OCR
RECOGNISING ACHIEVEMENT

Thursday 13 June 2013 – Morning

A2 GCE MATHEMATICS (MEI)

4754/01B Applications of Advanced Mathematics (C4) Paper B: Comprehension

QUESTION PAPER

Candidates answer on the Question Paper.

OCR supplied materials:
- Insert (inserted)
- MEI Examination Formulae and Tables (MF2)

Other materials required:
- Scientific or graphical calculator
- Rough paper

Duration: Up to 1 hour

* 4 7 5 4 0 1 B *

* 4 7 1 5 7 0 0 6 1 3 *

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- The Insert will be found in the centre of this document.
- 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.
- 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).
- Do **not** write in the bar codes.
- The Insert contains the text for use with the questions.
- 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**.
- This document consists of **8** pages. Any blank pages are indicated.

1 The diagram is a copy of Fig. 4.

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

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. **[2]**

1

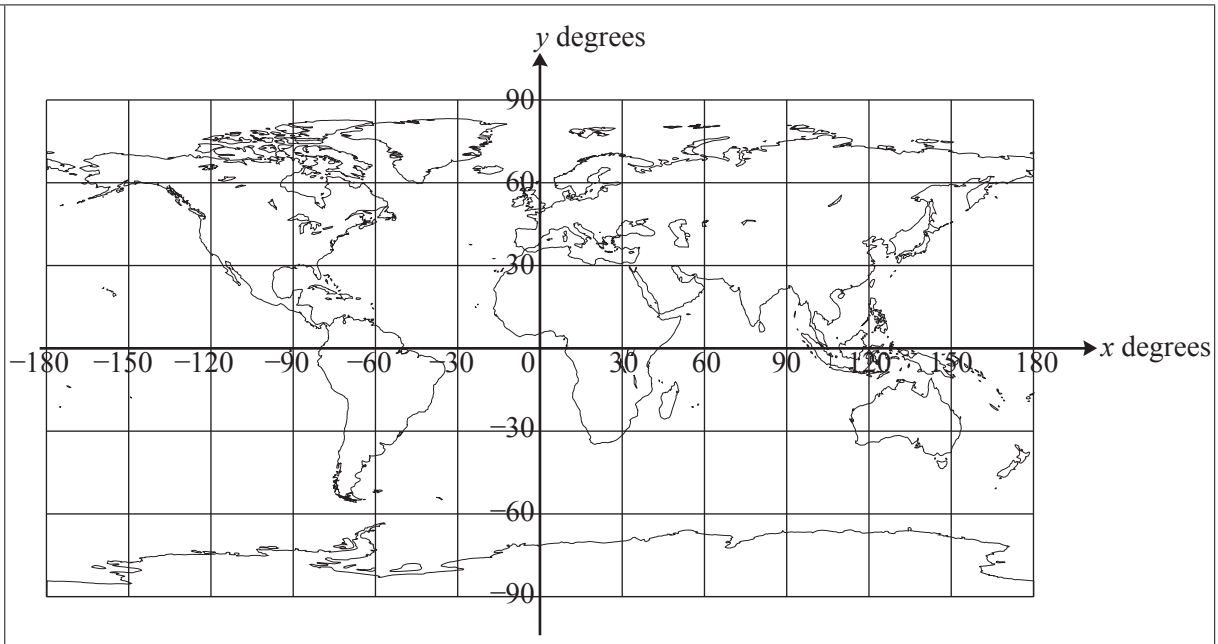

Fig. 4

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 graph is a copy of Fig. 6.

The article says that it shows the terminator in the cases where the sun has declination 10° north, 1° north, 5° south and 15° south.

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

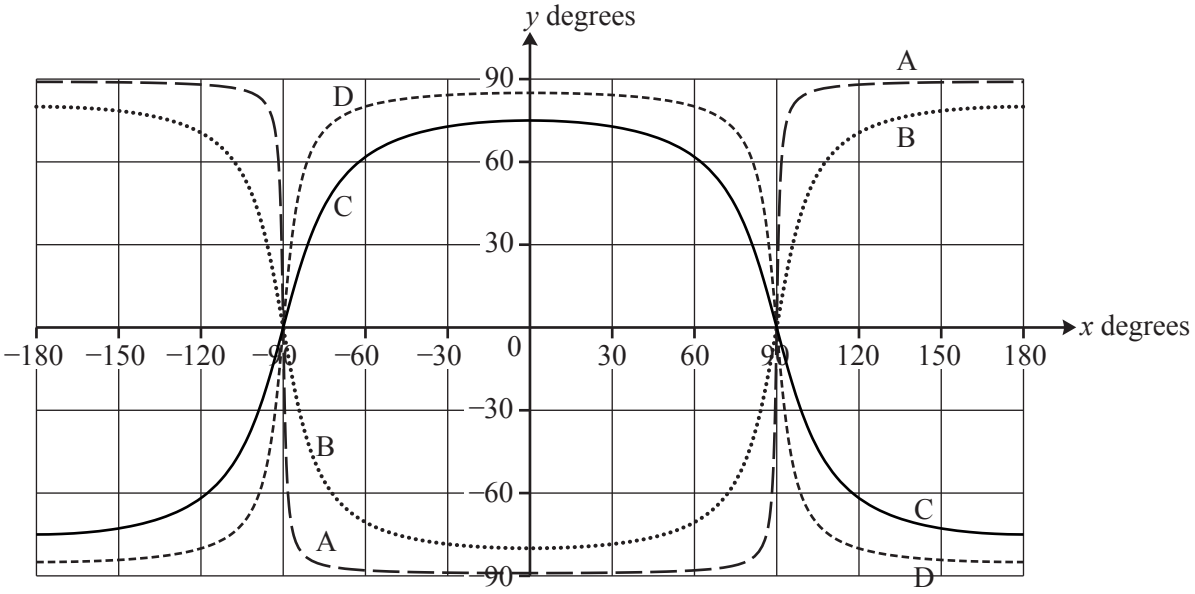

Fig. 6

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

4 In lines 94 and 95 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)	

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

PLEASE DO NOT WRITE ON THIS PAGE