**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

International General Certificate of Secondary Education

# MARK SCHEME for the November 2003 question papers

## 0580/0581 MATHEMATICS

| | |
|---|---|
| 0580/01, 0581/01 | Paper 1 (Core), maximum raw mark 56 |
| 0580/02, 0581/02 | Paper 2 (Extended), maximum raw mark 70 |
| 0580/03, 0581/03 | Paper 3 (Core), maximum raw mark 104 |
| 0580/04, 0581/04 | Paper 4 (Extended), maximum raw mark 130 |

These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks. They do not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination.*

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the *Report on the Examination.*

• CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the November 2003 question papers for most IGCSE and GCE Advanced Level syllabuses.

**Grade thresholds** taken for Syllabus 0580/0581 (Mathematics) in the November 2003 examination.

| | maximum mark available | minimum mark required for grade: | | | |
|---|---|---|---|---|---|
| | | A | C | E | F |
| Component 1 | 56 | - | 46 | 35 | 28 |
| Component 2 | 70 | 51 | 28 | 16 | - |
| Component 3 | 104 | - | 68 | 44 | 38 |
| Component 4 | 130 | 101 | 59 | 36 | - |

The threshold (minimum mark) for B is set halfway between those for Grades A and C.
The threshold (minimum mark) for D is set halfway between those for Grades C and E.
The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.
Grade A* does not exist at the level of an individual component.

## TYPES OF MARK

Most of the marks (those without prefixes, and 'B' marks) are given for accurate results, drawings or statements.

- **M** marks are given for a correct method.

- **B** marks are given for a correct statement or step.

- **A** marks are given for an accurate answer following a correct method.

## ABBREVIATIONS

| | |
|---|---|
| a.r.t. | Anything rounding to |
| b.o.d. | Benefit of the doubt has been given to the candidate |
| c.a.o. | Correct answer **only** (i.e. no 'follow through') |
| e.e.o. | Each error or omission |
| o.e. | Or equivalent |
| SC | Special case |
| s.o.i. | Seen or implied |
| ww | Without working |
| www | Without wrong working |
| √ | Work followed through after an error: no further error made |
| ≁ | Work followed through and another error found |

## Paper 1 Questions 7 & 16

| 7 | | 144° | 3 | **M2** for $\dfrac{(2 \times 10 - 4) \times 90}{10}$ or $\dfrac{(10 - 2) \times 180}{10}$ or $180 - \dfrac{360}{10}$.<br><br>After 0, **SC1** for answer 36° | 3 |
|---|---|---|---|---|---|
| 16 | (a) | 4.58(m) | 2 | **M1** for $\sqrt{5^2 - 2^2}$ s.o.i. e.g. $\sqrt{21}$ | |
| | (b) | 66.4o or 66.3o – 66.45o | 2 | **M1** for $\cos^{-1}\dfrac{2}{5}$ o.e. incl $\sqrt{}$ | 4 |

## Paper 2 Questions 10 & 18

| 10 | | 11.5(2) | 3* | **M1** $F = kv^2$ **M1** $k = 18/40^2$ or better | |
|---|---|---|---|---|---|
| 18 | (a) | $5.8 \times 10^8$ | 1 | | |
| | (b) | 98 | 2* | **M1** figs 58 ÷ figs 59 or figs 9830508 | |
| | (c) | 10200 | 2* | **M1** figs 59 ÷ figs 58 x $10^n$ or $\dfrac{1}{\textbf{(b)}}$ x $10^n$<br><br>n = 3 or 6 | |

