

Thursday 17 January 2013 – Afternoon

AS GCE GENERAL STUDIES

F732/01 The Scientific Domain

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

- Scientific calculator

Duration: 1 hour



| | | | |
|-----------------------|--|----------------------|--|
| Candidate forename | | Candidate surname | |
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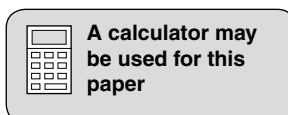
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| Centre number | | | | | | Candidate number | | | | |
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB 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.
- Answer **all** the questions in Section A and **one** question in Section B.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page on page 12 of this booklet. The question number(s) must be clearly shown.
- 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 **12** pages. Any blank pages are indicated.



SECTION A

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

- 1 A survey of 17 cars was carried out. Fig. 1 below shows the fuel consumption plotted against the amounts of carbon dioxide (CO₂) emitted by the cars.

Scatter graph showing the fuel consumption and CO₂ pollution from cars

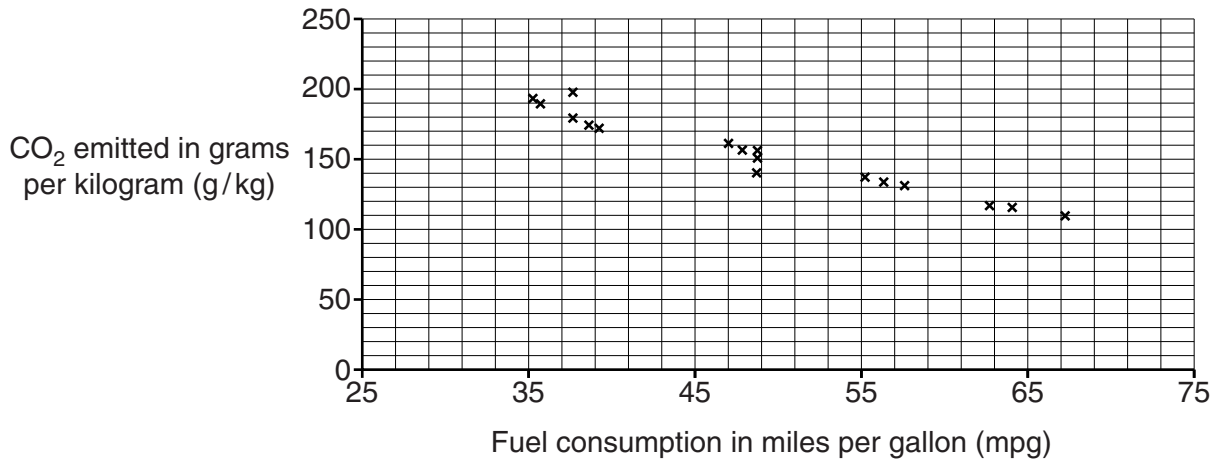


Fig. 1

- (a) Describe the trend shown in Fig. 1.

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.....

.....

..... [2]

(d) The average fuel consumption of the cars is 49 miles per gallon (mpg).

Convert this to kilometres per litre (km/l) assuming that 1 mile per gallon is equal to 0.354 kilometres per litre (km/l).

.....

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.....

..... [2]

- 2 (a) The numbers in the sequence below are called triangular numbers.

1 3 6 10 15 21 28

What pattern do you notice in this sequence?

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..... [2]

- (b) Hexagonal numbers can be calculated using the formula

$$2n^2 - n$$

For example when $n = 3$ the hexagonal number is 15.

Calculate the hexagonal numbers when $n = 4$, $n = 5$ and $n = 6$.

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..... [3]

(c) On the first day at college, 30 students are given new lockers numbered 1 to 30.

- The first student goes to every locker and opens it.
- The second student goes to every 2nd locker and closes it.
- The third student goes to every 3rd locker and opens it if it is closed or closes it if it is open.
- The fourth student goes to every 4th locker and opens it if it is closed or closes it if it is open.

The same procedure continues until all 30 students have completed the process.

What are the numbers of the **five** lockers which are still open at the end, when all 30 students have completed the process? Show your working out clearly.

Please use the space below to show your working out.

The numbers of the **five** lockers which are still open at the end of the process.

.....
..... [9]

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Section B begins on page 8

PLEASE DO NOT WRITE ON THIS PAGE

SECTION B

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

- 3** Many scientists find it difficult to obtain funding for their research.

Choose **one** area of scientific research. Briefly outline **two** advantages and **two** disadvantages of funding for that research being increased. **[30]**

- 4** Water pollution affects rivers, lakes and oceans all over the world.

Briefly outline **two** problems caused by water pollution and, for each problem, suggest **two** ways in which the problem may be reduced in the future. **[30]**

- 5** As the world population reaches seven billion, demand for resources such as energy and food is increasing.

Explain **three** environmental problems that this increase in demand will create. **[30]**

ADDITIONAL ANSWER SPACE

If additional answer space is required, you should use the following lined page. The question number(s) must be clearly shown in the margin.

A large rectangular area with a vertical solid line on the left side and horizontal dotted lines across the rest of the page, providing space for writing answers.



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