OXFORD CAMBRIDGE AND RSA EXAMINATIONS
ADVANCED SUBSIDIARY GCE
F732
GENERAL STUDIES
The Scientific Domain

THURSDAY 14 MAY 2009: Afternoon
DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the Answer Booklet

<u>**OCR SUPPLIED MATERIALS:**</u>
8 page Answer Booklet

<u>**OTHER MATERIALS REQUIRED:**</u>
An approved calculator

<u>**READ INSTRUCTIONS OVERLEAF**</u>

INSTRUCTIONS TO CANDIDATES

- **Write your name in clearly 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 <u>ALL</u> questions in Section A and <u>ONE</u> question in Section B.**

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.**

- **<u>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.</u>**

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1   **Two ice cream sellers who are in competition arrive at a crowded beach.**

     Fig. 1 opposite shows where the two ice cream sellers set up their stalls on the beach.
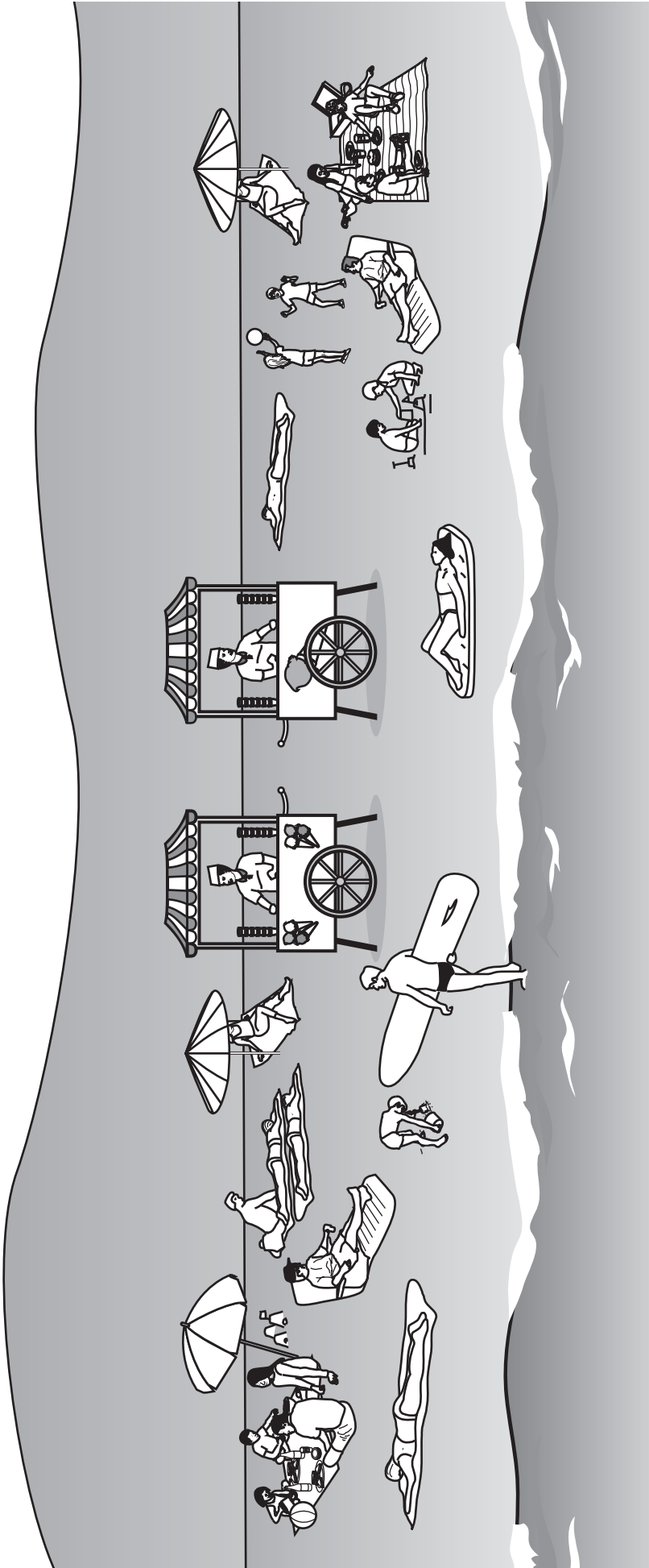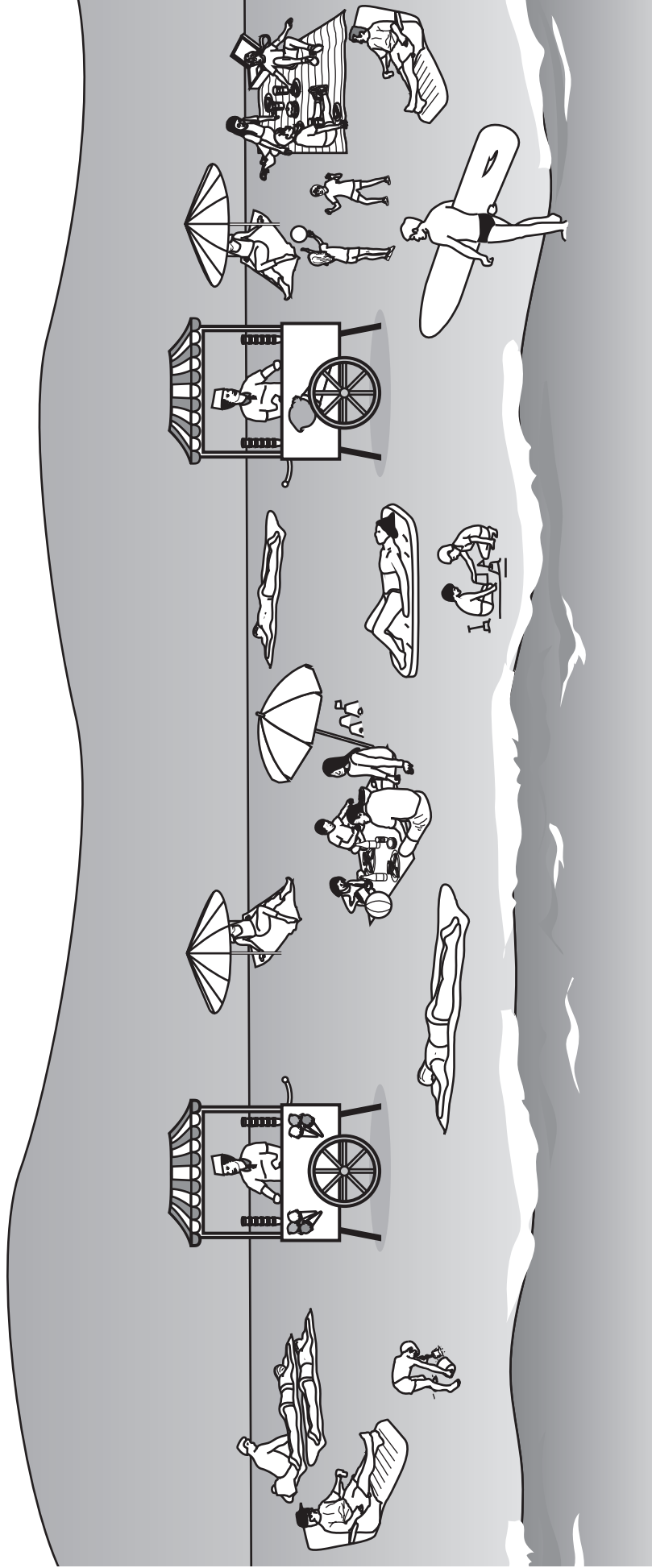
FIG. 1

