UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

GEOGRAPHY   **0460/41**

Paper 4 Alternative to Coursework   **May/June 2011**

                                                                              1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Calculator
                            Ruler

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE ON ANY BARCODES.

Answer **all** questions.
The Insert contains Figs 1 and 2 for Question 1 and Figs 4 and 6 and Tables 3 and 4 for Question 2.

The Insert is **not** required by the Examiner.
Sketch maps and diagrams should be drawn whenever they serve to illustrate an answer.

The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **14** printed pages, **2** blank pages and **1** Insert.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

1 Students heard that waste water from a factory was polluting the local river. They d
to do some fieldwork to see if this was true. However, before they started their investiga
their teacher warned them about the possible dangers of doing fieldwork in a **polluted** riv
She also suggested some precautions they might take to protect themselves.

   (a) (i) Suggest **two** dangers which their teacher may have warned them about and
   suggest how they might protect themselves whilst working in a polluted river.

   Danger 1 ....

   ....

   Protection ....

   ....

   Danger 2 ....

   ....

   Protection ....

   ....[4]

   (ii) Give **two** ways that the students would be able to check if the river was polluted
   before they began their fieldwork.

   1 ....

   ....

   2 ....

   ....[2]

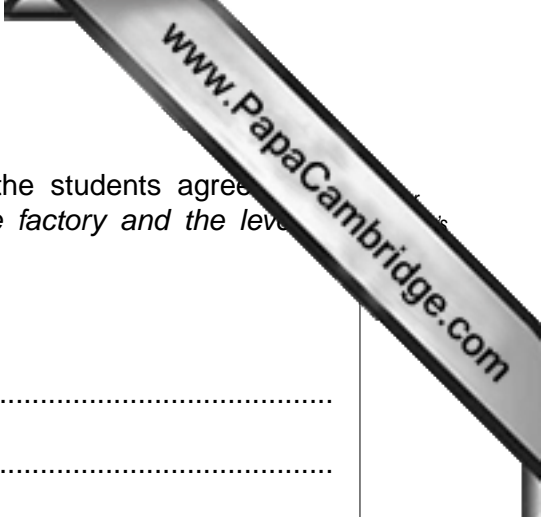   **(b)** The students agreed on two hypotheses to investigate.

   Hypothesis 1: *The river is most polluted near to the factory and the level of
   pollution decreases downstream.*

   Hypothesis 2: *Animal life in the river is affected by water pollution.*

   To measure the level of water pollution the students did some research in the local
   library. They found some secondary data which showed the results of a study into the
   levels of dissolved oxygen and ammonia in the river. The results of the study included
   the following:

   •   Oxygen is essential for animals to live in rivers. Polluted rivers have low
       dissolved oxygen levels.
   •   Ammonia is a chemical which pollutes water.

   A summary of the secondary data is shown in Fig. 1 (Insert).

(i) Having studied the secondary data shown in Fig. 1 the students agree
Hypothesis 1: *The river is most polluted near to the factory and the lev*
pollution decreases downstream.

What evidence on Fig. 1 supports their conclusion?

....

....

....

....[2]

(ii) Suggest why the level of pollution changes downstream from the factory.

....

....

....

....[2]

(c) To investigate **Hypothesis 2:** *Animal life in the river is affected by water pollution*
the students carried out the investigation described in Fig. 2 (Insert). They did the
investigation at five sites along the river; these are shown in Fig. 1.

(i) Why did the students disturb the river bed when carrying out the investigation?

....

....[1]

(ii) Should the students have put the net upstream or downstream of the kick-sampling
site? Explain your decision.

....

....

....

....[2]

(iii) Why did the students need to identify the animals found while sampling at each site?

....

....[1]

(iv) Why did the students do three tests at each site?

....

[1]

(d) Table 1, below, shows the results of the students' fieldwork.
The results are recorded using a tally method.

