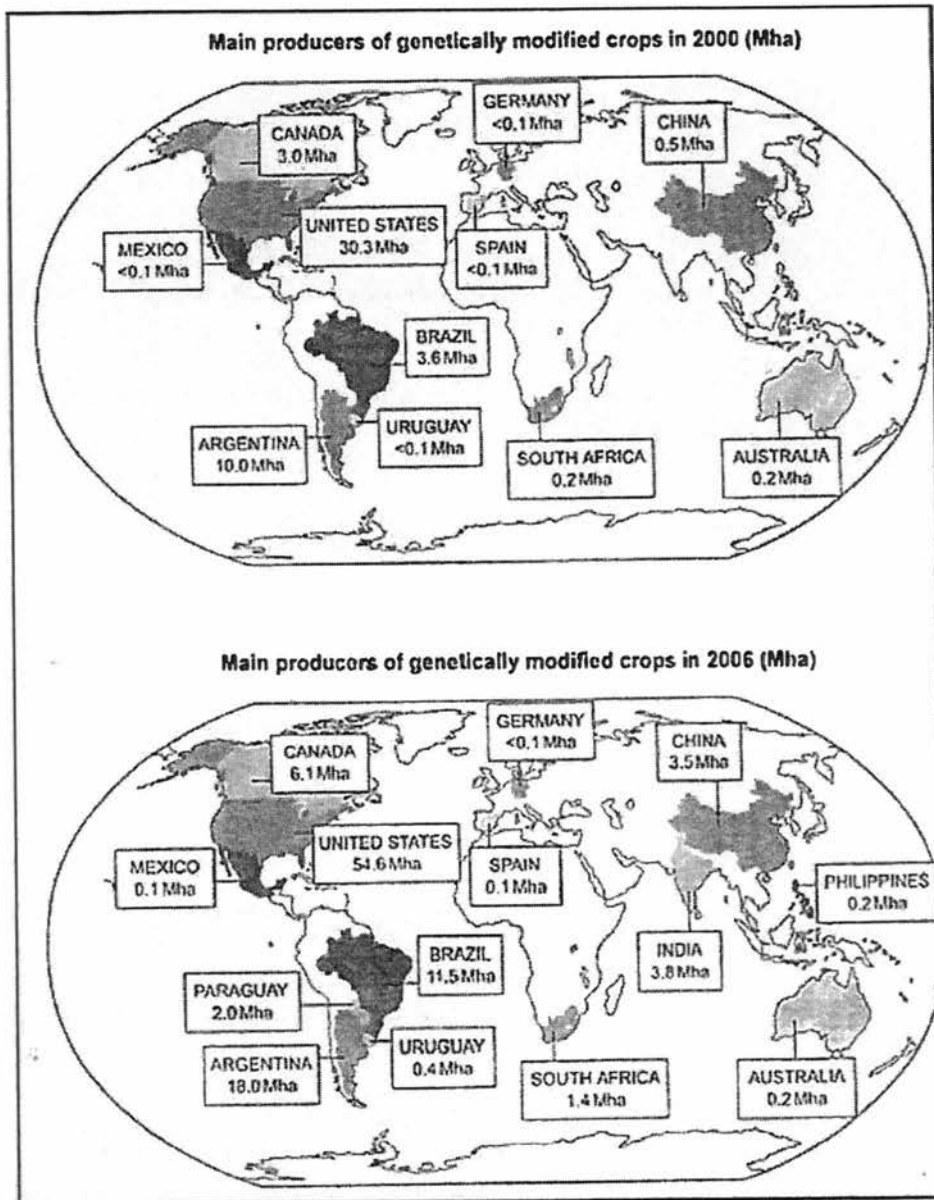
Key food items	2020 Local production targets	2014 production
Hen shell eggs	30%	25%
Leafy vegetables	10%	12%
Fish	15%	8%

Source: Agri-Food and Veterinary Authority of Singapore

Fig. 7

What are some of the challenges in meeting the production targets and suggest possible strategies that can be used to overcome such challenges? [5]

- (b) Fig.8 shows the amount of farm land used by countries for the production of genetically modified crops in 2000 and 2006



<http://www.economist.com/blogs/dailychart/2011>

Mha = million hectares

Fig. 8

- (i) With reference to Fig. 8, describe the changes to the production and location of genetically modified crops and the area they cover between 2000 and 2006. [4]
- (ii) Suggest reasons why countries like India, Paraguay and Philippines are cultivating GM crops. [3]

- (c) "Adopting modern technology in agriculture is more effective in increasing food production than using agricultural strategies."

To what extent do you consider this statement true? Use examples to support your answer.

[8]

4. (a) Study Fig. 9 (Insert) which is a map of Africa showing trends of drought areas in Africa and Fig. 10 (Insert) which shows countries in Africa facing a food shortage problem.

- (i) Using Fig. 9 and Fig.10, describe and account for the location of areas in Africa facing food security issues. [4]

- (ii) What are the impacts of food shortages on the people and countries in Africa? [5]

- (b) Study Fig. 11 (Insert), which shows the mortality rates of males due to cardiovascular disease (CVD).

- (i) Describe the distribution of mortality rates of males due to CVD around the world. [3]

- (ii) Suggest how social and economic factors could be reasons for the occurrence of CVD in these countries. [5]

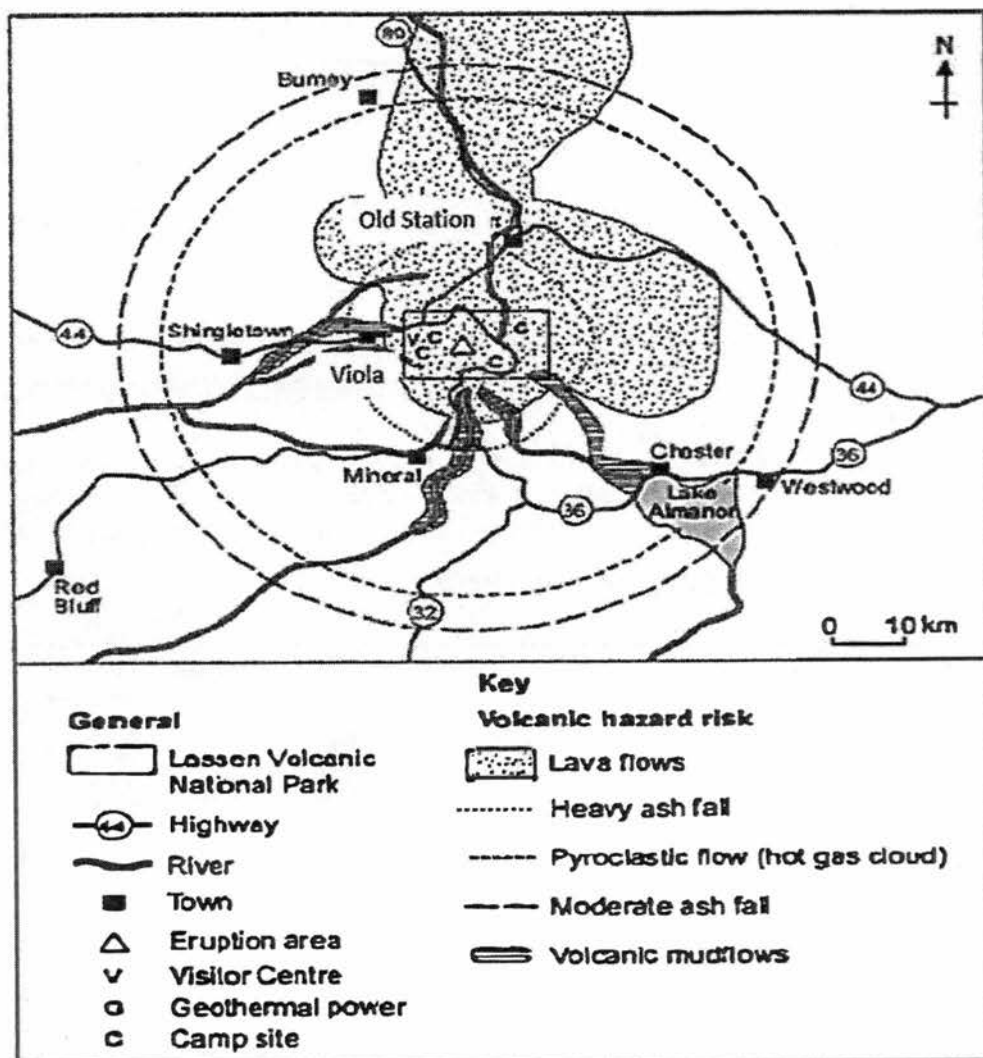
- (c) "The efforts of governments in managing the spread of diseases cannot succeed without the cooperation of individuals and communities."

To what extent do you consider this statement true? Give evidence to support your answer.

[8]

Insert

Fig. 5 A for question 2 (b)



<https://calisphere.org>

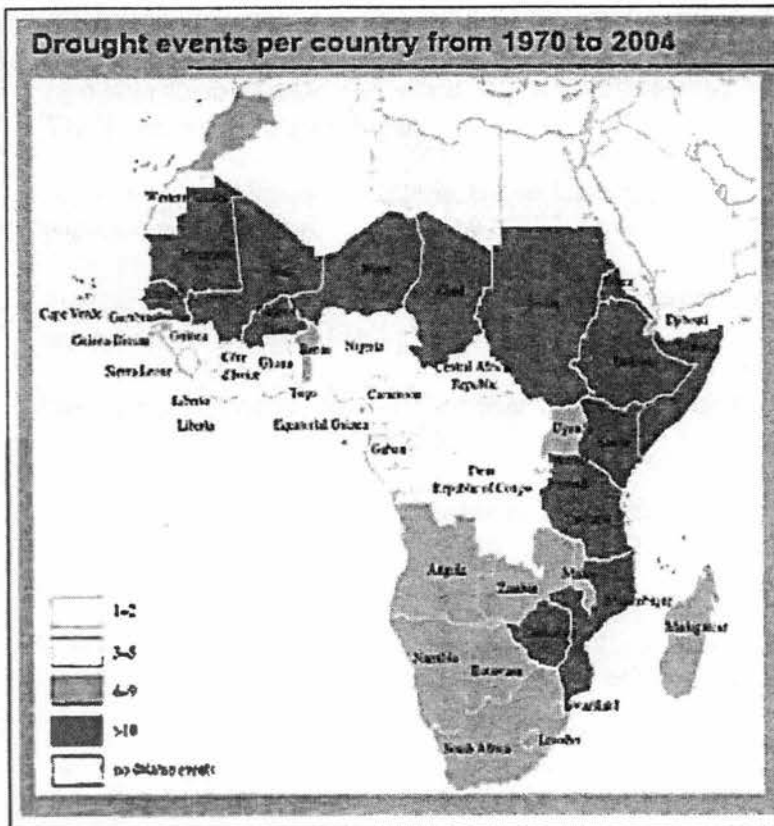
Fig. 5B for Question 2 (b)

The source of heat for volcanism in the Lassen area is subduction off the Northern California coast of the Gorda Plate diving below the North American Plate. The area surrounding Lassen Peak is still active with boiling mud pots, stinking fumaroles, and churning hot springs. Starting in May 1914 and lasting until 1921, a series of major explosive eruptions occurred on Lassen. These events created a new crater, and released lava and a great deal of ash.

Source: US Geological Survey

Insert

Fig.9 and Fig. 10 for Question 4 (a)



Increasing frequency and severity of drought witnessed in the African continent.

