

**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**

<b>Candidate forename</b>		<b>Candidate surname</b>	
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<b>Centre number</b>						<b>Candidate number</b>				
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**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**

## **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  $45^\circ$  north and longitude  $60^\circ$  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  $+20^\circ$ . 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  $30^\circ$  south and  $60^\circ$  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  $10^\circ$  north,  $1^\circ$  north,  $5^\circ$  south and  $15^\circ$  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]**

<b>3</b>	<b><math>10^\circ</math> north:</b>
	<b><math>1^\circ</math> north:</b>
	<b><math>5^\circ</math> south:</b>
	<b><math>15^\circ</math> south:</b>

**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]**

<b>4</b>	

- 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  $53^\circ$  north and longitude  $0^\circ$ .**

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

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

<b>5 (i)</b>	



5 (ii)	

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