Table 1

Fieldwork results

Animal species	Unpolluted Stonefly	Mayfly	Caddis fly	Shrimp	Water louse	Leech	Rat-tailed maggot	Bloodworm Very polluted	Average Biotic Index score at the site
Biotic score	10	8	7	6	5	3	3	2	
Site 1	II	II	II		I				55/7 = **7.9**
Site 2						II	I	II	13/5 = **2.6**
Site 3					I	II	II	I	19/6 = **3.2**
Site 4		I	II	I	I	I			
Site 5		II	II	I	II				46/7 = **6.6**

(Header note: "Quality of water" spans across with arrow from "Unpolluted" to "Very polluted")

(i) Calculate the average Biotic Index score for site 4. Put your answer into Table 1.
Show your calculation in the space below. [2]

(ii) Plot the average Biotic Index score for sites 4 and 5 on Fig. 3 below. S............
10.5 km downstream and site 5 is 14 km downstream.
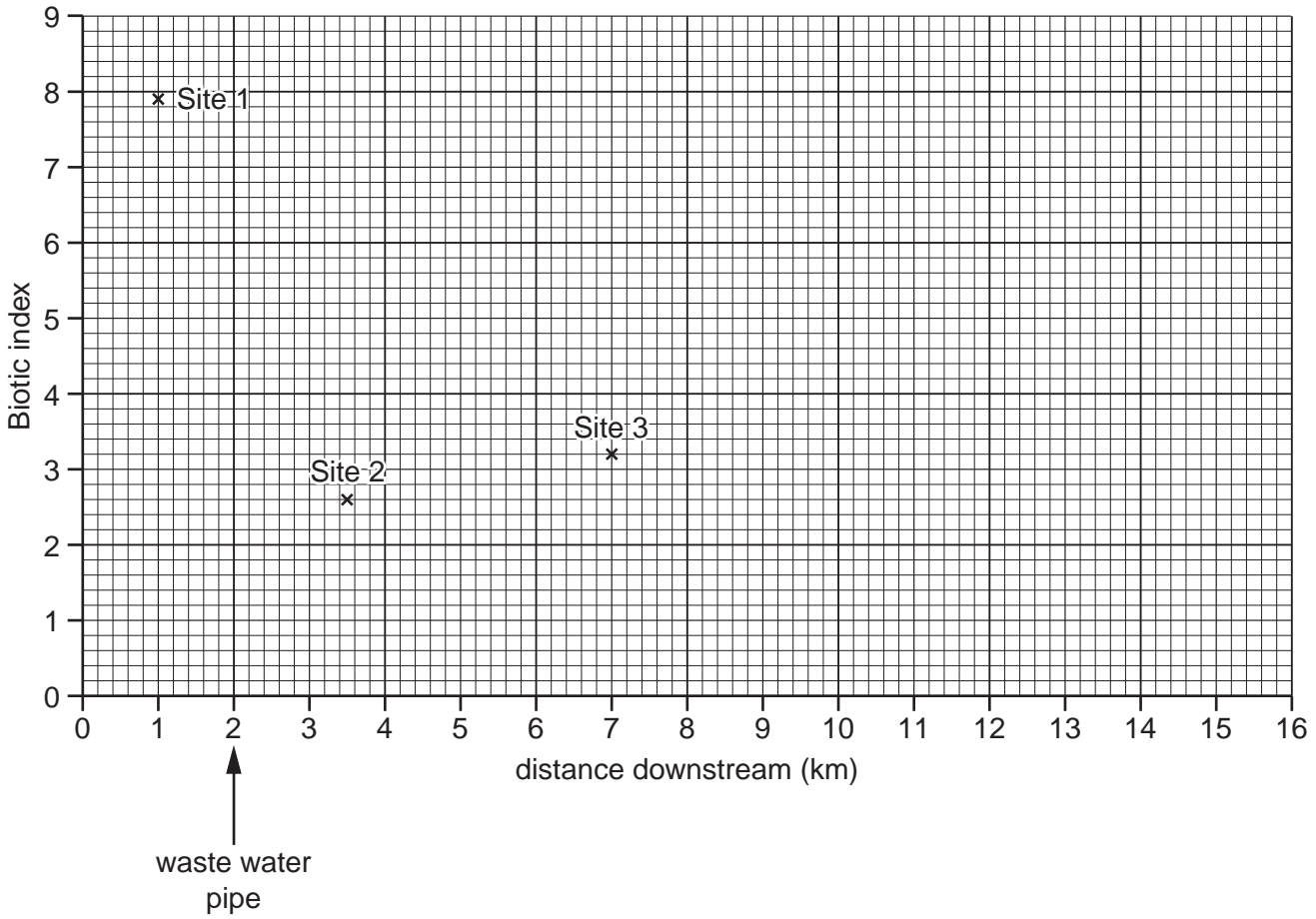
How Biotic Index changes downstream

Fig. 3

(iii) How does the average Biotic Index score change downstream? Support your answer with evidence from Fig. 3.