Two thirds of Africa classified as either deserts or drylands

Current climate scenarios – driest regions of the world will become drier

Fig. 9

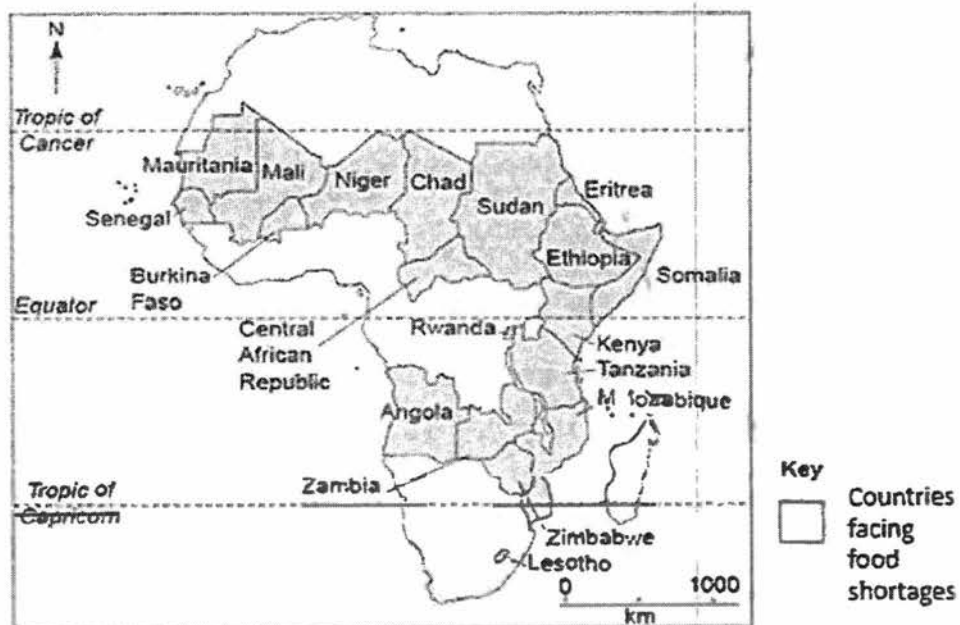
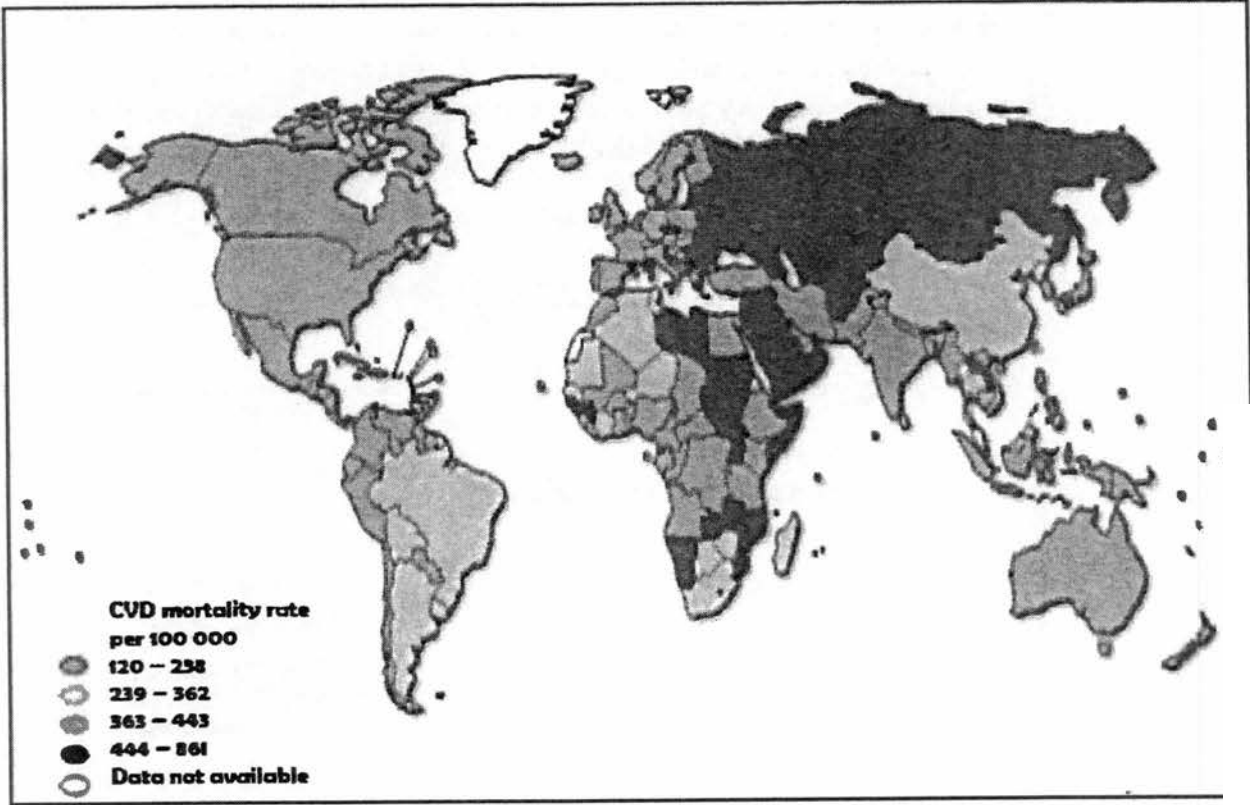


Fig. 10

www.cluva.eu/.../CLUVA

Insert

Fig. 11 for question 4 (b)



Global Atlas on CVD:World Health Organisation



ST JOSEPH'S INSTITUTION

**PRELIMINARY EXAMINATION 2017
(SECONDARY 4)**

GEOGRAPHY

2236/01

Paper 1

18 August 2017

Additional Materials

Inserts

1 hr 40 minutes

Writing Paper

(8.00am – 9.40am)

Topographical Map

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Fig. 2 for Question 1 (b).

Table 3 for Question 1(c).

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[Turn over]

Section A

This question is compulsory.

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Hypothesis 1: Physical attractions brought more tourists to Chiang Mai than human attractions.

Hypothesis 2: Tourism has a positive rather than negative impact on people who live in Chiang Mai.

- (a) The students decided to use the questionnaire, shown in Fig. 1 (Insert), to investigate Hypothesis 1.
- (i) The answers to Question 1 (Which continent do you come from?) are shown in Table 1 below.

Table 1
Answers to Question 1
Continent & Number of tourists

Continent	Number of tourists
Asia	26
Africa	4
Oceania	8
Europe	14
North America	12
South America	6
Total	70

What conclusions can you make from Table 1 about the origin of tourists visiting Thailand? [2]

Highest no of tourists come from nearer countries/Asia

(Asia – 26 vs 6 fr S. America and 12 fr N America)

Least no of tourists come from Africa (4)

- (ii) The answers to Question 2 (What are the main physical attractions you are visiting whilst in Chiang Mai?) and Question 3 (What are the main human attractions you are visiting whilst in Chiang Mai?) are shown in Table 2 below.

Table 2
Answers to Questions 2 and of tourist questionnaire

Q2 Physical Attractions	Number of visits made
Mae Kiang waterfall	35
Doi Inthanon mountain	48
Fang hotspots	17
Botanical Gardens	12
Elephant camp	34
Orchid and butterfly farms	6
Ob Luang gorge	18
Total	[]
Q3 Human Attractions	Number of visits made
Hill tribe villages	23
National museum	10
Shopping at night bazaar	45
Buddhist temples	37
Bhubing Palace	6
Muang Kung earthenware village	11
Royal pagodas	8
Total	[]

What type of graph can best show the answers to questions 2 and 3? Describe how you would draw this type of graph.

Comparative bar graph. 1m

X-axis – Total Physical & Human attractions side by side

[3]

Y-axis – number of visits made

Use different colour/shading for physical and human attractions. 2m

- (iii) What are some of the limitations of asking Questions 2 & 3 in trying to test Hypothesis 1? [3]

The phrase, 'you are visiting' may not indicate an actual visit as it is just a possibility/intent. This is therefore not the same as stating the response as 'number of visits made'.

There may be attractions that the tourists went to that were not listed, so the data may not be reliable.

The number of visits made to a physical/human attraction may not prove that it is the reason why tourists visit Chiang Mai

Some of the lesser known attractions, especially those not known to the tourists, may not have many visitors and hence affect the response /data.

- (iv) Was their Hypothesis 1: Physical attractions brought more tourists to Chiang Mai than human attractions proven? Support your answer with evidence from Table 2. [2]

Yes

There were 170 visits to physical attractions compared to 140 visits to human attractions

- (b) The students used a different questionnaire to investigate the impact of tourism on people who lived in Chiang Mai. The questionnaire is shown in Fig. 2 (Insert).

- (i) The students used a systematic sampling technique to obtain answers to their questionnaire. Suggest how they might have done this and state 2 advantages of using this technique. [3]

They can interview every nth person/regular intervals eg 1 person every 15 minutes 1m

- Quicker, easier and more convenient to carry out than random sampling and can be more accurate because it avoids the remote possibility that the random sample selects too many examples from one part of the distribution

- Ensures good coverage of an area/number of possible interviewees

- Accurately reflects continuous changes in variables

- Avoids some element of personal bias when selecting respondents any 2 = 2m

- (ii) Do you think that it was a good idea to ask people for their first and second choices for Questions 2 and 3 in the survey? Explain your decision. [2]

Yes, it makes the data more manageable

It prioritises respondents' ideas

It stops them from listing everything

To see if more than one positive/negative

Hard to choose just one idea

No : respondents may have more than 2 choices

Not much data can be collected

Information not required for hypothesis any 2 = 2m

- (c) The answers to Question 2 (What do you think are the main positive impacts of tourism in Chiang Mai?) and Question 3 (What do you think are the main negative impacts of tourism in Chiang Mai?) are shown in Table 3 (Insert).

The students devised this simple formula to work out which impacts were most important.

Positive impact: More jobs and income

1st choice $27 \times 2 = 54$

2nd choice $15 \times 1 = 15$

Total score 69

- (i) Use this formula to work out the total score for air pollution. Show all working. [1]

1st choice : $16 \times 2 = 32$

2nd choice: $10 \times 1 = 10$

Total score = 42

- (ii) What conclusion can you make about Hypothesis 2: Tourism has a positive rather than negative impact on people who live in Chiang Mai? Support your decision with evidence from Table 3 (Insert 3) [2]
Generally true – tourism has a positive impact on people living in Chiang Mai

Evidence: 53 thought it was positive as against 8 who thought it was negative 1m

BUT the total score of the positive and negative impacts are the same (183). This suggests that while the respondents felt that tourism has brought beneficial impacts like jobs and improved standard of living, the negative impacts are of concern too. 1m

- (iii) What did the local people consider to be the 2 most negative impacts of tourism? Suggest reasons why they did so. [3]

Traffic congestion is a very visible negative impact. It affects their daily lives in terms of slowing down their movement and affects productivity. It also leads to stress and accidents.

Air pollution from planes, vehicles and boats make the air toxic, leading to breathing problems and ill health.

- (d) Describe how the students could carry out fieldwork to investigate the impact of traffic congestion. [4]

Carry out a traffic survey on a few main streets at different times of the day (especially peak and non-peak hours).

Eg. Tally, 4 times a day, both sides of roads in pairs

Compile a questionnaire to ask drivers, pedestrians, officials to ask questions like:

What time is traffic congestion the worst?

How long does it take you to reach your school/office every day – when there is a jam/no jam?

*Observation of the area in terms of for eg. waiting time for public transport, air pollution, noise pollution and record using a bi-polar survey scale.

Section B

Answer one question from this section.

2. (a) Fig. 3 shows a scene at a beach.



<http://www.signsgoldcoast.com.au/signage/safety-wayfinding-signs>

Fig. 3

- (i) Describe the type of waves associated with signs seen in Figure 3. [3]

Destructive waves

Large, high waves

Backwash more powerful than swash

Wave frequency >10 waves per minute

- (ii) Evaluate any 2 appropriate coastal protection measures that may be used in this area to protect the beach. [5]

Breakwaters (large stones that are cemented) help to break the force of oncoming waves. Built parallel to coast, some distance offshore.

It creates zone of calm water behind and beach materials can be deposited to form beaches. This allows for some usage of the calm area behind the breakwaters.

However, they are aesthetically unappealing and costly to build. They also protect the coast unevenly as only the area behind it are protected. The zones away from the breakwaters will continue to be eroded by destructive waves.

