CAMBRIDGE
International Education

Cambridge International AS & A Level

THINKING SKILLS **9694/13**

Paper 1 Problem Solving **May/June 2024**

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 May/June 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level and Cambridge Pre-U 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 descriptions 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'.

Units

Unless required by the question or mark scheme, units such as $ do not need to be seen to award the marks.

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
dep mark depends on earlier, asterisked (*), mark
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 it is helpful to clarify the marking.

	Correct item
	Incorrect item
	Individual mark of partial credit
	Double mark of partial credit
	Essential element of answer/working missing
	Judged to be not good enough to earn the relevant credit
	Benefit of doubt
	Correct follow through
	Transcription error
	Special case
	Working seen but no credit awarded; blank page checked
Highlight	Use anywhere it is helpful to clarify the marking

Question	Answer	Marks
1	1 mark for either 90 + 88 + 86 + 84 + 82 + 80 + 78 + 76 + 74 + 72 OR 10 × 72 1530 minutes or 25 hours 30 minutes	**2**

Question	Answer	Marks
2(a)	5 mixed and 1 salmon 4 mixed, 1 salmon and 1 caviar 2 mixed, 2 salmon, 1 caviar and 1 avocado 1 mixed, 2 salmon, 2 caviar and 1 avocado *1 mark for any two* *2 marks for all four with no extras*	**2**
2(b)	Caviar; because (two of the ways to make six trays mean) two caviar canapes are left over (so making another will allow a seventh tray of three caviar) OR Caviar, because (the other two ways to make six trays mean) one salmon and one avocado canapes are left over (so making another will allow a seventh mixed tray)	**1**

Question	Answer	Marks
3(a)	13 = 7 + 3 + 3 29 = 7 + 7 + 3 + 3 + 3 + 3 + 3 26 = 7 + 7 + 3 + 3 + 3 + 3 19 = 7 + 3 + 3 + 3 + 3 *1 mark for any two number of bongs correct* They scored 6 bongs	**2**
3(b)	0, 3, 6, 7, 9, 10, 12 *1 mark for 4 correct and none incorrect,* *OR 5 correct and no more than 1 incorrect,* *OR 6 correct and no more than 2 incorrect,* *OR 7 correct and no more than 3 incorrect*	**2**

Question	Answer	Marks
4(a)	Cheapest is 1 Group ticket (for 5 adults), 5 Child tickets and 1 Adult ticket **[1]** This costs \$17.50 + \$4 + 5 × \$2.50 = \$34 *1 mark for \$34.50*	**2**
4(b)	\$19.50 is the best price for 2 adults and 3 children. **[1]** Therefore the donation was \$5.50, so the government gave the museum \$1.10 *If 0 marks scored, allow 1 mark for final answer \$2.10*	**2**

Question	Answer	Marks
5(a)(i)	One box can hold 3 × 2 × 1 = 6 parcels **[1]** Number of boxes = 72/6 = 12, so cost is 12 × $25 = $300	**2**
5(a)(ii)	Maximum weight per parcel = 500 g	**1**
5(b)	$15	**1**

Question	Answer	Marks
6(a)(i)	Den only works on Fridays	**1**
6(a)(ii)	Ann and Eva are not at work on Fridays **[1]** They only both work on Tuesdays **[1]** OR Only 3 employees work on Monday AND Thursday is consecutive, so must be Tuesday or Wednesday **[1]** Ann does not work on Wednesday, so must be Tuesday **[1]**	**2**
6(b)	Ann, Ben, Eva, Har	**1**

Question	Answer	Marks
7(a)	Red with 4, Blue with 3 others, and Black with 2 *1 mark for any complete set of combinations for a starting colour* 9	**2**
7(b)	A comes with 6 options GZ ZG GS SG ZS SZ Similarly O Only two others: GZS GSZ 14 *1 mark for 20 (omitting metal constraint) or 7 (omitting direction)*	**2**

Question	Answer	Marks
8	*1 mark for* (All 20 matches have 5 points available but) the total number of points scored is 98 *OR* The additional points scored for the first goals were 4 + 5 + 4 + 2 + 3 = 18 (and there were 20 matches) (so) the 1 point for scoring the first goal was not awarded in 2 matches **[1]** *Note: unsupported answer does not score full marks*	**2**

Question	Answer	Marks
9(a)	$1500	1
9(b)	Minimum sum of the cash totals is $6000 AND yesterday's sum was $7100 **[1]** The difference (of $1100) is $50 × 22 OR Maximum sum of the cash totals is $8000 AND yesterday's sum was $7100 **[1]** The difference (of $900) is $50 × 18, so number answered correctly is 22	2
9(c)	Both Sarah and Jason won $4250 in the second part of the show **[1]** Sarah's cash total = $13 300 **[1]** Total money won = ($13 300 + $6400 + $1400 + $1150 =) $22 250 *SC: 2 marks for final answer $15 600*	3

Question	Answer	Marks
10(a)(i)	9	1
10(a)(ii)	3 large trees and 1 medium tree give $590	1
10(b)	Two of Mon, Tues and Wed done optimally with 9S or 5M pruned in a day **[1]** Then one more optimal day leaving 1S + 2M, pruned in (50 + 90 + 90 =) 230 minutes, so finishes on Thursday at 12:50	2
10(c)	$660	1
10(d)	Toby can prune 3L + 3S in one day (taking 330 + 120 = 450 minutes) **[1]** Two days of this leaves 2L + 21S Next most efficient use of a day is pruning 11S (taking 440 minutes) **[1]** This leaves 2L + 10S 4th day: 1L + 8S (taking 430 minutes) **[1]** leaving 1L + 2S on 5th day, taking 190 minutes Earliest finish time on Friday is 12:10 *SC: 3 marks for (sub-optimal) final answer of 12:20*	4

Question	Answer	Marks
11	18 April 1972 or 18/04/72 19 April 1976 or 19/04/76 26 March 1978 or 26/03/78 13 June 1978 or 13/06/78 *2 marks for 2 right and 0 wrong, or 3 right and 1 wrong or 4 right and 1 wrong;* *1 mark for 1 right and 0 wrong or 2 right and 1 wrong or 3 right and 2 wrong;* *0 marks if more than 5 answers*	**3**

Question	Answer	Marks
12(a)	259	**1**
12(b)	422 – 351 = 71 **[1]** voted for Proposal 1 and against Proposal 2 163 – 71 = 92 voted against both proposals OR (600 – 163) – 351 = 86 **[1]** voted for Proposal 2 and against Proposal 1 (600 – 422) – 86 = 92 voted against both proposals	**2**

Question	Answer	Marks
13	23 birds and 16 bees *1 mark for (142 – 110) ÷ 2 seen OR for 16 (bees) OR 23 birds* *OR for a trial with at least 10 birds and at least 10 bees* *OR* $2x + 6y = 142$ *and* $2x + 4y = 110$	**2**