Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						7	3	6	2	/	0	1	Signature	

Paper Reference(s)

7362/01

Examiner's use only

Team Leader's use only

London Examinations GCE

Pure Mathematics

Alternative Ordinary Level

Paper 1

Monday 14 May 2007 – Afternoon

Time: 2 hours

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total	

Materials required for examination
Nil

Items included with question papers
Nil

Candidates are expected to have an electronic calculator when answering this paper.

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
Check that you have the correct question paper.
You must write your answer for each question in the space following the question.
If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

Full marks may be obtained for answers to ALL questions.
The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 10 questions in this question paper. The total mark for this paper is 100.
There are 28 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

Write your answers neatly and legibly.

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1. The region enclosed by the curve with equation $y^2 = 16x$, the x-axis and the lines $x = 2$ and $x = 4$ is rotated through 360° about the x-axis. Find, in terms of π, the volume of the solid generated.

(4)

Q1

(Total 4 marks)

Leave blank

2. A particle P moves in a straight line. At time t seconds, the displacement, s metres, of P from a fixed point O of the line is given by $s = 2t\cos t + t^2$. Find, in m/s to 3 significant figures, the velocity of P when $t = 3$.

(5)

Q2

(Total 5 marks)

Leave blank

3. A curve has equation $y = \dfrac{x-4}{5-x}, \quad x \neq 5.$

(a) Write down an equation of the asymptote to the curve which is parallel to

(i) the x-axis,

(ii) the y-axis.

(2)

(b) Sketch the curve, showing clearly the asymptotes and the coordinates of the points at which the curve crosses the coordinate axis.

(5)

Question 3 continued

Leave blank

Q3

(Total 7 marks)

Leave blank

4. The point A has coordinates (3, 2). The line l has gradient $\frac{7}{24}$ and passes through A.

(a) Find an equation, with integer coefficients, for l.

(3)

The point B, with coordinates $(b, 9)$, lies on l.

(b) Find the value of b.

(2)

(c) Calculate the length of AB.

(3)

Leave blank

Question 4 continued

(Total 8 marks)

Q4

Leave blank

5. (a) Complete the table for $y = e^{\frac{1}{2}x} - \frac{1}{2}x$, giving your values of y to 3 significant figures, where appropriate.

x	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y		1.03		1.37	1.72		2.98		5.39

(2)

(b) Using a scale of 4 cm to 1 unit on both axes, draw the graph of $y = e^{\frac{1}{2}x} - \frac{1}{2}x$ for $0 \leqslant x \leqslant 4$.

(2)