Seawalls made of concrete or stone built parallel to the coast. They absorb some of the wave energy.

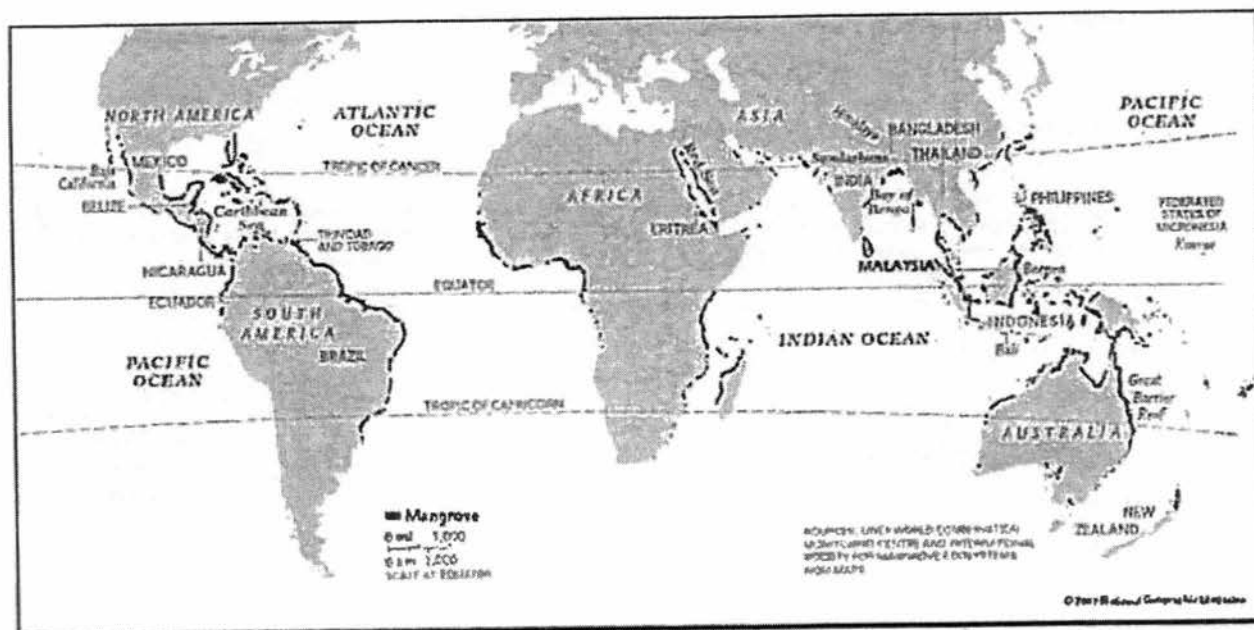
However, they are costly to build and maintain. Also, they can only absorb and reflect some of the wave energy. The powerful backwash can erode the base of the wall and lead to their collapse.

** Main problem of high energy waves must be addressed

Other possible measure; Gabions, Beach nourishment and groynes

Coral reefs and mangroves – **subject to conditions**

(b) Fig. 4 shows the distribution of mangrove forests around the world.



<http://resourcemanagement.thefieldworker>

Fig. 4

- (i) Describe and explain the global distribution of mangroves. [4]
 Found mainly along coastal areas of countries between the Tropics of Cancer and Capricorn
 Areas include S-E Asia, Sri Lanka, east India, Bangladesh, west Madagascar, east Africa, around the Red Sea, eastern coast of S. America, central America and northern Australia & Pacific islands
 Mangroves are tropical vegetation, being evergreen and require warmer temperatures.
 They are adapted to coastal conditions of mud/silt and saline water.
- (ii) What are the natural and human threats to mangrove forests? [5]
 Natural threats : 2m
 Storm /destructive waves/tsunamis - undermine the fine sediment in which the mangroves grow. This can prevent seedlings from taking root and wash away nutrients essential for mangrove ecosystems.

Climate change. Mangrove forests require stable sea levels for long-term survival. They are therefore extremely sensitive to current rising sea levels caused by global warming and climate change.

Diseases and pests that include grazing animals, crabs, parasites and insects that may increase with warmer climate.

Human threats: 3m
 Clearing: Mangrove forests have often been seen as unproductive and smelly, and so cleared to make room for agricultural land, human settlements and infrastructure (such as harbours), and industrial areas. More recently, clearing for tourist developments, shrimp aquaculture, and salt farms has also taken place. This

clearing is a major factor behind mangrove loss around the world.

Overharvesting: Mangrove trees are used for firewood, construction wood, wood chip and pulp production, charcoal production, and animal fodder.

River changes: Dams and irrigation reduce the amount of water reaching mangrove forests, changing the salinity level of water in the forest. If salinity becomes too high, the mangroves cannot survive. Freshwater diversions can also lead to mangroves drying out. In addition, increased erosion due to land deforestation can massively increase the amount of sediment in rivers. This can overcome the mangrove forest's filtering ability, leading to the forest being smothered.

Pollution: Fertilizers, pesticides, and other toxic man-made chemicals carried by river systems from sources upstream can kill animals living in mangrove forests, while oil pollution can smother mangrove roots and suffocate the trees.

- (c) "The loss of mangroves and coral reefs ~~will have~~ more devastating consequences to the economy than the environment."

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

[8]

Economic impacts:

Loss of revenue from sale of timber and other products from mangroves eg. S.E Asia

Loss of revenue from fishing and aquaculture industries eg. Vietnam

Loss of revenue from tourism activities that visit coral reefs and mangroves eg. Indonesia, Philippines

Environment impacts:

Loss of habitat for plant and animal species in mangrove and coral reef ecosystems

Greater erosion of coasts as corals and mangroves slow down and absorb wave energy

Conclusion: Environmental health is integral to economic health

Long term perspective needed for sustainability

Level 1 (0-3 marks)

- Listing of how mangroves or coral reefs cause impacts to economy or environment but 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 mangroves OR coral reefs cause negative impacts to economy AND/ OR environment
- Locations of countries and few examples given
- Answer written in essay form but with poor organization and are not in proper paragraphs

Level 3 (7-8 marks)

- Detailed explanations of how mangroves AND coral reefs cause negative impacts to economy AND environment
- Specific and detailed location of countries and many examples given
- Clear statements of which impacts are more devastating
- Answer written in essay form, with good organization in paragraphs
- Well- balanced conclusion

3 (a) Study the 1: 25 000 map extract of Tamarin (Mauritius).

Using map evidence, explain why area bounded by Northings 81 to 91 and eastings 82 to 84 is suitable for tourism? [5]

- There is a long stretch of public beach along the coast from Northing 87 to 91, including the river mouth area of River du Rempart, thus enabling beach-related recreational activities and businesses to develop.
- Hotels (grid square 8288 and 8387) provide accommodation for tourists
- Salt pans (8384 & 8485), Martello Tower (825827), coral reefs, Tamarin mountain, sugar and other plantations - attractions for tourists
- Area is served by Main roads and the jetties in the southern part facilitate access.
- The town of Tamarin provides services and facilities like health centre (837818), dispensary and post office (842865)

(b) Tables 4 and 5 show some tourism statistics for the country of New Zealand.

Table 4

Overseas Visitor arrivals for 2013 - 2016							
	2013	2014	2015	2016	2014	2015	2016
					Annual % change		
Oceania	1,311,872	1,359,120	1,415,588	1,514,080	3.6	4.2	6.9
Asia	528,624	575,200	681,568	814,640	8.8	18.5	19.5
Americas	264,576	285,664	307,024	348,192	8.0	7.5	13.4
Other	88,880	98,048	88,624	89,472	10.3	-9.6	1.0
Total	2,611,377	2,752,257	2,947,901	3,255,463	5.4	7.1	10.4

Table 5

Total Tourism Expenditure by tourists				
Year	Total Tourism Expenditure \$ (million)	Annual percentage change	Gross Domestic Product \$ (million)	International tourism as a % of total exports
2013	26 947	1.3	62 766	15.8
2014	28 039	4.1	67 002	15.4
2015	30 935	10.3	67 514	17.9
2016	34 699	12.2	70 144	20.7

<http://www.tdc.co.tt/index.php>

(i) Describe and suggest reasons for the trend of visitor arrivals to New Zealand from 2013 to 2016. [4]

From 2013 to 2016, the visitor arrivals to NZ from all regions shown have increased. 1m

Largest increase from Asia (8.8% in 2014 to 19.5% in 2016) and Americas (from 8% in 2014 to 13.4% in 2016)
1m

*Other region showed a decline from 10.3% increase in 2014 to 1% increase in 2016. In fact, there was a significant drop in visitor arrivals in 2015 (-9.6%) compared to previous year.

The increase in arrivals from Asia may be because of a rise in disposable income/rise of middle class in countries like China and India (as well as S.American economies), greater awareness of NZ as a tourist destination due to advertising, trade and media. Greater competition among airlines may have led to more attractive airfares, especially for long haul travel from the Americas.

2m

*Although there was a drop in visitor arrivals from 'Other' region (eg, Africa, Middle East) in 2015, the numbers increased again in 2016.

*optional

- (ii) With reference to Tables 4 and 5, explain how tourism is a boon and a risk to the New Zealand economy.

Boon:

Tourism brings significant benefits to the NZ economy:

2013 – \$26.9billion; 2016 – increased to \$34.7billion

International tourism accounts for 20.7% of NZ's total exports

This would have led to jobs and stimulated local businesses.

Tourism also lead to more investments into NZ due to greater awareness of business opportunities there.

Bane:

However, the fact that it accounts for 20 % of NZ's exports indicate its reliance on this sector of the economy. This makes NZ vulnerable to fluctuations in visitor arrivals due to economic downturns, outbreak of diseases and other disasters. This would impact NZ negatively, for eg. loss of jobs, closure of businesses.

- (c) Explain, with the use of examples, how budget airlines have contributed substantially to the growth of tourism. [4]

Budget airlines has made air transport affordable. They are cheaper than major commercial airlines as they do away with the frills, use smaller and more fuel-efficient aircraft. Most of the them fly to short haul destinations but this too has changed in recent years, with some budget carriers using better planes and travelling up to 7 hours. They sell tickets online , often with good promotional offers, thus attracting more customers.

Budget airlines have enabled more people to travel internationally and more frequently.

It has given travellers the opportunity to go on holidays further away (instead of domestic travel)

It enabled travellers to travel to destinations not covered by commercial airlines, especially in large countries and more remote locations (eg. Bhutan, Shangri-la, Corsica, Crete)

- (d) "Tourism activities are having a devastating effect on the environment."

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

[8]

- When tourism is organised on a large scale such as mass tourism to bring in profit, it will result in environmental destruction. Pollution and litter from tourists have become a major problem. Authorities sometimes fail to implement measures that would probably manage waste left behind by tourist. This can lead to degradation of such areas. For example, tourists often dump plastic bottles, food packaging and old batteries overboard from cruise ships. This causes harbours, marinas as well as the ocean to be polluted. For instance, many islands in the Caribbean have limited space on land to treat waste from ships. As a result, solid and liquid wastes are sometimes dumped into the Caribbean Sea by ships. As such, tourism as an enterprise is destructive in nature.

- Another environmental problem is the destruction of habitats. Popular tourist sites, such as quiet stretches of sandy beaches and scenic villages, can be overwhelmed with visitors during busy times of the year. When too many tourists visit a destination, they may destroy habitat and wildlife. Careless tourists may trample on plants, while others may collect eggs and feathers of birds as souvenirs. These tourists may also make too much noise **which can** disturb and frighten of animals. For example, Egypt's Red Sea coast **has developed** into a major diving and snorkelling destination for around 1.2 **million visitors** annually. Unfortunately, the habitats of coral reefs and exotic fish have been damaged by some swimmers collecting shells or corals as souvenirs, and by hotels and restaurants in the area dumping waste and sewage into the sea. In this way, tourism is a threat to the natural environment.

