OCR
RECOGNISING ACHIEVEMENT

ADVANCED SUBSIDIARY GCE **2962**

GENERAL STUDIES

The Scientific Domain

MONDAY 12 MAY 2008 Afternoon

Time: 1 hour 15 minutes

Additional materials (enclosed): Answer Booklet (8 page)

Additional materials (required):
An approved calculator

CUP/T44248

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the spaces provided on the Answer Booklet.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Answer **all** the questions in Section A and **one** question in Section B.
- Write your answers, in blue or black ink, in the Answer Booklet provided.
- If you use additional sheets of paper, fasten the sheets to the Answer Booklet.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total mark for this paper is **100**.
- You are advised to divide your time equally between Sections A and B.
- **Where an answer requires a piece of extended writing, 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 **7** printed pages and **1** blank page.

[Turn over

Section A

Answer **all** questions in this section.

1 **(a)** Temperatures can be given in degrees Fahrenheit (°F) or degrees Celsius (°C). The formula for converting temperature from °F to °C is:

$$C = \frac{5(F - 32)}{9}$$

(i) Calculate the Celsius equivalent of 77° Fahrenheit. [2]

(ii) Calculate to one decimal place the Fahrenheit equivalent of 14° Celsius. [3]

(iii) Use the conversion formula to show that Fahrenheit and Celsius are of the same value at −40°. [3]

(b) Table 1 shows the average monthly temperatures over a 25 year period for a city in the southern hemisphere.

Table 1

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
temperatures in °C	21.8	22.0	20.6	17.8	14.0	11.9	10.7	11.9	13.9	17.0	18.8	20.9

(i) What is the evidence that the city represented in Table 1 is in the southern hemisphere? [1]

(ii) Suggest why the temperatures are given as averages. [2]

(iii) Sketch a graph that would suitably represent the data in Table 1. [3]

(c) Fig. 1 shows estimated variations in average global temperatures and atmospheric carbon dioxide (CO_2) concentrations from 160,000 years ago to the present day.

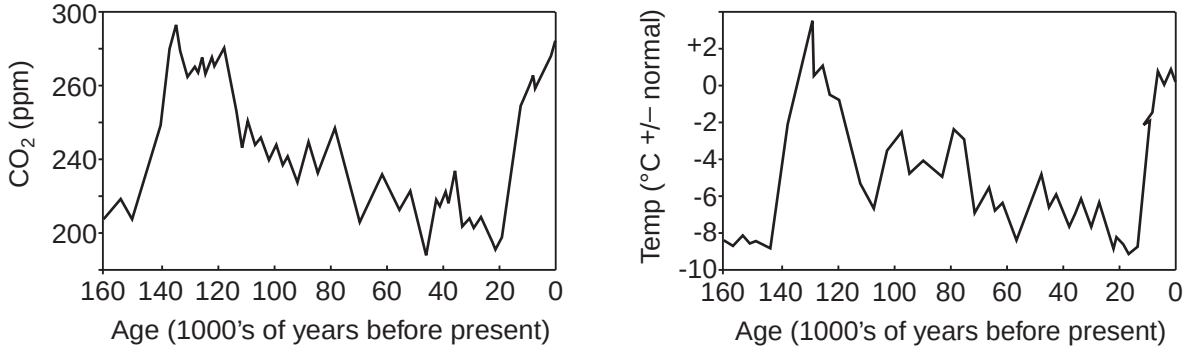

Fig. 1

(i) Describe and suggest reasons for the apparent connection between the two graphs shown in Fig. 1. [4]

(ii) Suggest and justify an alternative graphical method that could be used to assess the strength of the relationship between the two sets of data shown in Fig. 1. [4]

(d) Fig. 2 shows the extent to which in the period 1850 to 2008 annual temperatures in central England have deviated from the bench-mark average temperature shown as 0.0 for 1961.

