OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE

GENERAL STUDIES

The Scientific Domain

F732

OCE/25508

Candidates answer on the answer booklet.

OCR supplied materials:
- 8 page answer booklet (sent with general stationery)

Other materials required:
- An approved calculator

Monday 17 January 2011
Morning

Duration: 1 hour

F732

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the spaces provided on the answer booklet. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- If you use additional sheets of paper, fasten the sheets to the answer booklet.
- Answer **all** the questions in Section A and **one** question in Section B.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **60**.
- You are advised to divide your time equally between Sections A and B.
- **The quality of your written communication will be assessed, including clarity of expression, structure of arguments, presentation of ideas, grammar, punctuation and spelling.**
- This document consists of **8** pages. Any blank pages are indicated.

A calculator may be used for this paper

SOURCE INFORMATION FOR QUESTION 1 (a), (b) and (c)

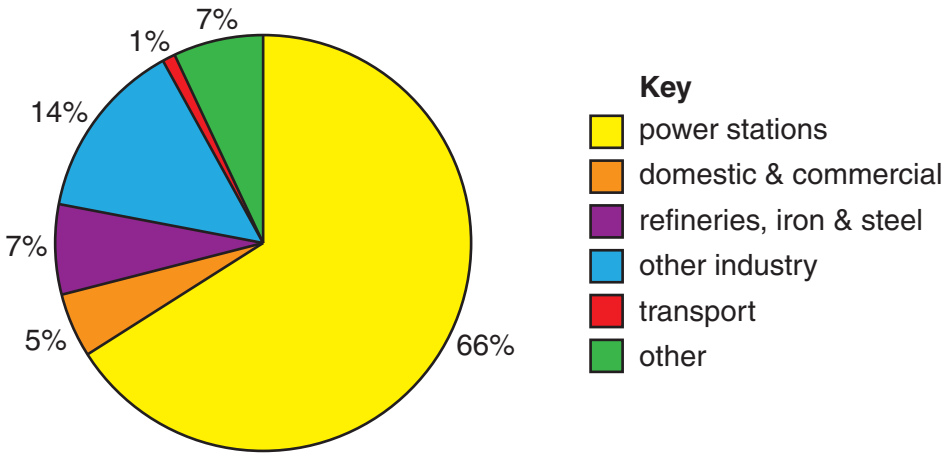

Fig. 1 Sources of Sulphur Dioxide Pollution in the UK

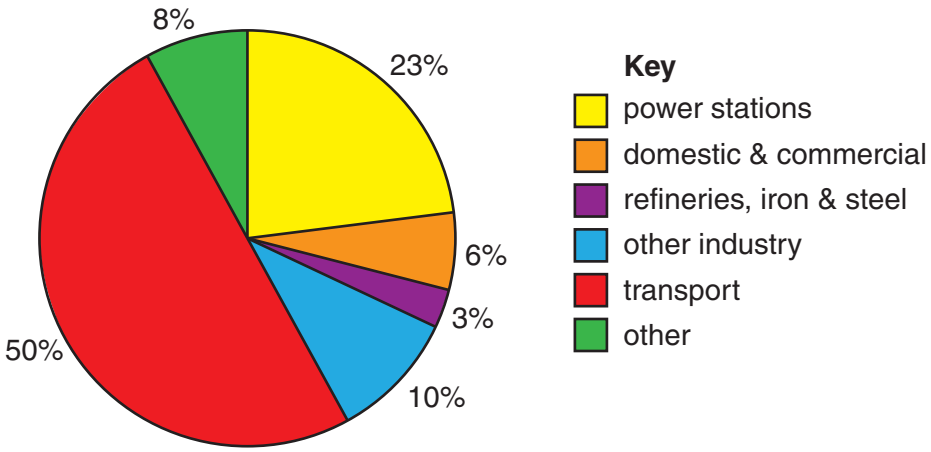

Fig. 2 Sources of Nitrogen Oxides Pollution in the UK

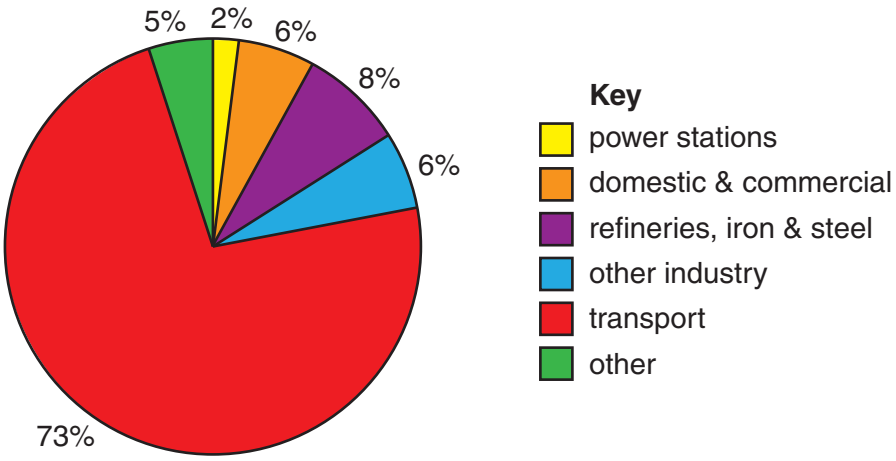

Fig. 3 Sources of Carbon Monoxide Pollution in the UK

Section A

Answer **all** the questions in this section.

1 Three significant components of air pollution in the UK are Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_x) and Carbon Monoxide (CO). Figs 1, 2 and 3 (opposite) show the main sources of these chemicals in air pollution.

(a) Identify the main source of air pollution for **each** of SO_2, NO_x and CO. **[1]**

(b) Using Figs 1, 2 and 3 state whether you agree or disagree with **each** of the following statements and give your reason.

(i) Transport makes the smallest contribution to the SO_2 found in the atmosphere. **[2]**

(ii) Domestic and commercial sources account for twice the NO_x contributed by refineries and iron and steel industries to air pollution. **[2]**