- Tourism also increases the carbon footprint on the environment. These activities may include travelling by planes and tour busses, and electricity consumption by hotels. For example, the carbon footprint of a one-way economy class flight from Singapore to Kuala Lumpur, Malaysia, is 30 kilogrammes of carbon dioxide per passenger. With mass tourism, the environmental impact will be even greater.

****** Tourism can also destroy the cultural environment of a place through cultural dilution. When tourism becomes the major activity of an area, the identity, culture and values of a can be lost. Commercial activities that cater mainly to tourists, such as food outlets, travel agencies, souvenir shops and hotels, can become the major commercial activities of an area. Older buildings may be converted to host tourist activities. At the same time, new and larger buildings may be constructed for tourism.

****** These activities may force the locals to relocate their original activities to other places. As a result, the identity of a place may be lost. When this happens, the original environment - atmosphere, appearance and functions of an area change. To meet the demands and expectations of tourists, local cultural festivals and religious rituals are sometimes modified. For example, Rituals may be shortened to fit into the itinerary of tourists. The authenticity and significance of these cultural events may be reduced whey they become commercialised. For example, tourists pay a hefty fee to enter the village of the Kayan Lahwi women in

Thailand. Due to the entrance fee, some tourists treat the women as exhibits that they are paid for. The tribe loses its cultural identity.

** optional

However, tourism can also be beneficial to the environment:

Conservation and preservation of natural and built environments (coral reefs, rainforests, mountainous areas, cultural & heritage sites). Governments are more willing to conserve & preserve environments in order to attract visitors.

Visitor spending can also provide funds for conservation & preservation of environments.

Greater global awareness of the threats to and appreciation of environments can also lead to more support for NGOs and other organisations that seek to protect the environment.

Level 1 (0 – 3marks)

- **At this level answers will be generalised** or with minimal support if any given at all.
- 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 to 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.
- Good reasoning and logic in parts of the answer with good expression in places.
- Some examples or other evidence will be presented to support answers in at least one place in the answer.

Level 3 (7 – 8 marks)

- At this level 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 or other evidence to support answers will be extensive

Tourist questionnaire

We are doing a tourism survey as part of our Geography coursework. Please will you answer the following questions?

1. Which continent do you come from?

- | | | |
|----------------------------------|--|--|
| ☐ Asia | ☐ Africa | ☐ Europe |
| ☐ Oceania | ☐ North America | ☐ South America |

2. What are the main physical attractions you are visiting whilst in Chiang Mai?

- | | |
|--|--|
| ☐ Mae Klang waterfall | ☐ Doi Inthanon Mountain |
| ☐ Fang Hot Springs | ☐ Botanical Gardens |
| ☐ Elephant camp | ☐ Child and Butterfly farms |
| ☐ Ob Luang Gorge | |

3. What are the main human attractions you are visiting whilst in Chiang Mai?

- | | |
|---|---|
| ☐ Hill tribe villages | ☐ National museum |
| ☐ Shopping at the night bazaar | ☐ Buddhist temples |
| ☐ Bhubing Palace | ☐ Muang Kung Earthenware village |
| ☐ Royal pagodas | |

Thank you for your time.

Insert

Fig. 2 for Question 1 (b)

Local people questionnaire

We are doing a tourism survey as part of our Geography coursework. Please will you answer the following questions?

1. Do you live in Chiang Mai?

☐

Yes

☐

No

(Finish interview if 'No')

2. What do you think are the main positive impacts of tourism in Chiang Mai?

Number your first and second choices '1' and '2'.

☐

More jobs and income

☐

Improved standard of living

☐

More modern services

☐

Cleaner environment

☐

Improved infrastructure e.g. airport, roads

☐

Reduction in crime

☐

Greater range of goods in shops

☐

Local people have greater global awareness

3. What do you think are the main negative impacts of tourism in Chiang Mai?

Number your first and second choices '1' and '2'.

☐

Noise pollution

☐

Air pollution

☐

Traffic congestion

☐

Increase in crime

☐

Decline of traditional culture and way of life

☐

Increase in litter

☐

Increase in cost of living

☐

Destruction of natural environment for hotels, shops etc.

4. Overall do you think tourism has a positive or negative impact in Chiang Mai?

☐

Positive

☐

Negative

Thank you for your time.

Insert

Table 3 for Question 1(c)

Answers to Questions 2, 3 & 4 of local people questionnaire

Q2 Positive impacts of tourism	First choice	Second choice	Total score using formula
More jobs and income	27	15	69
Improved standard of living	7	12	26
More modern services	2	6	10
Cleaner environment	3	1	7
Improved infrastructure	8	6	22
Reduction in crime	1	12	14
Greater range of goods in shops	6	6	18
Local people have greater global awareness	7	3	17
Total	61	61	

Q3 Negative impacts of tourism	First choice	Second choice	Total score using formula
Noise pollution	4	7	15
Air pollution	16	10	
Traffic congestion	17	14	48
Increase in crime	3	4	10
Decline of traditional culture and way of life	7	5	19
Increase in litter	3	7	13
Increase in cost of living	4	9	17
Destruction of natural environment	7	5	19
Total	61	61	

Q4 Overall impact of tourism	Answers
Positive	53
Negative	8

Insert

Fig. 1 for Question 1(a).



ST JOSEPH'S INSTITUTION

**PRELIMINARY EXAMINATION 2017
(SECONDARY 4)**

GEOGRAPHY

2236/02

Paper 2

29 August 2017

Additional Materials

Insert

1 hr 30 minutes

Writing Paper

(8.00am – 9.30am)

READ THESE INSTRUCTIONS FIRST

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

Write in dark blue or black pen on both sides of the paper.

Do not use paper clips, highlighters, glue or correction fluid.

Section A

Answer **one** question.

Section B

Answer **one** question.

Write all answers on the writing paper 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.

Insert contains

Fig. 5A and Fig. 5B for Question 2 (b)

Fig. 9 & 10 for Question 4 (a)

Fig. 11 for Question 4 (b)

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.

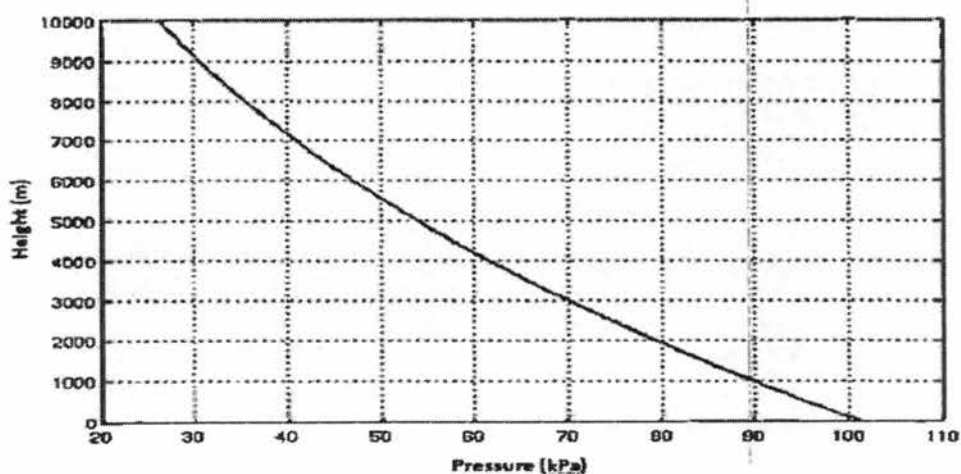
This document consists of **11** printed pages, including the Cover Page and Insert.

[Turn over]

Section A

Answer one question from this section.

- 1 (a) (i) Fig. 1 below shows the relationship between pressure and altitude.



<https://physics.stackexchange.com>

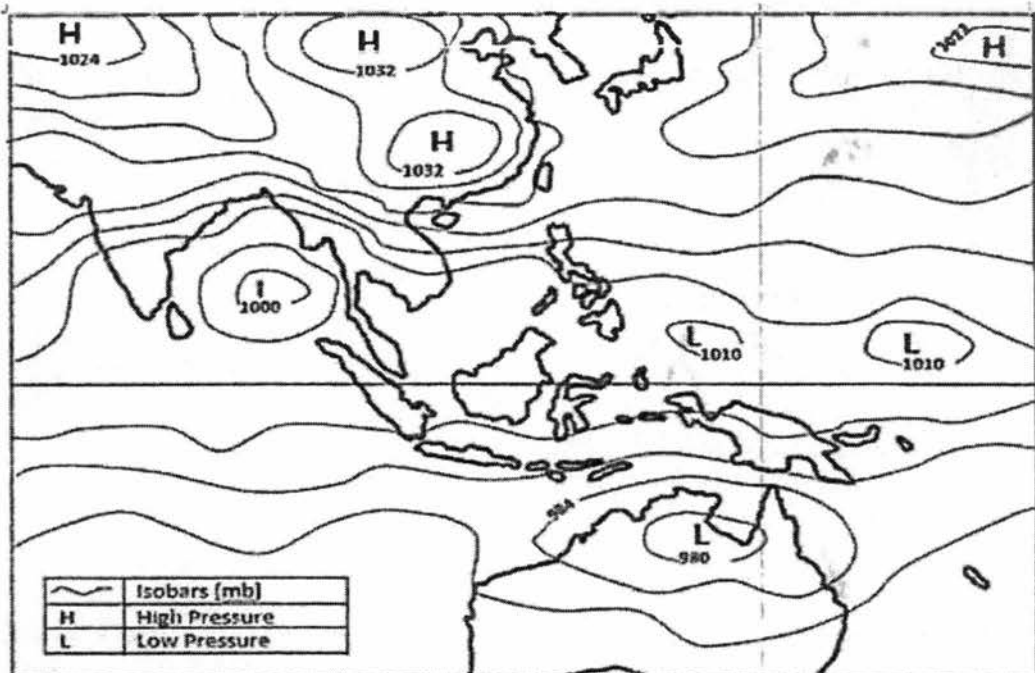
Fig. 1

Describe and explain the relationship between altitude and pressure [3]

Relationship : The higher the altitude, the lower the pressure. For eg. pressure at sea level (0m) is about 102kPa where at 4000m, the pressure is 60kPa.

Air is denser at lower altitude because it tends to be more compressed where the larger overlying mass exerts greater gravitational force.

- (ii) The simplified isobar map for East Asia and Australia in December is shown in Fig.2 below.



Adapted: <http://www.vagaries.in/2012>

Fig. 2

Based on the information in Fig. 2, account for the high and low pressure cells in the region shown and the likely wind pattern that will form.

In December, the northern hemisphere is getting cooler as winter is approaching and the southern hemisphere is approaching summer [5]

1m
With cooler temperatures at higher latitudes (eg. over Mongolia, Korea and China), the cold air sinks thus creating high pressure cells of about 1026mb.

1m
At the equator, the temperatures are still high. The warm air rises, creating cells of low pressure of about 1010mb. The high temperatures in the southern hemisphere, especially over the continent of Australia will also experience similar conditions of low pressure.

1m
A pressure gradient is thus set up between the high pressure cells at higher latitudes and the low pressure cells over at the equator and the southern hemisphere.

1m
Winds will thus blow out from the high pressure cells over China and Mongolia as the North West monsoon and due to the Coriolis effect, blow towards Peninsula Malaysia as the North East monsoon in the coming months. Australia will be experiencing the NW monsoon winds.

- (b) Explain how the presence of cloud cover can affect the daily temperature range. [4]

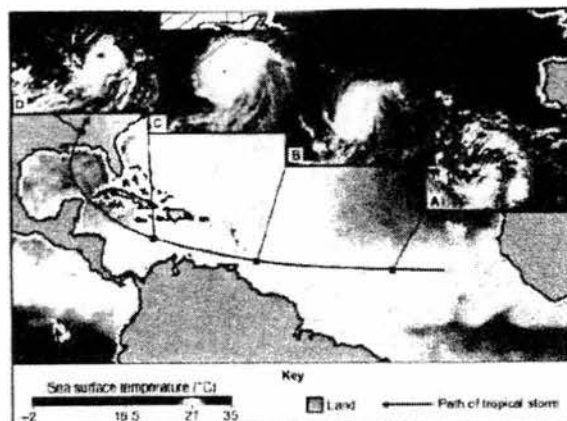
During the day, clouds (made up of visible water droplets or ice crystals) reflect a large portion of the sun's short wave energy back to space and only some of this energy enters the earth's atmosphere. This keeps the earth's surface cool. At the same time, clouds also absorb radiated heat (long wave energy) from the earth's surface.