Fig. 2 shows another possible pair of locations for the sellers on the beach.

FIG. 2

(a) What reason might both ice cream sellers give for selecting their location shown in Fig. 1? [3]

(b) Why would the locations shown in Fig. 2 be better than those in Fig. 1 for customers on the beach?

[3]

(c) How might the thinking behind the location of the two ice cream sellers in Fig. 1 and Fig. 2 be applied more generally to the location of shops?

[6]

2 **(a)** Examine Fig. 3 which shows a number square.

FIG. 3

8	1	6
3	5	7
4	9	2

What do you notice about the pattern of numbers in the square? [3]

(b) A mathematician named Mersenne devised some numbers that are given by the formula $2^n - 1$. For example if n = 2 the Mersenne number would be 3.

(i) Calculate the value of the Mersenne numbers for values of n from 3 to 6. [4]

(ii) What pattern do you discover for the Mersenne numbers for values of n from 2 to 6? [5]

(iii) Prime numbers are those numbers greater than 1 that cannot be divided by any number except themselves and one.

Show that when n=4 and n=6 the Mersenne numbers generated are not prime numbers. [6]

Section A Total [30]

Answer <u>ONE</u> question from this section.
Answers must be in continuous prose.

3   Surgeons regularly perform successful organ transplants but the extent of their work is restricted by a lack of available organs from volunteer donors. Describe <u>TWO</u> arguments for and <u>TWO</u> against the compulsory donation of organs to hospitals. [30]

4   Scientists are able to forecast with some accuracy certain events. Describe <u>ONE</u> type of event where forecasts have proved helpfully accurate and <u>ONE</u> where they have been less accurate. Suggest <u>TWO</u> reasons for the difference in the accuracy of forecasts. [30]

5   'People say that hindsight is 20:20.'

Describe an environmental problem with which you are familiar. Explain how people have attempted to manage the issue. How might hindsight suggest an alternative plan? [30]

Section B Total [30]

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RECOGNISING ACHIEVEMENT