....

....

....

....

....

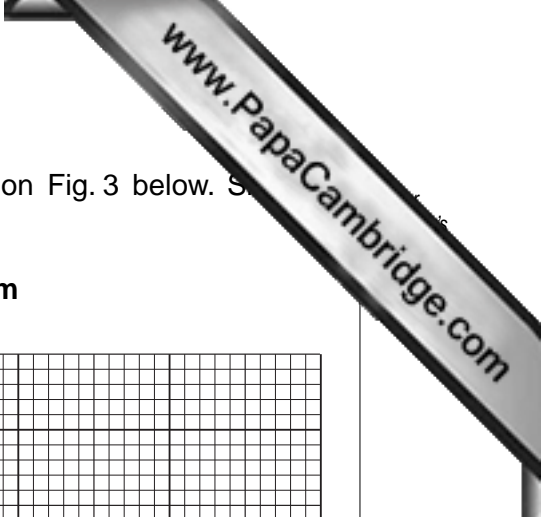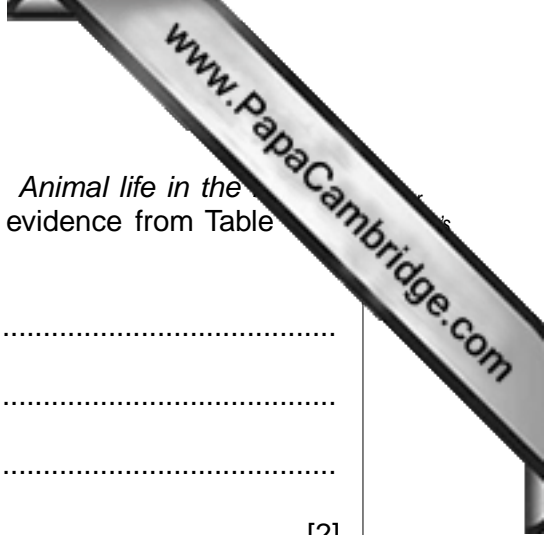...[3]

(iv) The students reached a conclusion that **Hypothesis 2:** *Animal life in the* affected by water pollution is true. Give **two** pieces of evidence from Table support this conclusion.

1 ....

....

2 ....

....[2]

(e) Describe **two** other ways in which a river may be polluted, other than by waste water from a factory.

1 ....

....

2 ....

....[2]

(f) Suggest **one** hypothesis that students might investigate through fieldwork in a river which is **not** polluted. Describe how they would test their hypothesis.

Hypothesis: ....

....

How they would test it: ....

....

....

....

....

....

....[4]

[Total: 30 marks]

2   Students who lived in Thailand were interested in the development of tourism at Chia... a city in the north of the country. They decided to investigate why tourists came to Chiang... 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. 4, (Insert), to investigate Hypothesis 1.

(i) When they showed their questionnaire to the teacher she suggested that they should start the questionnaire by asking:

'Are you a tourist in this city?'

Why do you think the teacher made this suggestion?

....

....

....

....[2]

(ii) Suggest why the students included some physical and human attractions from which tourists could choose.

....

....

....

....[2]

(iii) The answers to Question 1 (*Which continent do you come from?*) are sh___ Table 2 below.

Table 2

Answers to Question 1

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

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

....

....

....

