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| Surname | | | | | | Other Names | | | | | |
| Centre Number | | | | | | Candidate Number | | | | | |
| Candidate Signature | | | | | | | | | | | |

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General Certificate of Secondary Education
November 2006



MATHEMATICS (MODULAR) (SPECIFICATION B)
Module 3 Higher Tier Section A

33003/HA

H

Monday 13 November 2006 9.00 am to 9.40 am

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| <p>For this paper you must have:</p> <ul style="list-style-type: none"> • a calculator • mathematical instruments • a treasury tag | |
|--|--|

| For Examiner's Use | | | |
|---------------------|------|-----------|------|
| Section A | | Section B | |
| Pages | Mark | Pages | Mark |
| 2–3 | | 2–3 | |
| 4–5 | | 4–5 | |
| | | 6–7 | |
| Total Section A | | | |
| Total Section B | | | |
| TOTAL | | | |
| Examiner's Initials | | | |

Time allowed for Section A: 40 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Use a calculator where appropriate.
- Do all rough work in this book.
- This paper is divided into two sections: Section A and Section B.
- After the 40 minutes allowed for Section A, you must put your calculator on the floor under your seat. You will then be given Section B.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section A is 32.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

- 1 A school raises £660 from a sponsored walk.

The £660 was raised by teachers, parents and pupils in the ratio 2:3:7
The pupils raised the largest amount of money.

How much money did the pupils raise?

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Answer £ (3 marks)

- 2 Use your calculator to work out

- (a) the reciprocal of 0.8

Answer (1 mark)

- (b) $\sqrt{6.4^2 + 3.18^3}$

- (i) Write down the full calculator display.

Answer (1 mark)

- (ii) Write your answer to 2 significant figures.

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Answer (1 mark)

- 3 (a) In a sale the price of a digital radio decreases from £75 to £66.

Work out the percentage decrease in price.

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Answer % (3 marks)

- (b) In a sale the price of a CD player decreases by 60%.
 The sale price is £18.60

Work out the price before the sale.

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Answer £ (3 marks)

- 4 (a) Write 0.35 in standard form.

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Answer (1 mark)

- (b) When two numbers are multiplied together the answer is 6.4×10^{15}
 One of the numbers is 8×10^9

Work out the other number.
 Give your answer in standard form.

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Answer (3 marks)

5 y is inversely proportional to the square of x .

When $y = 50, x = 2$

(a) Find an equation connecting y and x .

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Answer (3 marks)

(b) Work out the value of x when $y = 32$

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Answer $x =$ (3 marks)

6 p is a positive integer greater than 1.

Explain clearly why $p^3 - p^2$ is always even.

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(2 marks)

- 7 On a day in November 45% of the pupils at a school have flu.
Of the pupils who have flu, 80% are absent from school.
6% of the pupils who do not have flu are absent from school for other reasons.

Work out the percentage of the pupils at the school who are absent on this day.
You **must** show your working.

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Answer % (4 marks)

- 8 Simplify fully $(2\sqrt{50} - 3\sqrt{8})^2$

You **must** show your working.

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Answer (4 marks)

END OF SECTION A

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| Centre Number | | Candidate Number | |
| Candidate Signature | | | |

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General Certificate of Secondary Education
November 2006



MATHEMATICS (MODULAR) (SPECIFICATION B)
Module 3 Higher Tier Section B

33003/HB

H

Monday 13 November 2006 9.45 am to 10.25 am

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|---|--|
| <p>For this paper you must have:</p> <ul style="list-style-type: none"> mathematical instruments <p>You must not use a calculator.</p> | |
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Time allowed for Section B: 40 minutes

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book.
- You may **not** use your calculator in Section B. Your calculator must remain on the floor under your seat.
- When you have answered Section B you may work again on Section A but you may **not** use your calculator. It must remain on the floor under your seat.
- At the end of the examination tag Section A and Section B together with Section A on top.

Information

- The maximum mark for Section B is 32.
- The marks for questions are shown in brackets.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

- 9 Find an approximate value of $\frac{7.93 \times 503}{0.486}$

You **must** show your working.

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Answer (3 marks)

- 10 When written as the product of prime factors $225 = 3^2 \times 5^2$

- (a) Write 150 as the product of prime factors.
Give your answer in index form.

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Answer (3 marks)

- (b) Work out the highest common factor (HCF) of 225 and 150.

