



ADVANCED SUBSIDIARY GCE
GENERAL STUDIES
 The Scientific Domain

F732

Candidates answer on the Answer Booklet

OCR Supplied Materials:

- 8 page Answer Booklet

Other Materials Required:

- An approved calculator

Thursday 8 January 2009
Afternoon

Duration: 1 hour



INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the spaces provided on the Answer Booklet.
- Read each question carefully and make sure that 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** 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.
- **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 **8** pages. Any blank pages are indicated.



**A calculator may
 be used for this
 paper**

Section A

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

- 1 The lines of verse that follow describe some aspects of English history around 1700. This was a period when scientists questioned some religious ideas. Read the following lines and answer the questions that follow:

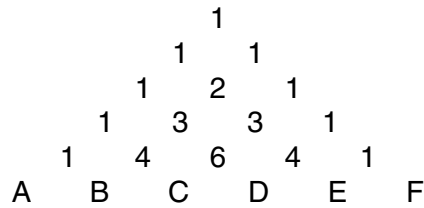
Did we think we were God on high
 To dare to question *How* and *Why*?
 But in that fast-evolving era,
 What we call 'science' came much nearer.
 When Galileo had the face 5
 To say the Earth revolves in space,
 It gave religious folk a fright:
 Did scripture really have it right?
 From then, the human intellect
 Became a scalpel, to dissect 10
 The Handiwork of the Creator;
 And Newton showed, a little later,
 That mathematics could apply
 To regions far beyond the sky.

[from *A Rhyming History of Britain, 55BC to AD1966* by James Muirden published by Constable, 2003, 1-84119-632-0]

- (a) Suggest what the author means by the following phrases:
- (i) To dare to question *How* and *Why*? (line 2) [3]
 - (ii) Became a scalpel, to dissect. (line 10) [3]
 - (iii) That mathematics could apply
 To regions far beyond the sky. (lines 13 and 14) [3]
- (b) Using your own words describe the changing relationship between religion and science as outlined in the lines of verse. [3]

2 This question is about Pascal's triangle and Fibonacci numbers.

The arrangement of numbers shown below is called Pascal's triangle. Each row builds on the previous row.



- (a) Write down the values for A to F in the next row of the triangle. Explain how you achieved your answer. [4]
- (b) Describe **three** patterns to be found on the diagonals of the triangle. [6]
- (c) The following numbers are arranged to form a Fibonacci sequence.

1, 2, 3, 5, 8, 13, 21, 34 ...

The Fibonacci Ratio is found by dividing a number in the series by the one before. Calculate, to two decimal places, the seven Fibonacci Ratios for these numbers. What do you notice about the pattern produced? [8]

Section B

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

- 3 Each decade brings new scientific inventions. Here are inventions introduced in each decade of the last 70 years.

Decade	Invention	Invention	Invention
1940s	Atomic bomb	Aerosol spray	Kidney dialysis machine
1950s	Diet soft drinks	Oral contraceptives	Computer hard disk
1960s	Valium	Soft contact lenses	Computer mouse
1970s	VCR	Hepatitis B vaccine	Floppy disk
1980s	Synthetic skin	Genetically engineered organism	Digital cell phone
1990s	HIV inhibitor (slows the progress of the disease).	Viagra	World wide web
2000s	Artificial heart	Thinking shoes	iPOD

On the basis of the three inventions listed, select the decade that most benefited the health of people living at that time. Justify your choice. **[30]**

- 4 Scientists recognise at least four types of model.

Type A: Hardware models.

They include small models in wood, card and plastic e.g. the plan for a new building

Type B: Teaching models.

They show how something works e.g. using sandpapers to show friction.

Type C: Mathematical models.

They usually involve a formula e.g. predicting population growth

Type D: Statistical models.

They involve collecting data and finding relationships using graphs and statistics. e.g. predicting life expectancy.

Select **one** of these types of model. Show how it can help scientists in their work. Identify and explain **one** of its weaknesses. **[30]**

- 5 'For every complex problem, there is a solution that is simple, neat, and wrong.'
H. L. Mencken (1920)

Describe how this quotation could be applied to an environmental management problem with which you are familiar. Suggest an alternative management plan and explain why you feel it would be more successful. **[30]**



Copyright Acknowledgements:

Q1 Taken from *A Rhyming History of Britain, 55BC to AD1966* by James Muirden published by Constable, 2003, [1-84119-632-0].

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