OXFORD CAMBRIDGE AND RSA EXAMINATIONS

A2 GCE

4754/01B

MATHEMATICS (MEI)

Applications of Advanced Mathematics (C4) Paper B: Comprehension

QUESTION PAPER

THURSDAY 13 JUNE 2013: Morning

DURATION: Up to 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:

Inserts (inserted)
Insert for Question 1
MEI Examination Formulae and Tables (MF2)

OTHER MATERIALS REQUIRED:

Scientific or graphical calculator
Rough paper

READ INSTRUCTIONS OVERLEAF

DC (CW) 2459231165 82075/1

INSTRUCTIONS TO CANDIDATES

- **The Inserts will be found in the centre of this document.**
- **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 ALL the questions.**
- **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. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**
- **The Inserts contain the text for use with the questions, a booklet of graphs that go with the text and an insert for answering question 1.**
- **You are permitted to use a scientific or graphical calculator in this paper.**
- **Final answers should be given to a degree of accuracy appropriate to the context.**

INFORMATION FOR CANDIDATES

- **The number of marks is given in brackets [ ] at the end of each question or part question.**
- **You may find it helpful to make notes and to do some calculations as you read the passage.**
- **You are not required to hand in these notes with your Question Paper.**
- **You are advised that an answer may receive NO MARKS unless you show sufficient detail of the working to indicate that a correct method is being used.**
- **The total number of marks for this paper is 18.**
- **Any blank pages are indicated.**

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1 **You are provided with a copy of Fig. 4 and Fig. 4a for this question. You may answer on either diagram.**

R is a place with latitude 45° north and longitude 60° west. Show the position of R on the diagram provided.

M is the sub-solar point. It is on the Greenwich meridian and the declination of the sun is +20°. Show the position of M on the diagram provided. **[2]**

2 **Use Fig. 8 to estimate the difference in the length of daylight between places with latitudes of 30° south and 60° south on the day for which the graph applies.** **[3]**

2	

3 The article says that Fig. 6 shows the terminator in the cases where the sun has declination 10º north, 1º north, 5º south and 15º south.

Fig. 6a is similar to Fig. 6 but shows only curves A and B.
Fig. 6b is similar to Fig. 6 but shows only curves C and D.

Identify which curve (A, B, C or D) relates to which declination. [2]

3	**10° north:**
	1° north:
	5° south:
	15° south:

4 In lines 155 and 157 the article says

"Fig. 8 shows you that at latitude 60° north the terminator passes approximately through time +9 hours and –9 hours so that there are about 18 hours of daylight."

Use Equation (4) to check the accuracy of the figure of 18 hours. [4]

4	

5 (i) Use Equation (3) to calculate the declination of the sun on February 2nd. [3]

(ii) The town of Boston, in Lincolnshire, has latitude 53° north and longitude 0°.

Calculate the time of sunset in Boston on February 2nd.

Give your answer in hours and minutes using the 24-hour clock. [4]

5 (i)	

5 (ii)	

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