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Answer (2 marks)

11 The areas of some African countries are shown.

| Country | Area (km ²) |
|--------------|-------------------------|
| Nigeria | 9.24×10^5 |
| South Africa | 1.22×10^6 |
| The Gambia | 11 300 |
| Morocco | 4.47×10^5 |
| Cameroon | 475 000 |

(a) Which country has the greatest area?

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Answer (1 mark)

(b) Work out the difference in area between Morocco and The Gambia.

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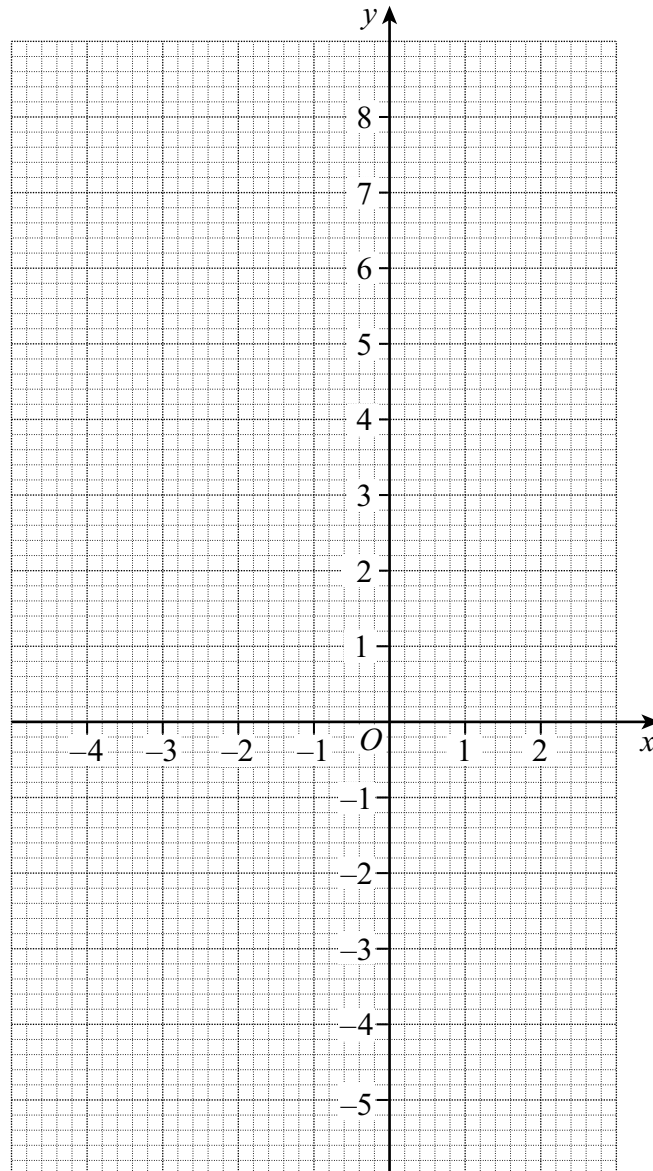
Answer km² (3 marks)

Turn over for the next question

12 Here is a table of values for the equation $y = x^2 + 3x - 2$

| | | | | | | | | |
|-----|----|----|----|-------|----|----|---|---|
| x | -4 | -3 | -2 | -1.5 | -1 | 0 | 1 | 2 |
| y | 2 | -2 | -4 | -4.25 | -4 | -2 | 2 | 8 |

(a) On the grid, draw the graph of $y = x^2 + 3x - 2$ for values of x from -4 to $+2$



(2 marks)

- (b) Use your graph to find the solutions of the equation $x^2 + 3x - 2 = 0$

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Answer $x =$ and $x =$ (2 marks)

- (c) By drawing a linear graph on the same axes, find the solutions of the equation

$$x^2 - 3 = 0$$

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Answer $x =$ and $x =$ (3 marks)

- 13 (a) Simplify fully $\sqrt{75} + \sqrt{27}$
 You **must** show your working.

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Answer (2 marks)

- (b) Rationalise the denominator and simplify $\frac{21}{\sqrt{7}}$

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Answer (2 marks)

14 (a) Write in the form 2^n $\frac{16^3}{4^{0.5}}$

You **must** show your working.

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Answer (3 marks)

(b) Simplify

(i) $\left(\frac{2}{3}\right)^{-1}$

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Answer (1 mark)

(ii) $1000^{-\frac{2}{3}}$

Give your answer as a fraction.

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Answer (2 marks)

15 In the calculation $150 \times (250 - 210)$

150 is correct to the nearest 50.
250 and 210 are correct to 2 significant figures.

Work out the minimum value of the calculation.
You **must** show your working.

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Answer (3 marks)

END OF QUESTIONS

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