....[2]
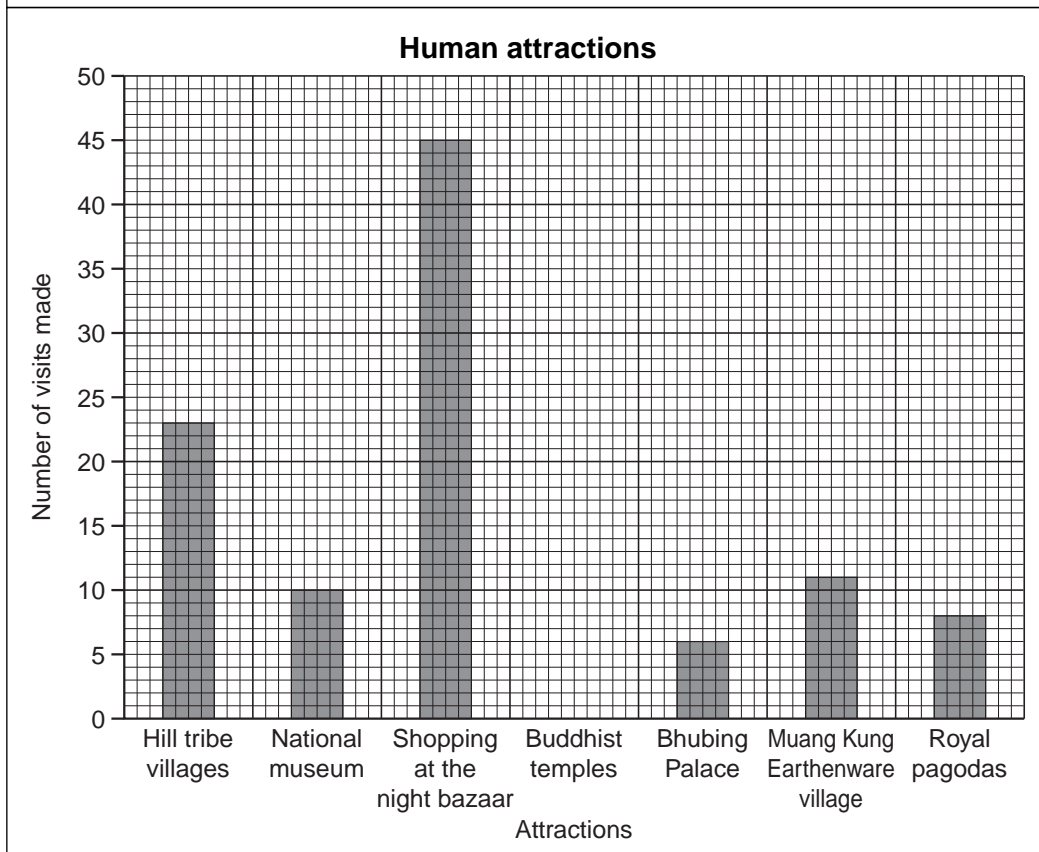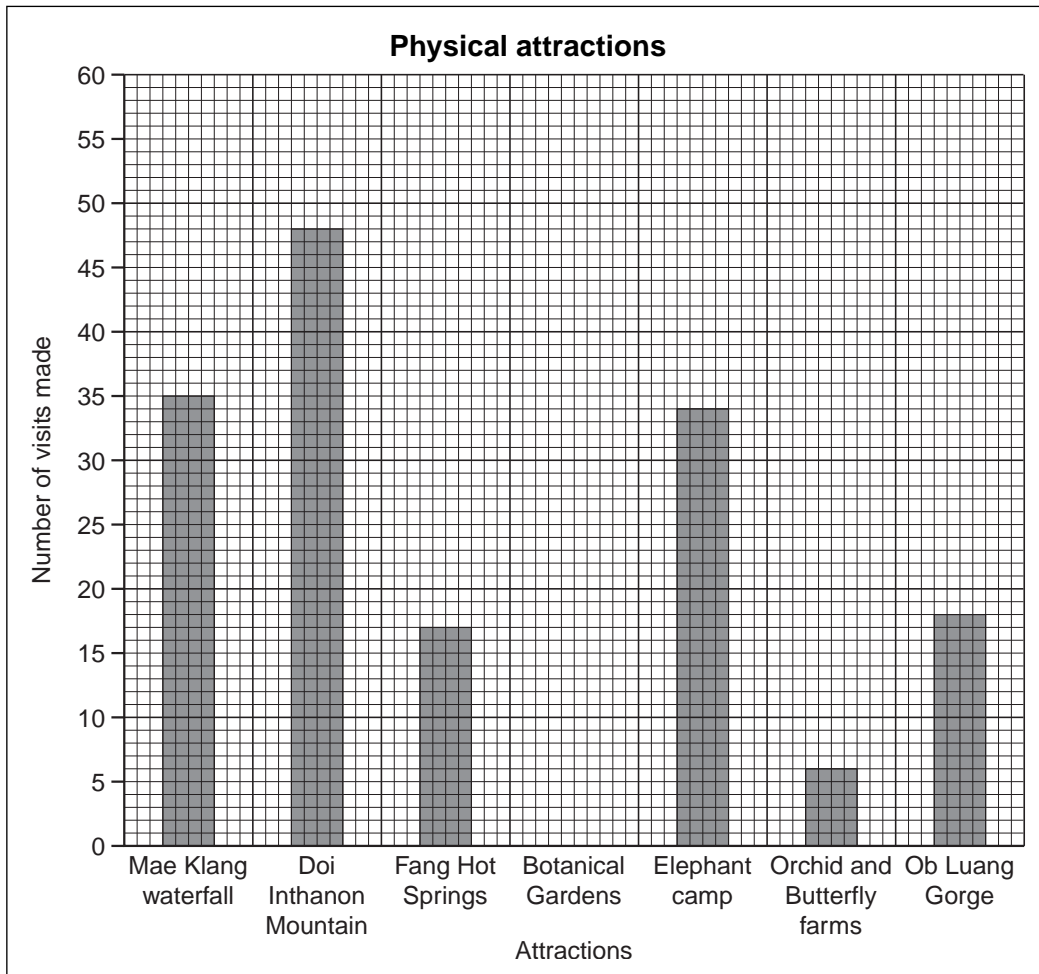
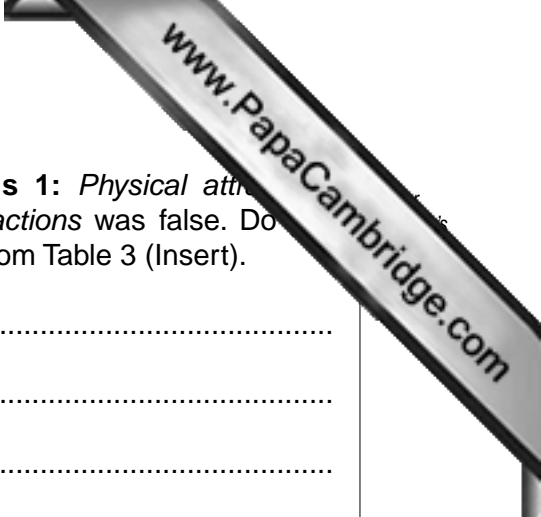**(iv)** The answers to Question 2 (*What are the main physical attractions you are visiting whilst in Chiang Mai?*) and Question 3 (*What are the main human attractions you are visiting whilst in Chiang Mai?*) are shown in Table 3 (Insert).

