OCR

Thursday 15 May 2014 – 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	

Centre number						Candidate number				

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.
- Answer **all** the questions in Section A and **one** question in Section B.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined pages on pages 11–12 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.

A calculator may be used for this paper

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SECTION A

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

1 One way of calculating the value of π is by dropping a needle onto a piece of paper which has equally spaced parallel lines drawn across it.

(a) Some students experiment in a laboratory.

(i) The first student drops a needle a number of times (N) onto a piece of lined paper. The number of times the needle lands on a line (n) is counted.

The student finds that the needle lands on a line 53 times in a total of 85 drops.

π can be calculated using the formula:

$$\pi = 2\,\frac{N}{n}$$

Calculate the student's estimate for π to 2 decimal places.

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..... **[2]**

(ii) A second student drops a needle of length (L) 2 cm 85 times onto a piece of paper with lines a distance (D) 2.25 cm apart.

He uses the formula below to estimate how many times (n) the needle should land on a line:

$$n = \frac{170\,L}{\pi\,D}$$

π to be of value 22/7 or 3.142.

Calculate how many times (n) the student expects the needle to land on a line.

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..... **[4]**

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(b) A computer program can be used to simulate the same experiment as the students, in order to calculate π. In Fig. 1 the lines show three sets of results from using the program.

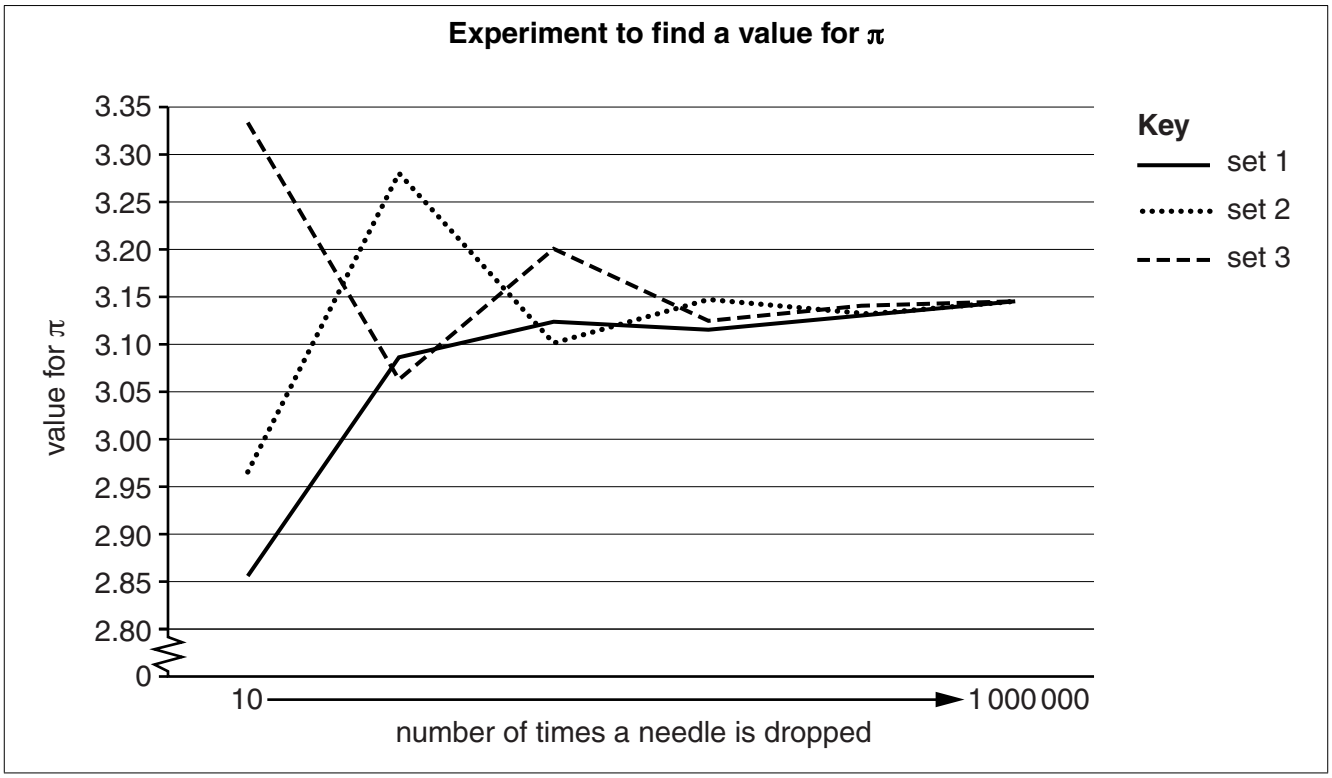

Fig. 1

Describe **two** trends shown by the results in Fig. 1.

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(c) Explain why the use of the computer simulation program might give a more accurate answer for the value of π than a practical experiment carried out in a laboratory.

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

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2 **(a)** A student wants to calculate her future repayments on a student loan.
If she earns an annual salary of more than £21 000, her loan repayments will be 8.5% of the difference between £21 000 and her annual salary.

Calculate her **monthly** loan repayments if her annual salary is £28 500.

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(b) At a graduation ceremony there are 9 lecturers. Each lecturer shakes hands once with every other lecturer. How many handshakes are there altogether?

Show how you have calculated your answer.

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..... **[4]**

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SECTION B

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

3 Assess **three** methods by which the spread of disease may be controlled. **[30]**

4 A student has devised a way of investigating people's reaction time.

Ten people are given the following instructions:

- look at the diagram on the computer screen
- use the mouse button to click 'Stop' when the background colour changes
- when the time for your reaction is displayed, record it.

Outline and assess ways in which the student could improve this investigation to ensure reliable results for a report. **[30]**

5 In order to secure a more sustainable future, mankind must consider:

- cleaner fuels
- power from renewable energy
- forest conservation
- energy efficient products.

Assess which **one** of these options you consider is **most likely** to be effective and which **one** of the options is **least likely** to be effective. Justify your choices. **[30]**

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Write the number of the question answered in the margin.

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ADDITIONAL ANSWER SPACE

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

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