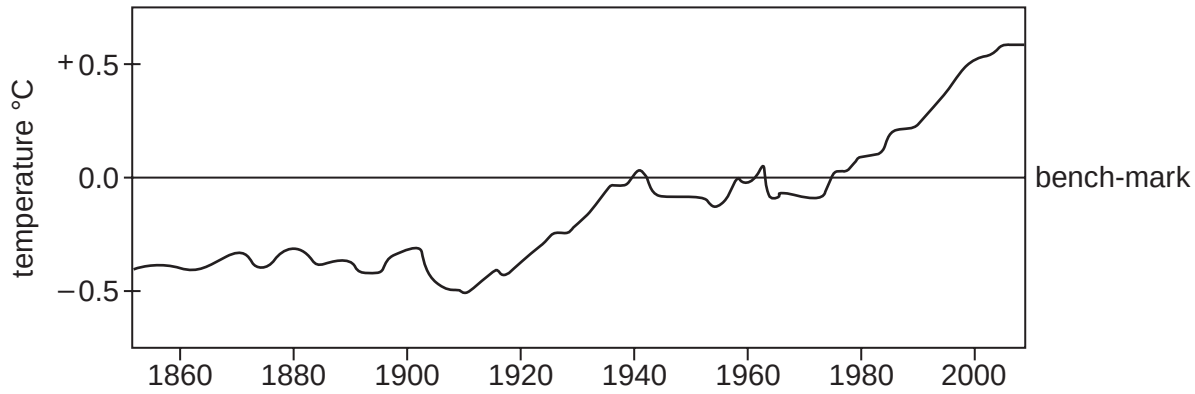

Fig. 2

Describe the trends shown in Fig. 2 and suggest a reason for the increase in temperature between 1970 and 2008. [3]

[25 marks]

[Turn over

2 Read the following extract and answer the questions that follow.

Genetic engineering (GE) is one of the most controversial scientific developments of recent years. There are strong cases for and against genetic engineering. *line 1*

While scientific progress in biotechnology has a great potential to increase understanding of nature and provide new medical tools, it should not be used as justification to turn the environment into a giant genetic experiment by commercial interests. The biodiversity and environmental integrity of the world's food supply is too important to our survival to be put at risk. *line 3* *line 5* *line 6*

These genetically modified organisms (GMO) can spread through nature and interbreed with natural organisms. Their release is 'genetic pollution' and is a major threat. *line 9*

Because of commercial interests, the public is being denied the right to know about GE ingredients in the food chain, and therefore losing the right to avoid them despite the presence of labelling laws.

(Greenpeace)

(a) Briefly outline what you understand by :

(i) genetic engineering (GE) (line 1) [3]

(ii) biotechnology (line 3) [3]

(b) Outline **three** examples of commercial interests in genetic engineering (line 5). [6]

(c) What do you understand by the biodiversity and environmental integrity of the world's food supply (lines 5 and 6)? [4]

(d) Do you agree that genetic pollution is a major threat (line 9)? Justify, including examples from your own experience. [9]

[25 marks]

Total [50] marks

Section B

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

3 **(a)** Fig. 3 is a model of the solar system showing the orbits of the planets around the sun. Outline **three** reasons why with the naked eye, it may be possible to observe a small number of planets in the night sky at the same time. [10]