Use this data to complete the bar graphs in Fig. 5 on page 9 (opposite). Draw the bars to show the number of visits made to the Botanical Gardens and the Buddhist temples. [2]

Tourist attractions

Physical attractions

Number of visits made

Attraction	Visits
Mae Klang waterfall	35
Doi Inthanon Mountain	48
Fang Hot Springs	17
Botanical Gardens	0
Elephant camp	34
Orchid and Butterfly farms	6
Ob Luang Gorge	18

Attractions

Human attractions

Number of visits made

Attraction	Visits
Hill tribe villages	23
National museum	10
Shopping at the night bazaar	45
Buddhist temples	0
Bhubing Palace	6
Muang Kung Earthenware village	11
Royal pagodas	8

Attractions

(v) In the space below draw and label a different type of graph that could be used to show the answers from Question 4 (*Overall which attracted you most to Chiang Mai?*) which are also shown in Table 3 (Insert).

(vi) The students reached the conclusion that **Hypothesis 1:** *Physical att... brought more tourists to Chiang Mai than human attractions* was false. Do ...... agree with them? Support your decision with evidence from Table 3 (Insert).

....

....

....

....

....

....

....

.... [4]

(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. 6 (Insert).

(i) The students used a systematic sampling technique to obtain answers to their questionnaire. Suggest how they might have done this.

....

.... [1]

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

....

....

....