2m
During the night, clouds absorb more of the heat (long wave energy) that is radiated from the earth's surface and prevent it from escaping into space. The air near the earth's surface is thus kept warm at night. The diurnal temperature range is therefore small.

2m

- (c)

Study Fig. 3 which shows the path of a tropical storm.



Source: © Commonwealth of Australia (2008), Bureau of Meteorology

Fig. 3

With the help of Fig. 3, explain the development of the tropical storm from A to D. Tropical storms are weather systems that develop over warm oceans in the tropics. They range in diameters from 150 km to >1500km, with sustained wind speeds of 120kmph or more. 1m

At the early stage (A), sea surface temperatures rise (>25 degrees Celsius), creating large volumes of clouds as warm moist air expands and rises. A low pressure cell begins to form. 1m

As this continues (B), the rising warm air condenses into large clouds, releasing latent heat, thus continuing to warm the air, making it expand and rise further. This reduces the air pressure over the ocean surface, creating and sustaining an area of low pressure. A steep pressure gradient develops, drawing in strong winds into this area of low pressure which spirals inwards and upwards at high speeds. The spiralling is created by the Coriolis effect. [5]

1m
A well-developed tropical storm, as seen in C, where the warm rising air cools and sinks. The descending dry air creates an environment in the centre of the cyclone characterised by calmness and absence of clouds. Surrounding this centre, called the 'eye' are the huge towering thunderstorm clouds, (seen as curved bands of clouds surrounding the eyewall). In addition to strong winds, heavy rainfall will occur. [The winds will also whip up strong waves surging onto the coastal areas (storm surge).]

1m
When the cyclone hits land (D), it brings heavy downpours and high speed winds. The is followed by a period of relative calm as the 'eye' passes the area and then followed by heavy rains and strong winds as the rear of the cyclone passes 1m

As it moves inland, the source of the warm rising air is no longer present and the cyclone gradually dissipates. 1m

- (d) 'National measures are more effective than international agreements in reducing the impact of climate change'.
To what extent do you consider this statement to be true? Use examples to support your answer. [8]

Any one or two of the national strategies should be discussed.

- Singapore Green Plan 2012 : Reduce greenhouse gas emissions by using natural gas as an energy source
- Green Mark Scheme: Constructing 'green' buildings
- Plant a tree Programme : Planting more trees and plants
- National Urban Transport Policy in India: public transport
- Energy labelling Programme: reducing energy consumption

Description of strategy	Successes	Limitations
Launched by the Ministry of the Environment in 2002, the Plan aims to generate 60 per cent of Singapore's energy needs using natural gas by 2012. Natural gas is a cleaner form of energy in comparison to coal because it does not produce smoke.	As early as 2010, about 79 per cent of Singapore's electricity was being generated from natural gas. This exceeded the Ministry of Environment's target ahead of schedule.	Natural gas requires complex treatment plants to process and pipelines to transport. These pipelines have high maintenance costs because they need to be laid underground and have to be checked regularly for leakage.
Launched by the Building Construction Authority (BCA) in 2005, the scheme allows buildings to be evaluated and certified according to how energy-efficient and environmentally friendly they are. The scheme aims to encourage more new 'green' buildings, which are more energy-efficient. Buildings which are more energy-efficient use less energy to provide the same service. An example is buildings that run partly on solar energy.	Existing 'green' buildings, such as Plaza by the Park, Standard Chartered @ Changi and the National Library Building, have reported energy savings of 15 per cent to 35 per cent compared to conventional buildings. This cuts down greenhouse gas emissions by reducing the use of fossil fuel to generate electricity.	Construction companies and developers in Singapore tend to be conservative about adopting new ideas and materials to build 'green' buildings. 'Green' buildings are built using processes that are environmentally friendly and resource-efficient. 'Green' buildings may cost more to build because 'green' materials may be more expensive. 'Green materials' are products such as bamboo or recycled metal that are non-toxic, reuseable, renewable, or recyclable.
Started in 1971 as Tree Planting Day, the Plant-A-Tree Programme by the Garden City Fund and Singapore Environment Council aims to maintain Singapore's status as a Garden City by planting trees. Residents are encouraged to donate money to buy a tree or take part in tree planting events that take place monthly throughout Singapore.	The programme has contributed to an estimated 60,000 trees planted yearly throughout Singapore by the National Parks Board (NParks). Trees are the green lungs of the environment as they remove carbon dioxide from the atmosphere.	Trees take many years to mature, so the positive effects of tree planting will take time to materialise. Even relatively fast-growing trees such as angsanas, raintrees and yellow flames that were planted by NParks took 25 years to reach their full height.

International strategies (1 or 2 to be discussed)

Kyoto Protocol

Copenhagen Conference

• Singapore Green Plan 2012

Kyoto protocol

Successes

Many countries such as Austria, Finland, Greece met or exceeded targets (5%) set by Kyoto Protocol as there was constant monitoring and reporting by

countries for self and peer assessment.

Encouraged sustainable development.

Developed countries are encouraged to work with developing countries in carbon-reducing projects e.g. installing energy efficient infrastructure (Clean Development Mechanism — CDM) which gave Certified Emission Reduction (CER) credits to countries that helped.

Each credit is = 1 tonne of CO₂ which they are allowed to release.

Limitations

Not all countries are able to meet their goals and not all countries have the same emission targets.

Denmark, Sweden and the United Kingdom did not achieve their targets

KP does not make it compulsory for countries with low GHG emissions to provide support to other countries.

Many countries did not sign the Kyoto Protocol and continue to contribute to global emissions.

A large portion of the increase in global emissions (35%) came from China, India and the United States of America

Copenhagen Conference

Successes

Allow countries to discuss measures to **deal with climate Change** effectively, including improvements to Clean **Development Mechanism** (CDM).

International agreement to **keep increase global temperature below 2°C**

Developed countries pledged **to**:

Reduce **greenhouse** gas emissions by 2020.

Provide **US\$30 billion** for developing countries to fight climate change

Limitations

Targets set to reduce GHG are insufficient to keep increase of global temperature to within 2°C

Lack for concrete plans on how to reduce greenhouse gases

Copenhagen Accord (Agreement) was not adopted by **all countries**.

- The Accord was a guideline and no countries will be **binded/punished** if they do not fulfill their pledges.

Conclusion:

International organisations **share knowledge/info/funds**; encourage & persuade; set broad goals

BUT practical policies and detailed action best carried out at National level after translating goals into plans

Level 1

Only national or international measures discussed

Answers are brief and not elaborated

No successes and limitations given

No examples given

Level 2

Both national and international measures discussed

Answers are well-elaborated but not very detailed.

Both successes and limitations each for each measure and agreement

Some examples given
There is an attempt t

Level 3

Both national and international measures discussed

Answers are well-elaborated.

Both successes and limitations each for each measure and agreement

Multiple examples given

Balance in answer and evaluation is clear, organised and cohesive.

Good links to the question is apparent

- 2 (a) (i) Study Fig. 4A which shows the location of Moscow and Singapore and Fig. 4B which shows the climographs of these 2 cities. [4]

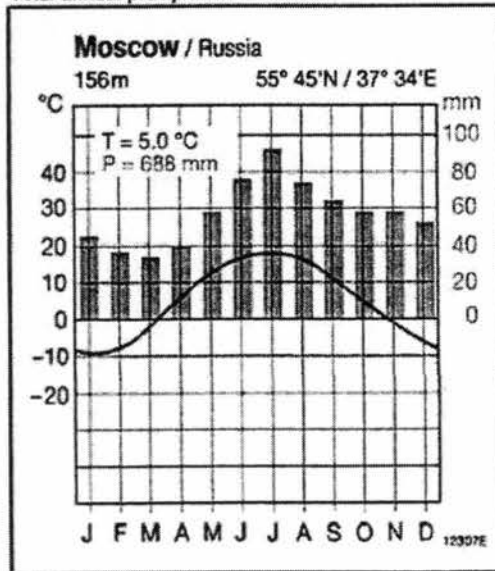


Fig. 4A

Moscow: 55°N 37°E

Mean annual temperature = 5.0°C

Total annual precipitation = 688mm



Singapore: 1.3°N 103°E

Mean annual temperature = 26.9°C

Total annual precipitation = 2275mm

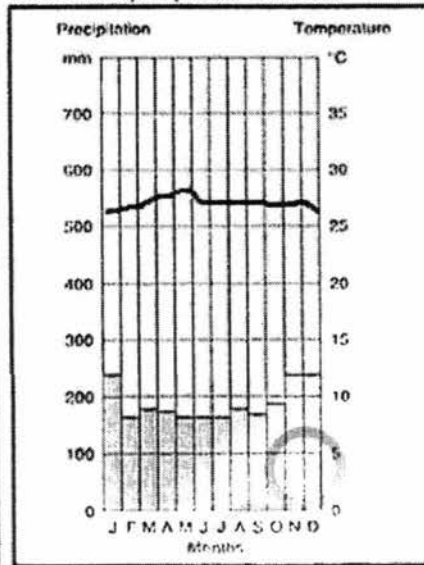
<https://en.climate-data.org>

Fig. 4B

- (i) With reference to Fig. 4A and Fig. 4B, compare the rainfall and temperature of Moscow and Singapore.

	Moscow	Singapore
Mean annual temperature	5C – low	27C – hot / high
Range of temp	large annual range of -28C	Small/narrow annual range of 3C
Max and Min temp	Max – 19C Min – -10C	Max – 27C Min – 23C
Seasonal temp	Warm summers, cold winters	Hot throughout the year
Total rainfall	moderate of 688mm/yr	Very high >2000mm/yr
Rainfall variations	Summer rain, snow in winter	Rain throughout the year, evenly distributed with slightly higher rainfall during end of the yr.

1m – Mean annual temp & season

1m – Temperature range; Max & min

1m – Rainfall total

1m – Rainfall distribution

- (ii) Account for the temperatures of Moscow and Singapore.

Moscow is in higher latitudes whereas Singapore is closer to the equator, therefore:

Moscow has a lower solar angle. The curvature of the earth surface diffuses the sun's rays and heat spread out over a larger area

Whereas Singapore - sun's rays strike at a higher angle and hence, solar energy is concentrated on a smaller area. Thus experience a higher average temperature.

Moscow is located further inland (**Continental effect**). In warmer months (summer), the land heats up faster than places nearer the sea (as water absorbs heat slower). Inland areas like Moscow therefore has high summer temperatures. In winter, the land loses heat faster than water, hence temperatures in Moscow are much lower than places nearer the sea. The temperature range of Moscow is therefore large whereas Singapore is an island and does not have the effect of continentality.

- (b) Study Fig. 5A which shows a volcanic hazard risk map for an area in California in the United States of America (USA) and Fig. 5B which is a write-up on the Lassen Volcanic National Park.

