



Cambridge International AS & A Level

THINKING SKILLS

9694/11

Paper 1 Problem Solving

October/November 2022

MARK SCHEME

Maximum Mark: 50

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **8** printed pages.

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

NOTES FOR MARKERS**Working**

Where a final answer is underlined in the mark scheme, full marks are awarded for a correct answer, regardless of whether there is any supporting working, unless an exception is noted in the mark scheme.

For partial credit, the evidence needed to award the mark will usually be shown on its own line in the mark scheme, or else will be defined in italic text.

For explanations and verbal justifications, apply the principle of ‘words to that effect’.

No response

If there is any attempt at a solution award 0 marks not NR. “-” or “?” constitute no attempt at a solution.

Abbreviations

The following abbreviations may be used in a mark scheme:

AG	answer given (on question paper)
awrt	answer which rounds to
ft	follow through (from earlier error)
oe	or equivalent
SC	special case
soi	seen or implied

Annotations

Where the answer is underlined in the mark scheme, and a candidate's correct final answer is both clear and clearly identified (encircled, underlined etc.), it is not necessary to annotate that item; nor is it necessary to annotate when there is No Response.

Where there is a response that scores 0, either SEEN should be used, or some other annotation(s) to indicate why no marks can be awarded (Caret, TE, NGE, Cross).

Partial credit should be indicated with a 1 (or, occasionally, a 2) at the point at which that mark has been earned.

The highlighter should be used anywhere that this helps to identify the precise piece of the working to which another stamp pertains (or an inexplicit correct answer).

	Correct item
	Incorrect item
	Individual mark of partial credit
	Double mark of partial credit
	Essential element of answer/working missing
	Correct follow through
	Transcription error
	Judged to be not good enough to earn the relevant credit
	Benefit of doubt
	Working seen but no credit awarded; blank page checked
Highlight	Identifies the part of the working to which another stamp pertains

Question	Answer	Marks
1(a)	$6 \times \$8 + 1 \times \$6 = \$54$ The number of dry days must be <u>1</u> . <i>1 mark for charge for any non-zero pair of wet and dry days calculated.</i>	2
1(b)	The number of dry days must be <u>3</u> .	1

Question	Answer	Marks
2(a)	$2 \times (4 + 6) + 9 = \underline{29}$	1
2(b)	$9 - (3 - 1) = \underline{7}$	1
2(c)	Without it there would be too many parts for Short and not enough marks for Medium.	1

Question	Answer	Marks
3(a)	<u>Computers on Monday</u> <u>Pottery on Friday</u> <u>Art on Tuesday</u> <u>Singing on Wednesday</u>	1
3(b)	Sessions giving the least gap in between are Art at 14:30 (to 16:10) and Baking at 16:45 (to 18:45) [1] Least overall time is 14:30 to 18:45, so <u>4 hours 15 minutes</u>	2
3(c)	She could do Baking at 14:30 (to 16:30) then Art at 17:00 to 18:40, giving total time of 4 hours 10 minutes	1

Question	Answer	Marks
4	$2 \text{ easys (LO) with 1 repeat (L)} = 2 \times 0.20 + 1 \times 0.15 = 0.55$ $3 \text{ mediums (WEN) with 1 repeat (E)} = 3 \times 0.30 + 1 \times 0.20 = 1.10$ $1 \text{ difficult (D) with 0 repeats} = 1 \times 0.40 = 0.40$ Total = <u>\$2.05</u> <i>Award 1 mark for either of the first two totals given OR for correct amounts listed for 7 or 8 letters</i>	2

Question	Answer	Marks
5(a)	Ages of children are 15, 13, 11, 5 [1] Cost = $2 \times \$40 + 2 \times \$36 + 2 \times \$25 = \underline{\$202}$	2
5(b)	Ages are now 16, 14, 12, 6 so extra is $\$4 + \$11 = \underline{\$15}$	1
5(c)	On Ollie's birthday, ages are 17, 15, 12, 7. Use Family ticket to include Max and Nia Cost = $\$150 + \$(40 + 25) \times 1.1$ [1] $= \$150 + \$71.50 = \$221.50$ On Lottie's birthday, ages are 17, 15, 12, 6 Cost = $(3 \times \$40 + 2 \times \$36 + 1 \times \$25) \times 1.1$ [1] $= \$238.70$ Saving = $\underline{\$17.20}$	3