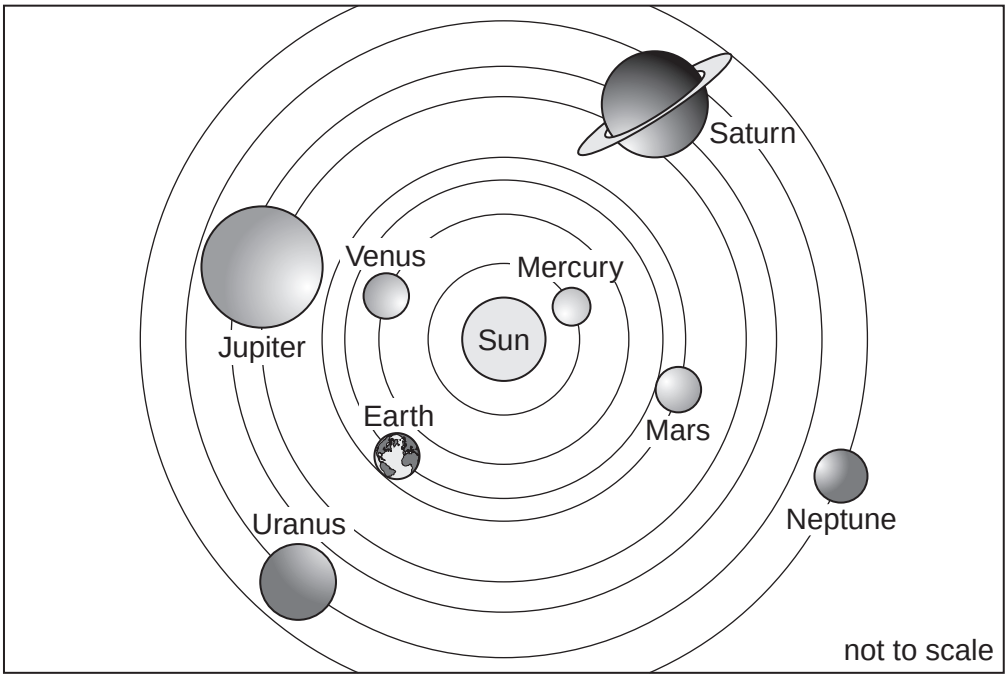

Fig. 3

(b) Describe and explain how technologies used on earth, have benefited from investments in space technology. Assess the benefits to people on earth. [40]

Total [50] marks

[Turn over

4 **(a)** Briefly describe the trends in global energy utilisation between 1970 and 2025 shown in Fig. 4. [10]

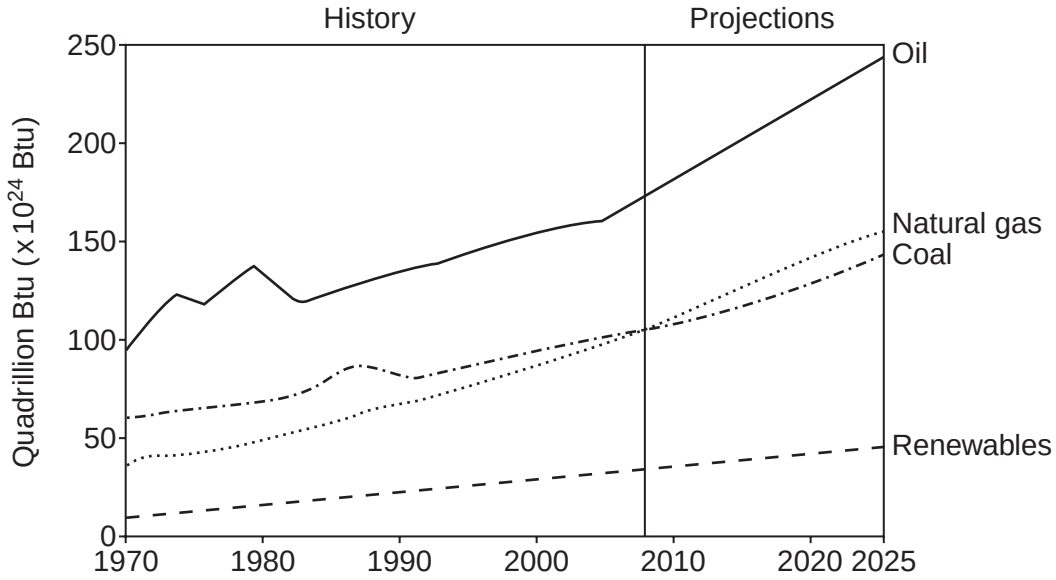

Fig. 4

(b) What is meant by the term *renewable energy*? Assess the arguments for and against the further development of renewable sources of energy. [40]

[50 marks]

5 **(a)** Outline **three** causes of the current concerns about the health and fitness of young people. [10]

(b) Assess the scientific arguments that personal health and fitness is dependent upon diet. [40]

[50 marks]

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