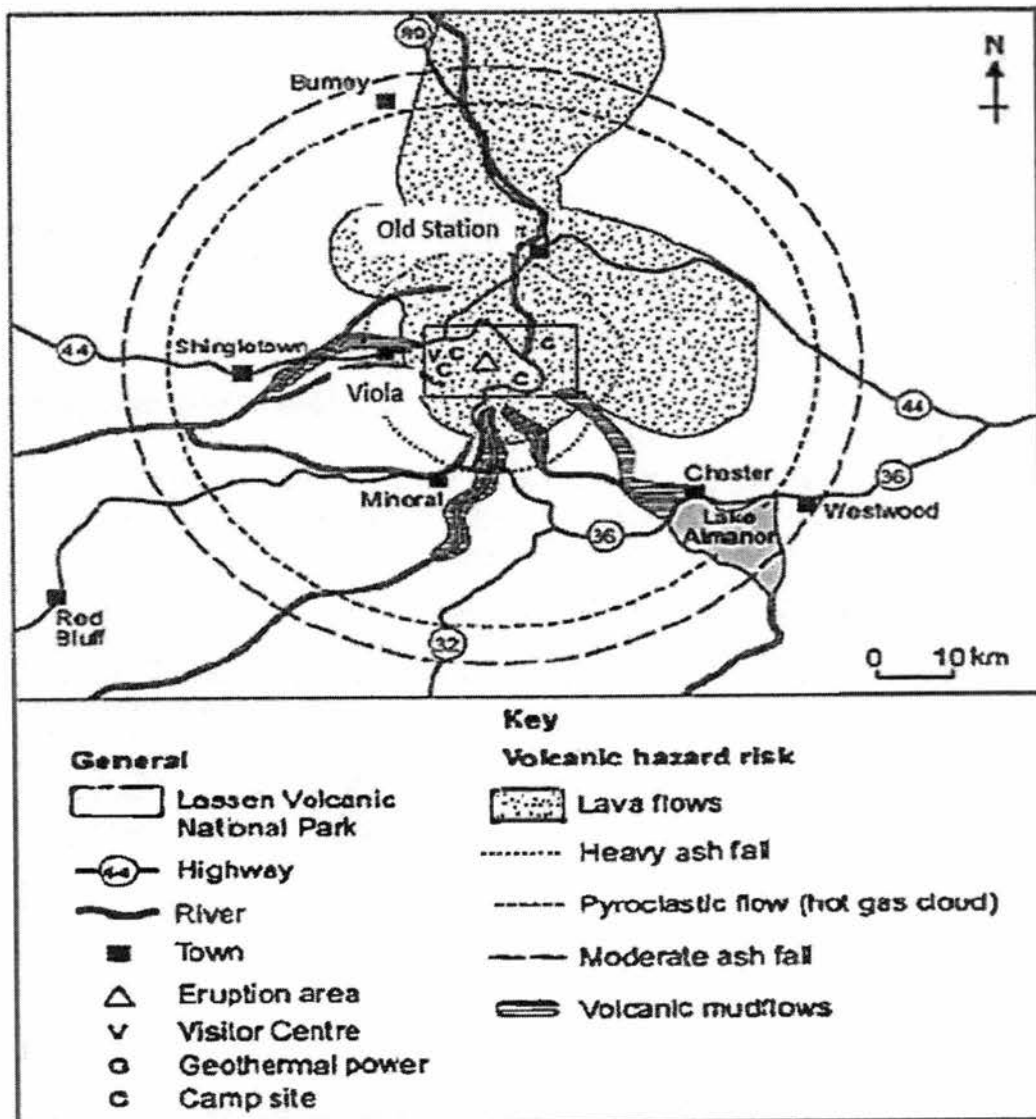


Fig. 5A

The source of heat for volcanism in the Lassen area is subduction off the Northern California coast of the Gorda Plate diving below the North American Plate. The area surrounding Lassen Peak is still active with boiling mud pots, stinking fumaroles, and churning hot springs. Starting in May 1914 and lasting until 1921, a series of major explosive eruptions occurred on Lassen. These events created a new crater, and released lava and a great deal of ash.

Fig. 5B

Source: US Geological Survey, USA

- (i) **Based on the information in Fig. 5A and Fig.5B, what type of volcano will likely form in the area shown? Explain your answer.** [4]
 Possibly Stratovolcano/Composite volcano. Or Cinder cone on top of lava field.
 Subduction of Gorda plate below North American plate. Subduction zones usually result in stratovolcanoes
 These are formed from successive major/ violent eruptions of lava and pyroclasts.
 Pyroclasts refer to ash, rock fragments and volcanic bombs ejected during a volcanic eruption.
 After an initial eruption of pyroclasts, the subsequent eruption ejects lava which covers the pyroclasts and prevents it from being eroded away. When pyroclasts mix with super-heated gases ejected during a volcanic eruption, it results in pyroclastic flows. Pyroclasts may also mix with water from melted ice or lakes to result in lahars which are fast flowing mudflows, covering large areas.
 Caldera formed due to explosive nature of the eruptions.
 The area shown in the diagram shows lava flows, ash fall, pyroclastic flow and mudflow.
 Successive eruptions over time may build a high and steep volcano on one side or cinder cones on top of a ash and lava field.
- (ii) **With reference to Fig. 5A and Fig.5B and studies you have made, describe the type and level of risk for towns like Westwood and Bumey as compared to Old Station and Viola.** [5]
 Distance from eruption area (lesser risk with distance from eruption)
 Viola – 12km
 Old Station - 18km
 Westwood – 45km
 Bumey – 35km
 1m
 Heavy ash fall and pyroclastic flow – Viola and Old Station within radius whereas Bumey and Westwood is further away, affected by moderate ash fall.
 1m

Lava flows towards the north – Old Station is in its path. Although Bumey could also have been affected. 1m

Old Station and Viola are near rivers. Viola affected by volcanic mudflows. Westwood is blocked by Lake Almanor from the effect of volcanic mudflow.

1m

Therefore, Old Station and Viola face higher level of risk than Westwood and Bumey.

*float 1m

- (c) "Since earthquakes are hard to predict, it is better to invest in response measures than preparedness measures."

To what extent do you consider this statement to be true? Use examples to support your answer. [8]

Response Measures include: (1-2 of the following)

Short-term responses

*Search and rescue. Survivors have been found even after a few days. Limited time of 72 hours for survival of trapped victims. Can be hampered by lack of equipment and skilled personnel.

*Emergency food, water and medical supplies. These have helped survivors to continue with their lives for the time being. Limited by the amount sent and the availability and accessibility to such supplies.

Long term responses

*Rebuilding of infrastructure after the earthquake. Stricter building codes and restoration of infrastructure. Limitation include protection against tsunamis may not be done.

*Provision of healthcare including long term counselling. However, restoring the resilience of people after an earthquake can be challenging as they still lack basic services and facilities for a normal life.

Preparedness Measures include: (1-2 of the following)

Land use regulations

Land use regulations are rules that restrict developments in certain areas that have been deemed to be at greater risk to damage from earthquakes.

For example in California, all new building developments are not build across fault lines or areas at risk of liquefaction.

Also along the coasts of Japan and North America, construction of new buildings are not permitted on low lying areas in case of tsunamis.

This is to minimise the damage to property and danger to human lives.

However these measures may be costly as many of these areas may already be populated and governments would have to compensate those already living there.

Also, private owners may be reluctant to move as they feel that another earthquake may not occur in their lifetime.

Building Design

Building with steel and reinforced concrete make building more able to withstand earthquakes. Including damping devices in the building design allow seismic energy to be absorbed in an earthquake. Also, constructing buildings with a wide

and heavy base decreases the likelihood of these building collapsing.

All these are incorporated into Taipei 101, a building in Taiwan.

Effective building design can reduce the likelihood of building collapse and minimize the damage caused by earthquakes.

However, such buildings can be costly to build and maintain. It may also be costly to convert existing buildings.

Infrastructure Development

Infrastructure needs to be developed with advanced engineering to withstand the shocks associated with earthquakes.

Roads, bridges and dams can be built to withstand earthquake shocks or made more to be more easily repaired.

Buildings can be fitted trip switches that ensure all electrical points are switched off in an earthquake to prevent fires from breaking out.

Underground water tanks are built as emergency reservoirs to fight fires after an earthquake.

Past earthquake events have demonstrated that using this technology, fewer lives are lost, faster rescue and evacuations and less money spend on recovery for the affected areas.

Developing infrastructure to withstand earthquakes is more costly and in some places remains untested.

Emergency Drills

Emergency drills are a form of preparedness measure where people practice the steps to take when an earthquake occurs

Every year on September 1st, Japan conducts emergency drills to simulate the occurrence of an earthquake of high magnitude. This is to prepare the people mentally on how to react to a disaster

Emergency drills create awareness and reduces panic in people when an earthquake strikes by ensuring that people know what to do in the event of an emergency.

However these drills are based on the scale and magnitude of past events and therefore emergency scenario might not be realistic if a more powerful earthquake strikes the area

Use of Technology

Technological devices such as monitoring and warning systems allow scientist to warn people of imminent earthquakes so that they can take appropriate action.

Advanced technology such as seismic risk map, earthquake sensor and tsunami monitoring systems help to detect earthquakes earlier.

If scientists determine that an earthquake or tsunami is imminent, people can be evacuated from high-risk areas, emergency services can be placed on high alert to reduce the number of casualties.

However, these systems are costly to install and use. There is a possibility of false alarms as these systems are subjected to interference by lightning or storm waves. There is also very little time for response, as the systems do not give enough time for evacuations to take place.

Conclusion: People respond to earthquakes by trying to prepare for them and putting in place preparedness measures to mitigate the impacts. However, even

the best preparation, which can be costly, may not be adequate or be sufficient to deal with the unexpected. When earthquakes do occur, people have to deal with the impacts with short and long term responses.

Level 1 (1-3 marks)

Answers will be generalized or with minimal support if any given at all. 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)

Response or preparedness measures will be supported by appropriate detail. Or, both types of measures are considered, but support is patchy so that the answer is not full. Good reasoning and logic in parts of the answer with good expression in places. Some examples or other evidence will be presented to support answers in at least one place in the answer.

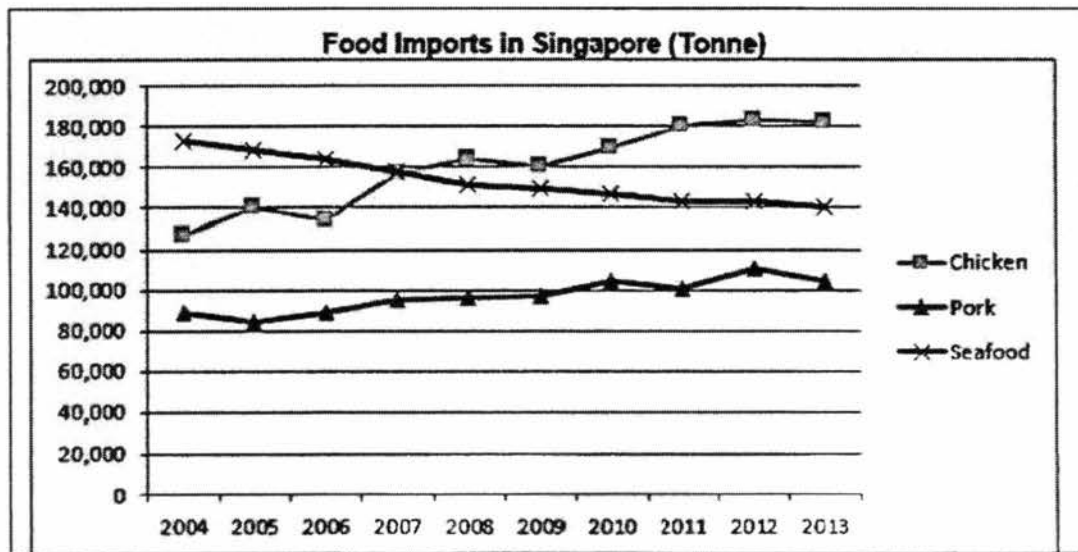
Level 3 (7-8 marks)

Answers will be comprehensive and supported by sound knowledge. Both types of measures are considered and well supported. Reasoning is clear and logical with good expression of language. Examples or other evidence to support answers will be extensive. Conclusion as to which type of measure is better will be based on a criterion (eg cost considerations or effectiveness in reducing losses). Conclusion can also be based on the complementarity of both types of measures as both are necessary to deal with different circumstances.

Section B

Answer one question from this section.

3. (a) (i) Fig. 6 shows the amount of meat and seafood imported into Singapore from 2004 to 2013.