## Paper 3 Question 5

| 5 | a) | | 6 | 1 | | |
|---|---|---|---|---|---|---|
| | | | –4 | 1 | | |
| | b) | i) | Rotation<br>through 180°<br>about (2.5, 6) o.e. | **M1**<br>**A1**<br>**A1** | Half turn **M1 AI**, –1 for "symmetry"<br><br>allow correct description of point | |
| | | ii) | Enlargement<br>s.f. 3<br>centre (1,7) | **B1**<br>**B1**<br>**B1** | accept scale 3, x3 etc<br>accept 'B' for (1,7) | |
| | c) | i) | 3 cao | 1 | ignore units | |
| | | ii) | 1 : 9 cao | 2 | **SC1** for 27 seen<br>**M1** for correct answer nlt | |
| | d) | | $\dfrac{-2}{3}, \dfrac{-6}{9}$ , –0.66 or better | 2 | **SC1** for $\dfrac{2}{3}$ oe or –k | 13 |

## Paper 4 Questions 4 & 5

| | | | | | |
|---|---|---|---|---|---|
| 4 | (a) | | Scale correct | S1 | $0 \leqslant t \leqslant 7$ (14 cm) and $0 - 60 \uparrow$ (12 cm) |
| | | | 8 correct plots (0 , 0), (1 , 25), | | Allow **P2** for 6 or 7 correct |
| | | | (2 , 37.5), (3 , 43.8), (4 , 46.9), | P3 | **P1** for 4 or 5 correct |
| | | | (5 , 48.4), (6 , 49.2), (7 , 49.6) | | Accuracy better than 2mm horizontally. In correct square $\uparrow$ |
| | | | Reasonable curve through 8 points | C1 (5) | Not for linear or <u>bad</u> quality |
| | (b) | (i) | $f(8) = 49.8$ or $49\frac{103}{128}$ o.e. | B1 | Do not accept improper fractions |
| | | | $f(9) = 49.9$ or $49\frac{231}{256}$ o.e. | B1 | |
| | | (ii) | $f(t$ large$) \approx 50$ | B1 (3) | |
| | (c) | (i) | Tangent drawn at $t = 2$ | B1 | Not a chord and not daylight |
| | | | Uses vert/horiz using scale | M1 | Can be given after **B0** if line not too far out |
| ** | | | Answer correct for their tangent | A1 √ | |
| | | (ii) | Acceleration or units | B1 (4) | Accept ms$^{-2}$, m/s$^2$, m/s/s. |
| | (d) | (i) | Straight line through (0 , 10) | B1 | ⎫ |
| | | | Straight line gradient 6 | B1 | ⎬ Must be ruled and full length to earn B2 |
| ** | | (ii) | one √ intersection value for $t$ | B1√ | |
| ** | | | Second √ $t$ <u>and</u> range | B1√ | |
| | | (iii) | Distance = area (under curve) | M1 | |
| | | | First particle (f($t$)) goes further | A1 (6) **(18)** | |

Marking final answers throughout this question

| | | | | | | |
|---|---|---|---|---|---|---|
| 5 | (a) | (i) | 0.2 | o.e. | B1 | Accept 2/10, 1/5, 20% |
| | | (ii) | 0.4 | o.e. | B1 | After first **B0**, condone "2 in 10" type answers. |
| | | (iii) | 0.5 | o.e. | B1 | Never condone 2 : 10 type |
| | | (iv) | 0.1 | o.e. | B1 | |
| | | (v) | 0 | | B1 (5) | Accept "none", "nothing", 0/10, nil, zero |
| | (b) | (i) | 2/10 x 1/9 | | M1 | |
| | | | 1/45 | o.e. | A1 | Accept 2/90, 0.0222    2.22%   www2 |
| | | (ii) | 3/10 x 2/9 | | M1 | |
| | | | 1/15 | o.e. | A1 | Accept 6/90 etc, 0.0666(or 7), 6.66 or 6.67% www2 |
| | | (iii) | (their) 1/45 + (their) 1/15 | | M1 | |
| | | | 4/45 | o.e. | A1 | Accept 8/90 etc, 0.0888(or 9), 8.88 or 8.89% www2 |
| | | (iv) | <u>Clearly</u> 1 – (their) 4.45  o.e. | | M1 | Alternative method must be complete |
| | | | 41/45 | | A1 (8) **(13)** | Accept 82/90 etc, 0.911, 91.1%  www2 |