OXFORD CAMBRIDGE AND RSA EXAMINATIONS
AS GCE

F732/01

GENERAL STUDIES

The Scientific Domain

THURSDAY 15 MAY 2014: Afternoon

DURATION: 1 hour
plus your additional time allowance

MODIFIED ENLARGED

Candidate forename		Candidate surname	

Centre number					Candidate number				

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Scientific calculator

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.

Use black ink. HB pencil may be used for graphs and diagrams only.

Answer <u>ALL</u> the questions in Section A and <u>ONE</u> 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 19–21 of this booklet. The question number(s) must be clearly shown.

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 <u>60</u>.

You are advised to divide your time equally between Sections A and B.

<u>THE QUALITY OF YOUR WRITTEN COMMUNICATION WILL BE ASSESSED, INCLUDING CLARITY OF EXPRESSION, STRUCTURE OF ARGUMENTS, PRESENTATION OF IDEAS, GRAMMAR, PUNCTUATION AND SPELLING</u>.

Any blank pages are indicated.

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:

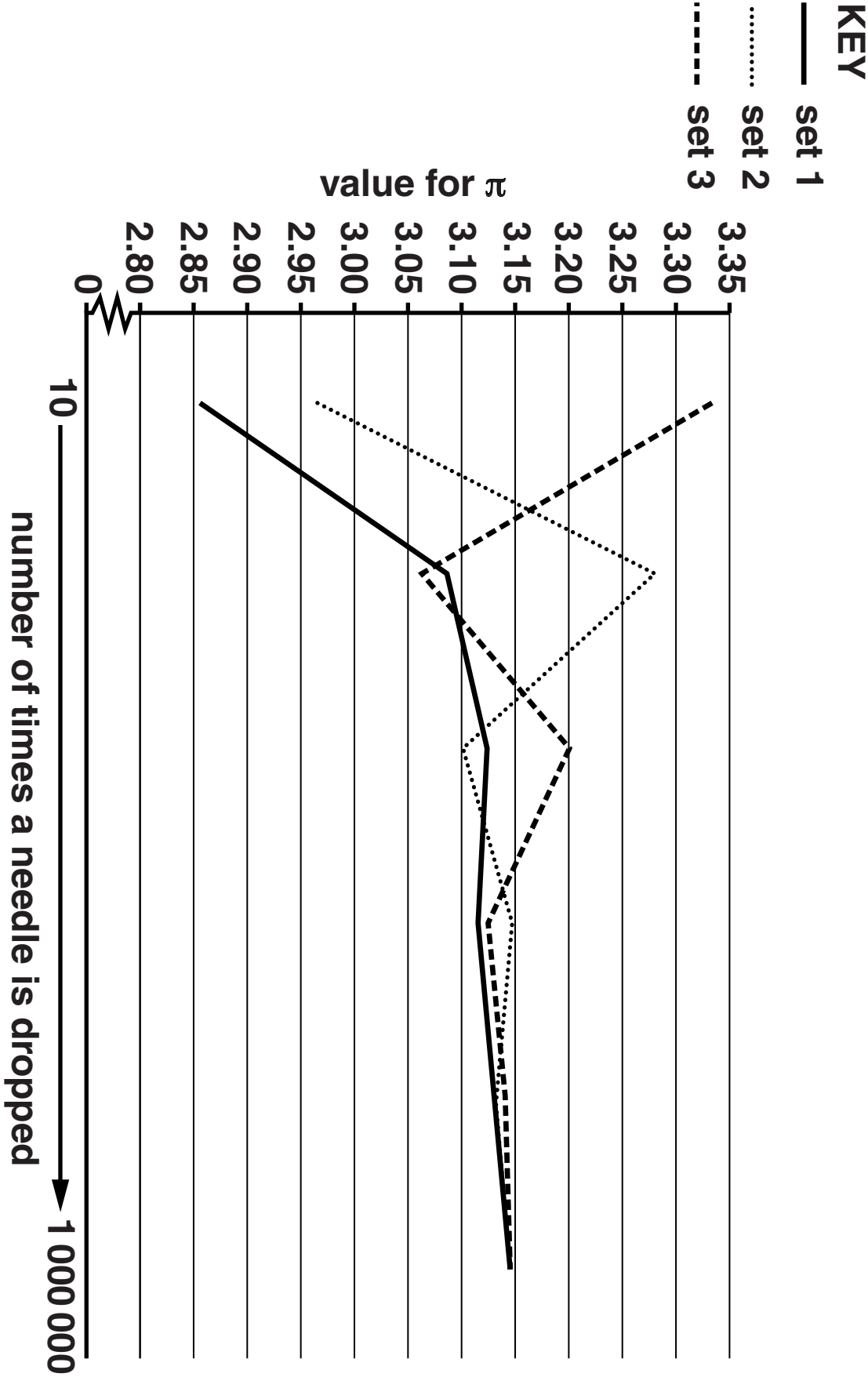$$n = \frac{170 \, L}{\pi \, D}$$

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 (opposite) the lines show three sets of results from using the program.**

Describe TWO trends shown by the results in Fig. 1.

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_____ **[7]**

FIG. 1

EXPERIMENT TO FIND A VALUE FOR π

7

(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]**

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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_____ **[4]**

(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]**

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]

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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