Source: Agri-Food and Veterinary Authority of Singapore
Fig. 6

With reference to Fig. 6, compare and account for the trends in demand for chicken, pork and seafood

[5]

Reserve 1m for trend.

Reserve 1m for data to support each trend.

1m for each of the following points:

- Between 2004 and 2013 both pork and chicken show a general increase a food imports in Singapore while seafood shows a general decline.
 - Chicken increased by about 55,000 tonnes while pork increased by about 15,000 tonnes.
 - on the other hand, seafood has decreased by about 35,000 tonnes.
 - This have be because local fish farms have increased production. thus leading to lower imports.
- **Chicken has** a steeper and greater rate of increase than pork.
- **Chicken is** considered to be a **healthier option** than pork and can be consumed by all cultures/religions whereas pork is not eaten by Muslims.
- While seafood imports were higher than chicken between 2004 and 2007, it was less than amount of chicken imported after 2007.
- Pork is the lowest amount of meat imported as compared to chicken and seafood from 2004 to 2013.

(ii) The targets for local production of 3 key food items are shown in Fig. 7 below.

Key food items	2020 Local production targets	2014 production
Hen shell eggs	30%	25%

Leafy vegetables	10%	12%
Fish	15%	8%

Source: Agri-Food and Veterinary Authority of Singapore
Fig. 7

What are some of the challenges in meeting the production targets and suggest possible strategies that can be used to overcome such challenges? [6]

Challenges:

Lack of land space for large scale cultivation of vegetables and chicken/egg farms; limited coastal areas for setting up aquaculture farms as Singapore has narrow territorial waters

Lack of interest in investments in agriculture especially from local businesses; farming in S'pore is high-tech and requires substantial capital outlay

Shortage of manpower; few people keen on working in this sector

Possible strategies:

Improved mechanisation – use of advanced machinery to perform tasks which they would otherwise have to do manually.

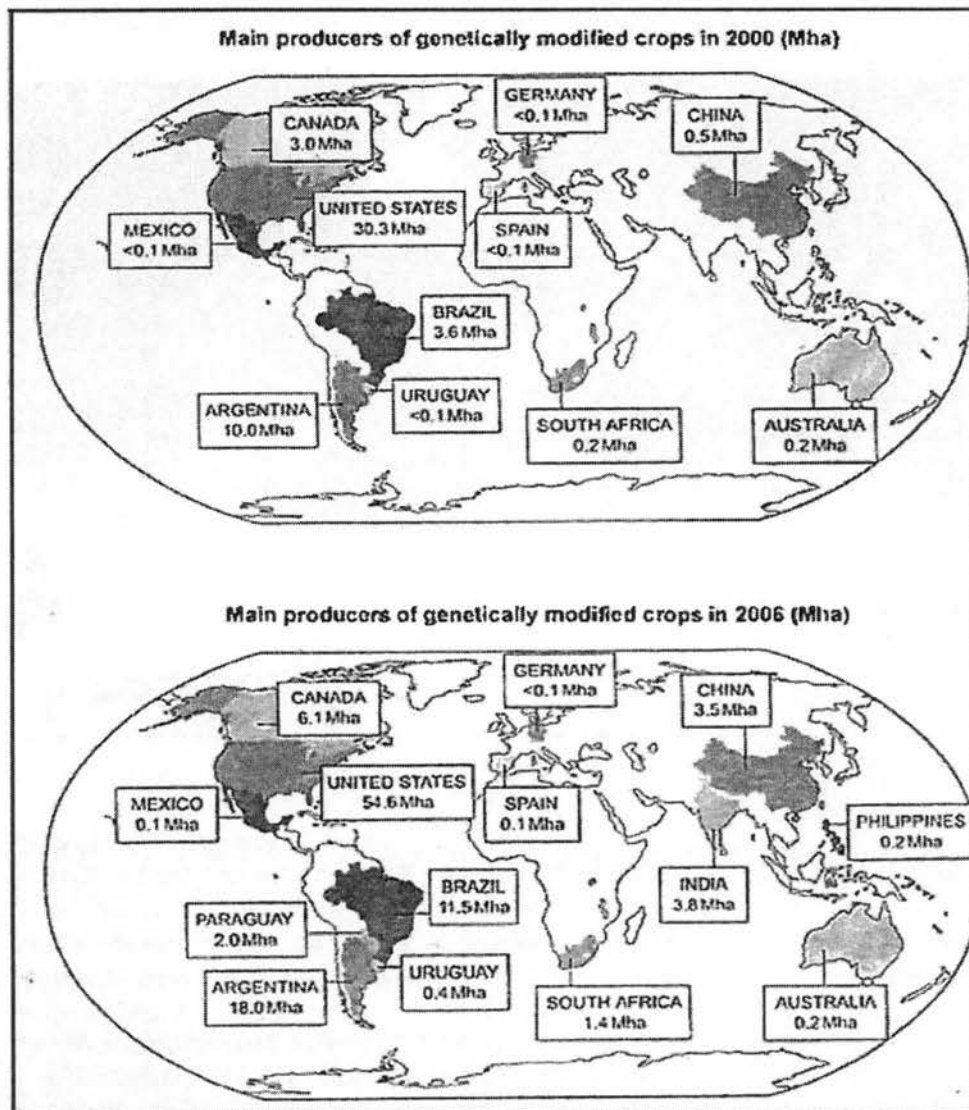
Use of computers in Singapore's high-tech farms allows fewer workers needed to grow crops on the farms. Use of other high-tech farming techniques – vertical farming to save space; use of chemical solutions in aeroponics and hydroponics etc.

Use of biotechnology – use of GM crops, which have a higher yield than non-GM crops.

Social strategies – encourage locals to support the local farmers by purchasing locally produced food through advertising and campaigns. This will help to keep the local farmers in business through ensuring demand for their produce. Encourage and support community and urban farming.

Government policies that will support and encourage local agricultural production that will attract investments and long term sustainability of such enterprises. This can include low cost land rent, technical assistance and tax incentives.

- (b) Fig.8 shows the amount of farm land used by countries for the production of genetically modified crops in 2000 and 2006



<http://www.economist.com/blogs/dailychart/2011>

Mha = million hectares

- (i) With reference to Fig. 8, describe the changes to the production and location of genetically modified crops and the area they cover between 2000 and 2006. [4]

- GM food is mainly produced in the continents of North and South America and parts of Asia. There is little GM food produced in the continents of Europe and Africa. 1m
- In 2000, most of the main producers are the developed countries in North America e.g. the United States (30.3Mha)USA, Canada (3.0Mha), Australia while in 2006, there are many new new main producers are from the less developing countries in Asia and South America 1m
- The number of main producers of genetically modified food has increased from 11 in 2000 to 14 in 2006 New producers include

countries such as , India (3.8Mha), Paraguay (2.0Mha) and the Philippines.

1m

- There is an overall increase in the area used in producing GM food across the world, e.g. In the United States, the area used for growing GM crops increased from 30.3Mha in 2000 to 54.6Mha in 2006, but the continents of Europe and Africa remain largely unaffected by GM food production.
- All countries saw an increase in GM food production except for Germany and Australia.

1m

- (ii) Suggest reasons why countries like India, Paraguay and Philippines are cultivating GM crops. [3]

Reasons for cultivating GM crops:

1. Increased demand due to increasing population and export to other countries
2. **Need to ensure better crop survival and yield** through crops **that can produce more, tolerate pests and diseases**
3. **Introduction of GM crops technology into these countries** through Government agricultural policies and investments in agribusinesses (globalisation)

- (c) "Adopting modern technology in agriculture is more effective in increasing food production than using agricultural strategies."

To what extent do you consider this statement true? Use examples to support your answer. [8]

Agricultural strategies:

Multiple cropping and crop rotation

Advantages – nitrogen released by leguminous crops act as fertiliser for other crops; growing a variety of crops minimises problem of pests; reduces dependence on only one crop due to pests, price fluctuations

Water and soil conservation

No-till farming where weeds are not removed and no digging of soil. Plant materials from previous season kept to improve quality of soil. This protects soil from erosion.

Leasing farmland to other countries

Land scarce countries lease farmland from other countries for agriculture.

Eg. South Korea leased >3million acres from Madagascar

Countries with land but cannot produce enough food can lease out farmland to generate income

Modern technology strategies:

Storage – refrigerated warehouse/trucks; silos

Cut spoilage and loss of crops & made food available and accessible eg. Timor Leste

Limitation of cost

Farming technology - use of HYVs, irrigation, chemical fertilisers and pesticides and machinery (*green revolution)

Biotechnology – GM foods have higher yield, can be grown in previously less suitable areas and are more resistant to weather conditions. But there are still concerns regarding GM crops and GM seeds are out of reach of any farmers in LDCs.

Conclusion:

Modern technology have increased food production tremendously in the last 5 decades. Its effectiveness in improving food production is without question. The potential to harness technology in areas with difficult conditions will benefit many countries. However, there are lingering concerns over the impacts on environment and consumers. Agricultural strategies can complement technology in **providing a more balanced** and environment friendly solution.

Level 1 (1-3 marks)

Answers will ~~be generalized~~ or with minimal support if any given at all. 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)

Technological or agricultural strategies will be supported by appropriate detail. Or, both types of strategies are considered, but support is patchy so that the answer is not full. Good reasoning and logic in parts of the answer with good expression in places. Some 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 types of strategies are considered and well supported. Reasoning is clear and logical with good expression of language. Examples or other evidence to support answers will be extensive. Conclusion as to which type of strategy is more effective will be based on a criterion (eg greater output or environment-friendly). Conclusion can also be based on the complementarity of both types of strategies as both are necessary to deal with different circumstances.

4. (a) Study Fig. 9 (Insert) which is a map of Africa showing trends of drought areas in Africa and Fig. 10 which shows countries in Africa facing a food

shortage problem.

- (i) Using Fig. 9 and Fig.10, describe and account for the location of areas in Africa facing food shortage issues. [4]

- The African countries facing food shortage are found mainly in sub-Saharan Africa, OR
- found between the Tropic of Cancer and Tropic of Capricorn.

1m for each specific detail, e.g.:

- Whole belt of countries just below northern Africa, + examples of countries (Mauritania, Mali, Niger, Chad, Sudan)
- down the eastern coast and then + examples of countries (Somalia, Kenya, Tanzania, Mozambique)
- Stretching across to west coast, just before southern Africa + examples of countries. (Angola, Zambia, Zimbabwe)

2m
Why?

Many of these countries are at risk of drought.

Drought will lead to poor soil and climatic conditions necessary for crop cultivation. Poor harvests lead to food shortages.

Drought will put these places at risk of desertification where relatively dry area of land becomes increasingly arid, typically losing its bodies of water as well as vegetation and wildlife. Hence sources of food become scarce.

2m

- (ii) What are the impacts of food shortages on the people and countries in Africa? [5]

People

- Health – people may suffer from malnutrition in which the body does not get sufficient or balanced of nutrients it needs to maintain healthy tissues and organs. This will lead to death or long-term development problems such as kwashiorkor and rickets.
- Health – People may suffer from starvation which is an extreme form of malnutrition and leading to poor health and death.
- Economic – People are stuck in poverty since children miss out on school days thus reduce educational opportunities, scavenging which leads to ill-health as food may be contaminated.

Countries

- Political – Food shortage may cause social unrest and riots as the people protest or behave violently to show their unhappiness about the situation as they lives are at risk and the government is not managing the problem well.
- Economic – The countries may have little or no progress in terms of development because with the workforce is most often of low productivity due to ill health resulted from food

shortage. Thus, investors will have a lack of confidence in investing their money and resources in these countries, impeding the development of the countries.

- Economic – The government will have a high expenditure on healthcare due to the high demand for health services. This will deny spending on other important aspects of country like education and agriculture which will help the countries to progress.

(b) Study Fig. 11 (Insert 1) which shows the mortality rates of males due to cardiovascular disease (CVD).

