UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/06**

Paper 6 (Extended) **For Examination from 2010**

SPECIMEN MARK SCHEME

1 hour 30 minutes

MAXIMUM MARK: 40

This document consists of **5** printed pages and **1** blank page.

UNIVERSITY of CAMBRIDGE
International Examinations

[Turn over

TYPES OF MARK

- **M** marks are given for a correct method.
- **A** marks are given for an accurate answer following a correct method.
- **B** marks are given for a correct statement or step.
- **D** marks are given for clear and appropriately accurate drawing.
- **P** marks are given for accurate plotting of points.
- **E** marks are given for correctly explaining or establishing a given result.
- **C** marks are given for clear communication (Papers 5 and 6 only).
- **R** marks are given for appropriate reasoning (Papers 5 and 6 only).

ABBREVIATIONS

- ft Follow through
- oe Or equivalent
- soi Seen or implied
- www Without wrong working

A Investigation

1	**(a)**	$\frac{3}{24}+\frac{4}{24}=\frac{7}{24}$	AR1	(both accuracy & reasons are required)
	(b)	$\frac{2}{12}+\frac{3}{12}=\frac{5}{12}$	AR1	
2	**(a)**	$\frac{1}{3}+\frac{1}{6}=\frac{2}{6}+\frac{1}{6}=\frac{3}{6}=\frac{1}{2}$	R1	
	(b)	$\frac{1}{3}=\frac{1}{4}+\frac{1}{12}$	B1	
	(c)	$\frac{1}{4}=\frac{1}{5}+\frac{1}{20}$	B2	
		$\frac{1}{5}=\frac{1}{6}+\frac{1}{30}$ $\frac{1}{6}=\frac{1}{7}+\frac{1}{42}$ $=\frac{1}{8}+\frac{1}{56}$	B1	for three correct
	(d)	$\frac{1}{99}=\frac{1}{100}+\frac{1}{9900}$	B1	
	(e)	$\frac{1}{n}=\frac{1}{n+1}+\frac{1}{n(n+1)}$	B2	B1 for $\frac{1}{x}+\frac{1}{nx}$
3	**(a)**	$\frac{2}{3}=2\times\frac{1}{3}=2\left(\frac{1}{4}+\frac{1}{12}\right)=\frac{2}{4}+\frac{2}{12}=$ $\frac{1}{2}+\frac{1}{6}$	R2	
	(b) (i)	$\frac{2}{5}=2\left(\frac{1}{6}+\frac{1}{30}\right)=\frac{1}{3}+\frac{1}{15}$	AR1	
	(ii)	$\frac{2}{7}=2\left(\frac{1}{8}+\frac{1}{56}\right)=\frac{1}{4}+\frac{1}{28}$	AR1	
	(c) (i)	$\frac{3}{8}=3\left(\frac{1}{9}+\frac{1}{72}\right)=\frac{1}{3}+\frac{1}{24}$	AR1	
	(ii)	$\frac{4}{11}=4\left(\frac{1}{12}+\frac{1}{132}\right)=\frac{1}{3}+\frac{1}{33}$	AR1	

4	**(a)**	Multiply $\frac{a}{xy} = \frac{1}{kx} + \frac{1}{ky}$ by kxy $\frac{akxy}{xy} = \frac{kxy}{x} + \frac{kxy}{y}$ (M1) $\Rightarrow ak = y + x$ $\Rightarrow k = \frac{x+y}{a}$	M1	
	(b) **(i)**	$\frac{1}{6} + \frac{1}{10} = \frac{5}{30} + \frac{3}{30} = \frac{8}{30} = \frac{4}{15}$	C1	
	(ii)	$x = 3$ and $y = 5$ (or vice versa) in which case $k = \frac{5+3}{4} = 2$	B1	
	(iii)	$x = 1$ and $y = 15$ (or vice versa) in which case $k = \frac{15+1}{4} = 4$ and $\frac{4}{15} = \frac{1}{4} + \frac{1}{60}$	B2	
5		Taking $x = 1$ and $y = 20$ gives $k = 7$ and $\frac{3}{20} = \frac{1}{7} + \frac{1}{140}$ Taking $x = 2$ and $y = 10$ gives $k = 4$ and $\frac{3}{20} = \frac{1}{8} + \frac{1}{40}$ Taking $x = 4$ and $y = 5$ gives $k = 3$ and $\frac{3}{20} = \frac{1}{12} + \frac{1}{15}$	B1 B1 B1	

6	(a)	$1 = \frac{1}{2} + \frac{1}{2} = \frac{1}{2} + \frac{1}{3} + \frac{1}{6}$ using the pattern in part 2. $1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{4}$	B1	
	(b)	In the first result, breaking down $\frac{1}{3}$ gives $1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{12} + \frac{1}{6}$	B1	no penalty if missing
		breaking down $\frac{1}{6}$ gives $1 = \frac{1}{2} + \frac{1}{3} + \frac{1}{7} + \frac{1}{42}$	B1	
		OR $1 = \frac{1}{2} + \frac{1}{3} + \frac{1}{10} + \frac{1}{15}$ using the method in question 4, with $x = 2$ and $y = 3$.	B1	
		In the second result, breaking down $\frac{1}{4}$ gives $1 = \frac{1}{2} + \frac{1}{4} + \frac{1}{5} + \frac{1}{20}$	B1	
		For clear communication and reasoning throughout part **A** award C2		

Total: 31 marks scaled down to 25.

B Modelling

1	Suitable scales chosen Correct plots	D1D1 P2	 P1 for 1 or 2 incorrect.
2 (a)	$T = 40$ is incorrect. It should be 36.	B1	
(b)	$T = 0.3\ S$	M1 A1	correct form
3	$n = 2$ $B = 0.01\ S^2$	B1 A1	
4 (a)	$D = 0.3S + 0.01\ S^2$	B1	
(b) (i)	40 metres	A1A1	(units required)
(ii)	At 30 km/h $D = 18$ metres	A1	
	% reduction = $\frac{22}{40}$ = 55%.	A1	(follow through)
5 (a)	braking distance = 180 – thinking distance at 100 km/h = 180 – 30 = 150 metres. So $k\ 100^2 = 150 \Rightarrow k = 0.015$		
	$D = 0.3S + 0.015\ S^2$	M1 A1	
(b)	Solve $0.3S + 0.015\ S^2 = 88$ 67.2 km/h using graphics calculator.	M1 A1	
	For clear communication and reasoning throughout part **B** award C2.		

Total: 20 marks scaled down to 15.