(c) **(i)** 'Adding together the percentages for each of the sources suggests that Transport (124%) is the largest contributor to air pollution.'
Explain the flaws in this statement. **[3]**

(ii) Give **two** disadvantages of using the pie charts shown in Figs 1, 2 and 3 to display this data. **[2]**

(d) Table 1 shows how air pollution emissions have been declining in the UK since 1960.

Table 1

POLLUTANT (annual emissions in thousand tonnes)	**1960**	**2007**
Sulphur dioxide (SO_2)	6370	676
Nitrogen oxides (NO_x)	3125	1595
Carbon monoxide (CO)	12120	2270

Suggest **two** reasons for the changes shown in Table 1.
Outline **two** further ways in which air pollution could be reduced in the future. **[8]**

TURN OVER FOR SECTION A, QUESTION 2

2 *The following article describes one of the ways in which the Royal Horticultural Society marked the bicentenary of the birth of Charles Darwin.*

'Treasure chests' containing tools, seeds, flower presses and plant guides are being distributed to every state primary school in the UK as part of the 'Great Plant Hunt'.

A visiting expert told the children at a London primary school they would be the "Charles Darwins of the 21st century". He handed over the first of the 23,000 chests designed by experts from the Royal Botanical Gardens at Kew. Darwin himself frequently collaborated with his own children on experiments as they explored the landscape around his house.

A director at Kew explained: "We are facing a skills shortage in science in the UK especially in botany. By the time many children reach secondary school, they already feel science is not for them. By 16, the majority are lost to science, seeing it as dull and repetitive. The Great Plant Hunt is setting out to change some of that by offering opportunities to engage with real science and to explore the wonder and beauty of the world of plants."

As part of the project, children will be encouraged to go on 'thinking walks', as Darwin reportedly did when formulating his theories of evolution and natural selection. With no laboratory, he used the grounds around his home to devise experiments and test his ideas.