(i) Describe the distribution of mortality rates of males due to CVD around the world. [3]

Very High CVD male mortality rates (444- 861 per 100000) occur in regions/countries like Russia, Arab peninsular and parts of Africa (Libya, Sudan, Namibia, Somalia)

High CVD mortality rates (363 -443 per 100000) occur in many countries in Africa, Middle East, Turkey., Indian subcontinent and S.E. Asia.

Lower rates of 120 -238 per 100000 occur in North America (USA, Canada), western S America (Colombia, Ecuador, Peru, Chile), western Europe and Australia

(ii) Suggest how social and economic factors could be reasons for the occurrence of CVD in these countries. [5]

Cardio-vascular disease is a degenerative disease where affected tissues (heart, blood vessels and affected organs) deteriorate over time.

Social factors :

Diet – high consumption of meat, fats and sugars, common in DCs

Lifestyle – low levels of physical activity/sedentary; high levels of stress – typical of DCs 1m

**So it is puzzling as to why high rates of CVD male death rates occur mainly in LDCs and not DCs 1m

Possible reason – As LDCs improve economically and due to globalisation, their diet and lifestyle choices have begun to be similar to DCs. 1m

Economic factors:

Poverty and affluence which influences access to healthcare.

DCs have higher investments in healthcare, with more and better health facilities and services.

Hence, lower CVD male mortality rates occur in DCs. 2m

(c) "The efforts of governments in managing the spread of diseases cannot succeed without the cooperation of individuals and communities."

To what extent do you consider this statement true? Use examples to

support your answer.

[8]

Example of content

Precautionary- measures take before the outbreak of the disease to reduce occurrence.

Describe	Explanation and Example	Successes	Limitation
Vaccination Increases body immunity to certain diseases	Vaccination helps to reduces a person's chance of getting infected and spreading the disease. In 2009, Singapore began providing vaccinations for its population against the H1N1 influenza virus before it emerged in the country. Clinics island-wide were made H1N1-ready	When the outbreak occurred, most of the cases were mild and death rates were low.	Individuals can choose not to take the vaccinations. Vaccinations also took 2 weeks to take working. Infection could take place during these two weeks.
Community Education	The NEA has a five-pronged approach to vector control: 5 steps to Mizzie wipe out. It was launched on 28 April 2013. There is a 'Colour Code Alert System', which indicates the seriousness of the dengue situation through colour-coded banners. The colours indicate the corresponding preventive measures to take.	The WHO cited Singapore as a role model. The number of cases with more serious dengue fever has decreased in recent years since the 2005 dengue fever outbreak.	Most people are unaware or complacent about Aedes mosquitoes breeding at their place of residence. This posed difficulties in preventing the breeding of the mosquitoes. Due to climate change, mosquitoes breed faster at higher temperatures. More people had been infected with Den-1, a new dominant virus. It can spread faster and majority of the population has no immunity against this new virus.

Mitigation Measures- measures taken after the outbreak of the disease. This measures will reduce the impact of the diseases

Describe	Explanation and Example	Successes	Limitation
Control measures	Detecting and isolating infected people in a dedicated hospital. A dedicated private ambulance service was used to transport people suspected to be infected. Potential patients of the diseases was home- quarantined by law Health screening became mandatory at hospitals, schools and other public areas.	Governmental intervention was prompt and open. This reduced the chances of SARS being spread to more of the population.	Some patients displayed symptoms not commonly associated with SARS. Some patients who did not show any signs of SARS until much later. <u>Some individuals deliberately broke quarantine rules;</u> thereby infecting others

Communities can work together to control diseases by:

Introducing possible control strategies

Ground-level outreach to educate, persuade and monitor strategies. People are **more** receptive to advice/info from fellow citizens

Train and assist government depts.

Provide support to those undergoing treatment at community/local level

Conclusion:

Any measure/strategy at controlling or mitigating diseases can only **succeed with cooperation** from individuals.

Pathogens and carriers of diseases are cannot be **eradicated entirely and easily transmitted.**

Communities' efforts in supporting the strategies have a **better chance to succeed through** shared responsibility and efforts.

Level 1: 0-3 marks

- At this level answers will be generalized or with minimal support if any stand were given at all.
- Reasoning rather weak and expression may be unclear.
- A basic answer that has little development.
- There may be no or little attempt at indicating effectiveness of the government measures. This means that only government measures are considered.
- Maximum 3 marks if answers lack examples

Level 2: 4-6 marks

- At this level answers will contain some appropriate detail.
- The content will lack balance and some relevant detail. Government, individual and community efforts are considered but support is patchy so that the answer is not full.

- Assessment may be given but may be general in nature.
- A country will be named in the answer.

Level 3: 7-8 marks

- At this level answers will be comprehensive and supported by sound knowledge.
- There will be assessment made of the role of government, individuals and communities in managing infectious diseases.
- Located examples are necessary.

Insert

Fig.9 and Fig. 10 for Question 4 (a)

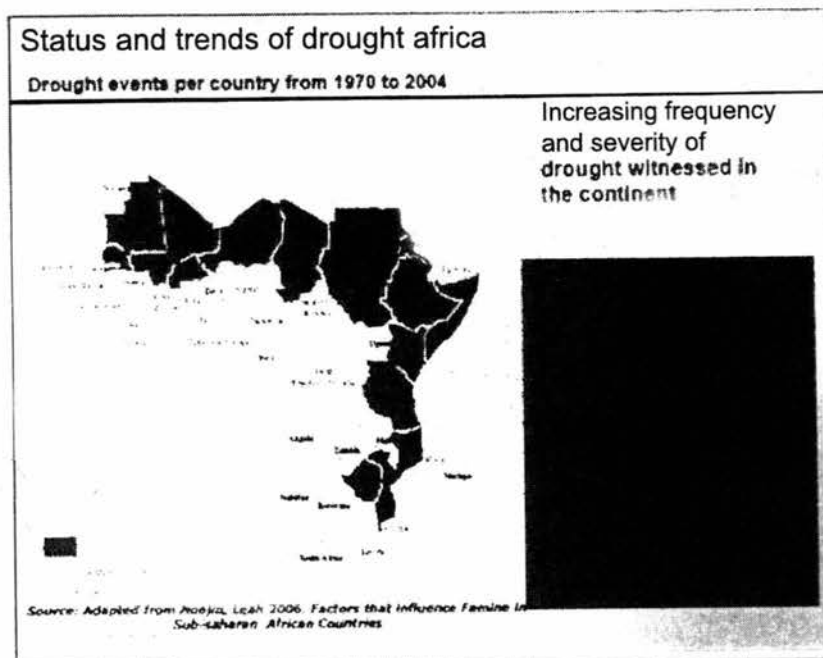


Fig. 9

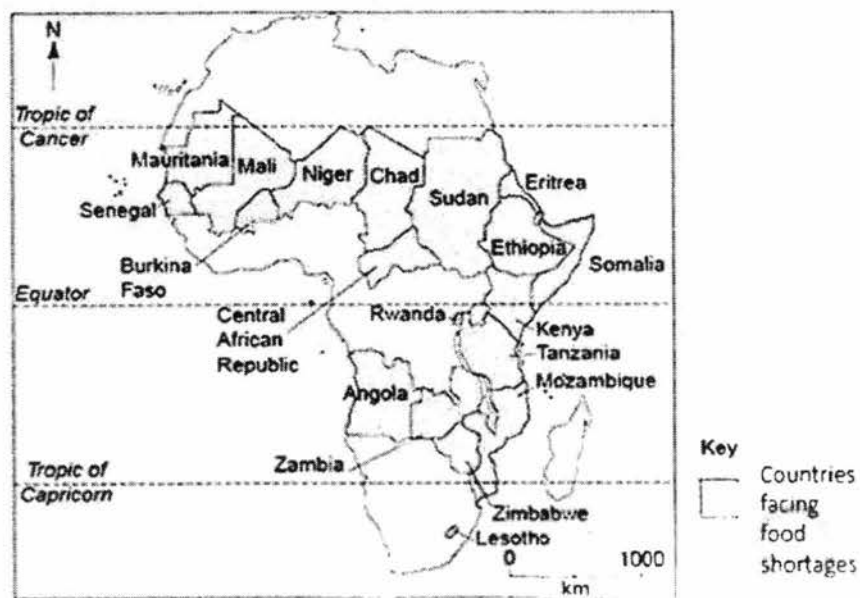
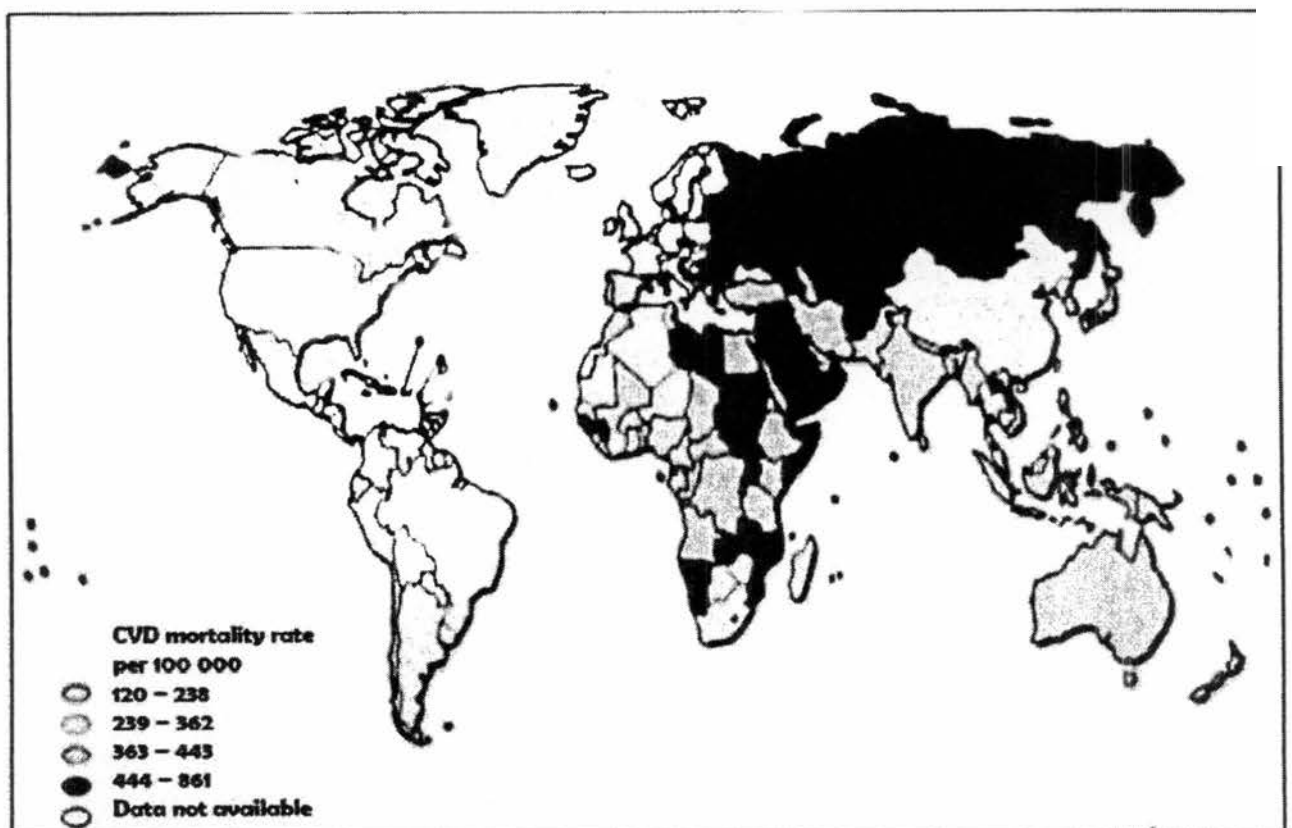


Fig. 10

www.cluva.eu/.../CLUVA_Climate-change-and-vulnerability-of-African-cities

Insert

Fig. 11 for question 4 (b)



Global Atlas on CVD:World Health Organisation