.... [2]

(c) The answers to Question 2 (*What do you think are the main positive impacts of* in *Chiang Mai?*) and Question 3 (*What do you think are the main negative impa tourism in Chiang Mai?*) are shown in Table 4 (Insert).

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

Positive impact: More jobs and income

1st choice   27 × 2 = 54

2nd choice   15 × 1 = 15

Total score   69

(i) Use this formula to work out the total score for air pollution.   [2]

Negative impact: Air Pollution

1st choice

2nd choice

Total score

Using the results calculated by their formula the students drew the graphs, and 7B, below.
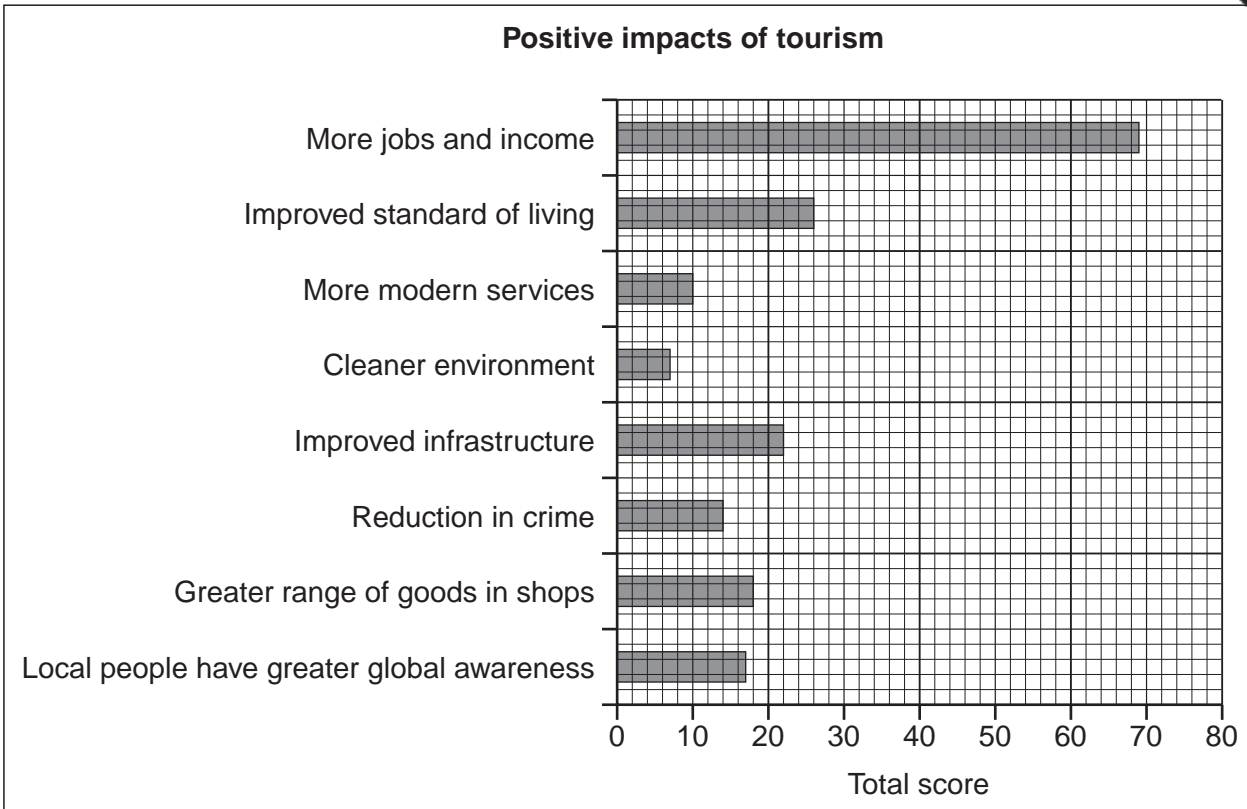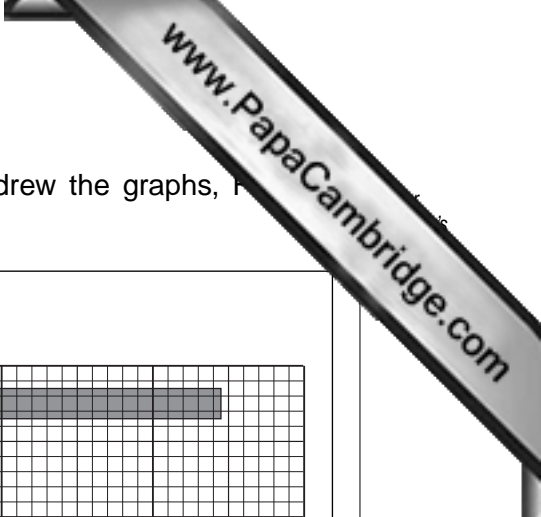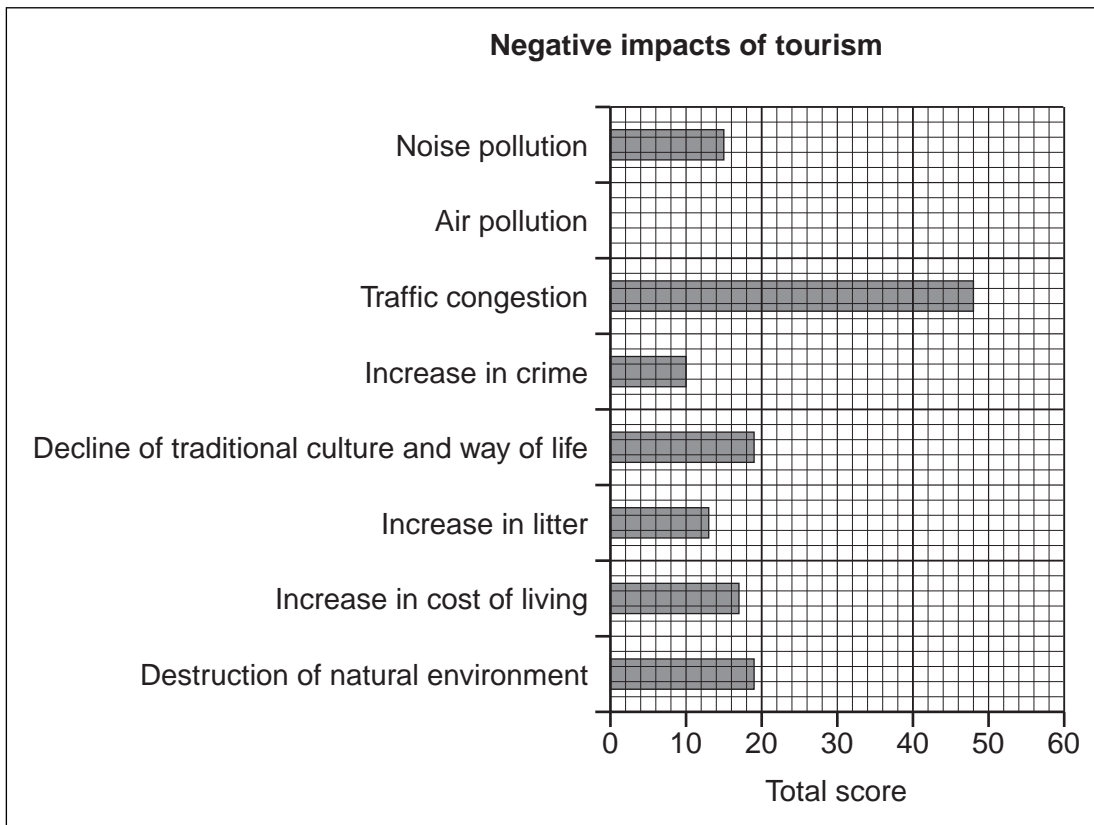
Positive impacts of tourism

Fig. 7A

Negative impacts of tourism

Fig. 7B

(ii) Plot on Fig. 7B the result of your calculation for air pollution in (c)(i). [1]

(iii) What conclusion can you make about **Hypothesis 2:** *Tourism has a positive than negative impact on people who live in Chiang Mai*? Support your decision evidence from Table 4 (Insert) and Figs 7A and 7B.

....

....

....

....

....

....

....

....[4]

(iv) Local people identified air pollution and traffic congestion as the main negative impacts of tourism. Why do you think they identified these?

....

....

....

....[2]

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

....

....

....

....

....

....[3]

[Total: 30 marks]

BLANK PAGE

BLANK PAGE