(c) Use your graph to solve, to 2 significant figures,

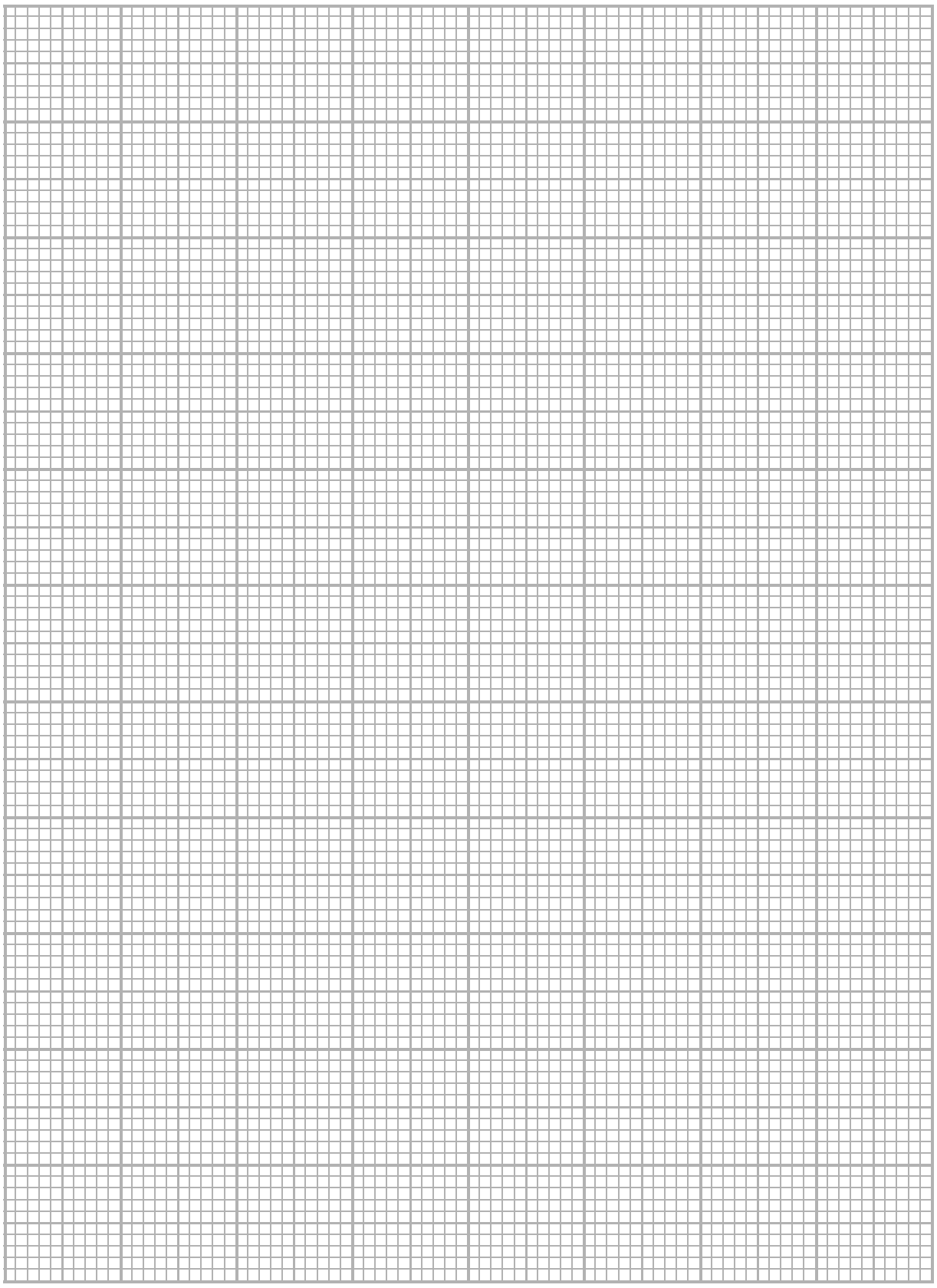
(i) $2e^{\frac{1}{2}x} = x + 3$,

(ii) $x = 2\ln(2 + \frac{1}{2}x)$.

(5)

Leave blank

Question 5 continued



Q5

(Total 9 marks)

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6. (a) Expand $(1+5x)^{\frac{1}{5}}$ in ascending powers of x up to and including the term in x^4, simplifying each term as far as possible.

(3)

(b) Show that $(1+\frac{5}{32})^{\frac{1}{5}} = \frac{1}{2}\sqrt[5]{37}$.

(2)

(c) Hence obtain an approximation, to 6 significant figures, for $\sqrt[5]{37}$.

(2)

(d) Calculate the percentage error, to one significant figure, in the approximation obtained in part (c).

(3)

Leave blank

Question 6 continued

(Total 10 marks)

Q6

Leave blank

7. Solve, to 3 significant figures, for $0 \leqslant \theta \leqslant \pi$,

(a) $(3 \cos \theta + 1)(\sin \theta + 3) = 0$,

(2)

(b) $\tan(2\theta + \frac{\pi}{6}) = 3$,

(4)

(c) $5 \sin^2 \theta - 8 \cos \theta = 1$.

(5)

Leave blank

Question 7 continued

(Total 11 marks)

Q7

Leave blank

8. The 15th term of an arithmetic series is 46. The sum of the first 20 terms is 650. Find

(a) the common difference of the series,

(4)

(b) the first term of the series,

(2)

(c) the least number of terms for which the sum of the series is greater than 1000.