Question	Answer	Marks
6	From the proportions given, supposing a multiple of 12 is likely to be helpful. Suppose there are 48 people in the crowd: Of these, 24 support the Reds, 12 the Blues, 12 neither [1] 8 red hats, 3 blue hats, 6 black hats [1] Proportion of hats that are Reds = $8/(8 + 3 + 6) = \underline{8/17}$ oe (47.1%) OR <i>1 mark for any of $\frac{1}{2} \times \frac{1}{3}$ or $\frac{1}{4} \times \frac{1}{4}$ or $\frac{1}{4} \times \frac{1}{2}$</i> <i>1 mark for writing the three fractions with a common denominator</i>	3

Question	Answer	Marks
7(a)	365 non-leap years would have to pass, which would take $365 \times 4 = \underline{1460 \text{ years}}$ <i>Ignore subsequent attempts to consider various moments of abolition</i>	1
7(b)	In a period of 100 years, there would be 24 leap years [1] In a period of 400 years there would be one extra, for 97 leap years [1] In a period of 1200 years there would be 291 leap years In 1500 years there would be 363 leap years Leaving 2 additional leap years to re-synchronise, for a total of <u>1508 years</u>	3

Question	Answer	Marks
8(a)(i)	Gilmesh will be ahead by 100 m after 1 minute, then by a further 85 m after 2 minutes, with his lead increasing by 15 m less each minute. [1] This is at a maximum after <u>7 minutes</u>	2
8(a)(ii)	$100 + 85 + 70 + 55 + 40 + 25 + 10 = \underline{385 \text{ metres}}$	1
8(b)	<u>15 minutes</u>	1

Question	Answer	Marks
9(a)	<u>41</u> <i>1 mark for sight of three ages with a difference of 8 between the higher two, a difference of 11 between the lower two OR an algebraic relationship such as $x + x + 8 + x - 11 = 120$</i>	2
9(b)	<u>64</u> <i>1 mark for three ages that are the correct amount apart with six different digits, not including 0</i>	2

Question	Answer	Marks
10(a)	<u>3</u> units of energy	1
10(b)	<i>2 marks for 10 units of energy with correct sequence of collisions. 1 mark for a correct sequence up to a point at which a green particle is used in a collision.</i>	2
10(c)	<u>9</u> units of energy	1
10(d)	<u>14</u> units of energy	1

Question	Answer	Marks
11(a)	<u>240 000</u>	1
11(b)	<i>1 mark for each of the following amounts (max 2) THOUSAND is constrained by S: $(50 \times \\$1000 =)$ \$50 000 HUNDRED is constrained by D: $((1250 - 50)/2 \times \\$100 =)$ \$60 000 TEN is constrained by T: $((12\ 000 - 50) \times \\$10 =)$ \$119 500 giving a total of <u>\$229 500</u></i>	3

Question	Answer	Marks
12(a)	<u>27</u>	1
12(b)	1, 8, 17, 26, 35, 44, 54 <i>1 mark for any 2 correct, 1 mark for another 4 correct, 1 mark for the final one correct</i>	3
12(c)	Sum must be 21 and last digits not greater than 93 (because 17 drop needs at least 6 before so at most 9 after can back to 21) and not less than 78	1

Question	Answer	Marks
13	The earliest point possible could be achieved at a time at which all 50 spaces were occupied by cars that had paid for the most expensive ticket. $50 \times 3.50 = \$175$, so the tickets bought (previously) must have cost a total of \$75 [1] 50 tickets at \$1 (for 30 minutes), plus an additional 25 tickets bought at 08:30 for another 30 minutes would achieve more than \$75 which means that the \$250 could be achieved at 09:00 [1] This could not be achieved with just \$1 tickets, but 50 tickets at \$1.50 (1 hour) would cost \$75 [1] 09:00	3