The flower press in The Great Plant Hunt treasure chest is modelled on the one Darwin used. Among the specimens pupils are encouraged to collect are seeds. Inside the chests, the children will find details about the experiments they can do, magnifiers, a plant identikit and a mini seed bank.

(adapted from www.greatplanthunt.org, RHS 2009)

(a) Read the passage above and state briefly, in your own words, what you understand by the following:

(i) 'the 'Charles Darwins of the 21st century'' (lines 3–4) **[2]**

(ii) 'to go on 'thinking walks'' (line 13). **[2]**

(b) Using your own words, outline **two** reasons given in the article for the 'skills shortage in science' (line 7). **[4]**

(c) Justify **one** way, other than 'The Great Plant Hunt', in which more students might be encouraged to choose to study science at A-level. **[4]**

Section A Total [30]

Section B

Answer **one** question in this section. Answers should be in continuous prose.

3 Why are governments currently so concerned about global warming? Explain **two** actions that governments could take to slow the rate of global warming. **[30]**

4 The American mathematician John Allen Paulos, in his book 'Innumeracy' [2001], concludes that the three mathematical concepts a person needs in daily life are proportion, risk and probability.

Explain, using an example of **each**, how these **three** concepts inform decision making in daily life. Justify **one** further mathematical concept you would add to the list. **[30]**

5 Describe how you would use the hypothesis testing model (Fig. 4) to test the suggestion that females aged 17 are better at examinations than males of the same age. **[30]**

Section B Total [30]

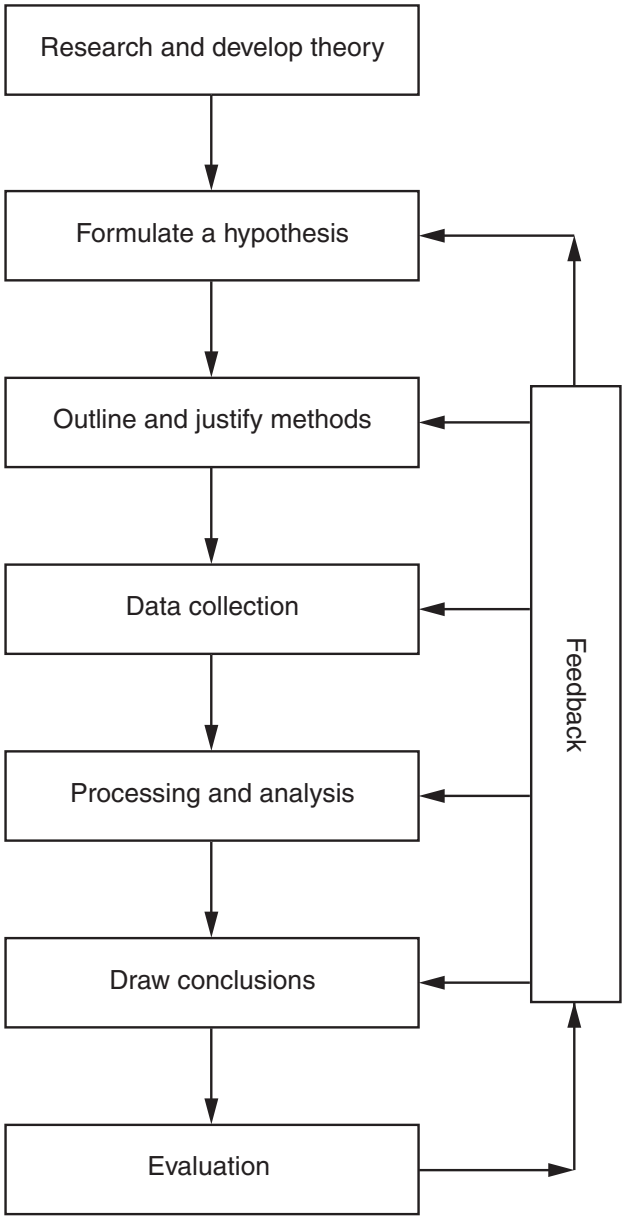

Fig. 4 Hypothesis testing model

BLANK PAGE

BLANK PAGE