(4)

Given that the series has 40 terms,

(d) find the sum of the last 10 terms of the series.

(3)

Question 8 continued

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Question 8 continued

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Question 8 continued

(Total 13 marks)

Q8

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9. **Figure 1**

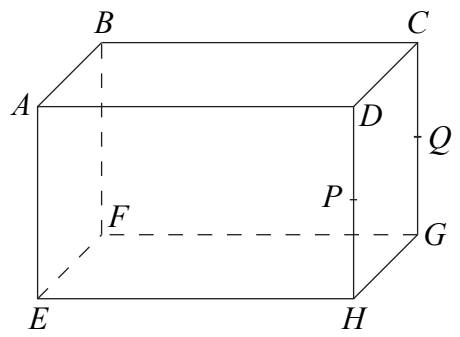

Figure 1 shows a cuboid with a rectangular top $ABCD$.

$AB = 5$ cm, $AD = 8$ cm and $AE = 4$ cm.

The mid-point of DH is P and the mid-point of CG is Q.

(a) Find, to 3 significant figures, the length of AG.

(2)

Calculate, in degrees to one decimal place, the **acute** angle

(b) between AG and the plane $EFGH$,

(3)

(c) between the plane $ABQP$ and the plane $EFQP$,

(3)

(d) between the plane BCH and the plane $EFGH$,

(3)

(e) between AG and CE.

(4)

Question 9 continued

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Question 9 continued

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Question 9 continued

(Total 15 marks)

Q9

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10. **Figure 2**

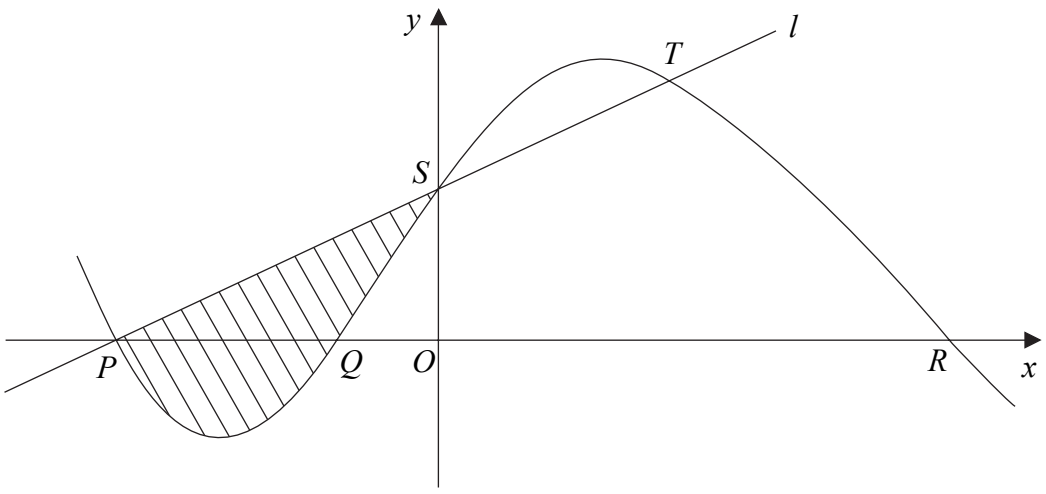

Figure 2 shows the curve with equation $y = k + 7x - x^3$, where k is a constant. The curve crosses the x-axis at the points P, Q and R. Given that R has coordinates (3, 0), find

(a) the value of k,

(2)

(b) the coordinates of P and the coordinates of Q.

(3)

The curve crosses the y-axis at the point S. The line l passes through P and S.

(c) Find an equation for l.

(3)

The line l meets the curve again at the point T.

(d) Find the coordinates of T.

(3)

(e) Calculate the area of the region shown shaded in Figure 2.

(7)

Question 10 continued

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Question 10 continued

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Question 10 continued

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(Total 18 marks)

Q10

TOTAL FOR PAPER: 100 MARKS

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