Cambridge International AS & A Level

THINKING SKILLS   **9694/13**

Paper 1 Problem Solving   **October/November 2023**

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 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

This document consists of **9** 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
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
1	Individual mark of partial credit
2	Double mark of partial credit
^	Essential element of answer/working missing
NGE	Judged to be not good enough to earn the relevant credit
BOD	Benefit of doubt
FT	Correct follow through
TE	Transcription error
SC	Special case
SEEN	Working seen but no credit awarded; blank page checked
Highlight	Use anywhere it is helpful to clarify the marking

Question	Answer	Marks
1(a)(i)	62	**1**
1(a)(ii)	76 (should be 75)	**1**
1(a)(iii)	Eagle	**1**

Question	Answer	Marks
2	<u>55</u> *1 mark for any of the following:* • 28 matches played within the group of eight • 21 matches played within the group of seven • 50 matches played in total	**2**

Question	Answer	Marks
3	The difference between her winning total (116) and her total number of correct answers (72) is 44 **[1]** The only combination that works is $16 \times 2 + 12$ <u>History: 3 points; Geography: 2 points</u>	**2**

Question	Answer	Marks
4(a)	Each ticket costs $2 + 15 \times \$0.10 = \$3.50$ **[1]** Both tickets would be \$7 Applying 20% discount gives \$<u>5.60</u> *SC 1 mark for \$6.20 as final answer*	**2**
4(b)	The journey home will cost $\$0.80 + 14 \times \$0.70$ **[1]** $= \$10.60$ The journey to the party will still be cheaper on the bus, costing \$3.50 \$<u>14.10</u>	**2**
4(c)	Total cost with staying at friend's house will be \$7 Saving is $\$14.10 - \$7 = \$7.10$ Qasim will give \$<u>3.55</u> to his friend	**1**

Question	Answer	Marks
5(a)	There must be 4 extra seats in each row **[1]** So there are 12 rows **[1]** 77 + 73 + 69 + 65 + 61 + 57 + 53 + 49 + 45 + 41 + 37 + 33 = <u>660</u> seats *SC: 1 mark for answer 275 from 5 rows increasing by 11 each time*	**3**
5(b)	Assuming a standard price of $10: 300 tickets sold at 30% discount means $900 have been discounted **[1]** $900/200 = $4.5 per ticket So the last 200 tickets must be sold at <u>45%</u> greater than the standard price *OR* There are 2/3 as many higher-priced tickets, so the percentage differential from the standard must be $3/2 \times 30\%$ = <u>45%</u> *Algebraic:* S = standard price N = non-standard price $300(0.7S) + 900S + 200N = 1400S$ **[1]** $N = 1.45S$ <u>45%</u>	**2**

Question	Answer	Marks
6	The first cycle makes a profit of $15 and the second cycles makes a profit of $13 **[1]** Each subsequent cycle makes $2 less in profit, so the process is no longer profitable after <u>8</u> cycles *OR* 15/2 = 7.5 **[1]** <u>8</u> cycles	**2**

Question	Answer	Marks
7(a)(i)	<u>6th; 4th; 3rd</u> *1 mark for 3rd; 4th; 6th in any order.* *OR* *1 mark for sight of (2 +) 3 + 5 + 6 points (= 16)*	**2**
7(a)(ii)	No Eve must score at least 2 more points/37 points **[1]** Fay can score at most 36 **[1]** *Max 1 mark if Yes is stated*	**2**
7(b)	Total number of points awarded in Events 1 – 4 = 156 Total number of points scored by top five = 120 *1 mark for either statement* Bet, Dev and Huw each have <u>12</u> points	**2**
7(c)	Joy scored 5 points each time OR Ian scored 10, 8, 6, 3, 2 and 1 **[1]** Only 4 points was not scored by either of them, which is <u>fifth</u> position	**2**

Question	Answer	Marks
8	`ar&7249Q6` **[1]** The second version (is shorter so) is missing a character so otherwise must be correct **[1]** The first version has a Y instead of 9, so & must be correct **[1]** *OR* `ar&7249Q6` **[1]** The second version doesn't have a symbol, (so that must be its error and) so the & in the first version must be correct **[1]** So the Y in the first version must be its error, and should be a 9 **[1]**	**3**

Question	Answer	Marks
9	In 700 meals, was 7*17, now 6*2 + 100 **soi [1]** 119 then [112 = 16%] so <u>1% decrease</u>.	**2**

Question	Answer	Marks
10(a)	*1 mark for finding the time for both of the distances at one of the speeds OR for finding the time for one of the distances at all of the speeds* The 3 km route is run at 7.5 km/h and the 3.6 km route is run at 9 km/h **[1]** The 4.5 km/h route is 1.8 km long The 6 km/h route is 2.4 km long	**3**
10(b)	Reduced speed by a third: 3 km/h, 4 km/h, 5 km/h and 6 km/h **[1]** Average speed is 4.5 km/h	**2**

Question	Answer	Marks
11(a)	The 3 sets of 10 cakes sold for $99 So the other 88 cakes sold for $341 **[1]** 88 cakes @ $5 each would be $440, but each set of 6 reduces this by $9 **[1]** $99 / 9 is 11 sets of 6 sold **[1]** So 22 individual cakes *OR* 88 cakes sold for $341 **[1]** $x + 6y = 88$ **[1]** $5x + 21y = 341$ **[1]** *OR* *1 mark for 88 cakes sold for $341* **[1]** *1 mark for a search attempt in which either the total number of cakes is 88 or the total cost is ($)341* *1 mark for a second attempt closer to 88 or 341*	**4**
11(b)	7 tens and 2 sixes **[1]** $273 *SC: 1 mark for $274 seen*	**2**
11(c)(i)	Profit already is ($440 – $285 =) $155 **[1]** $45 ÷ 30 = $1.50	**2**
11(c)(ii)	$278	**1**

Question	Answer	Marks
12	If Ian only had the money for participation and Barbara walked 10 km then Ian would raise $56 and Barbara $315, so Barbara would have raised $259 more **[1]** For each extra kilometre that they both walked the difference would reduce by $15 **[1]** To reduce the difference by $240 would require 16 km extra to be walked **[1]** Total raised is $56 + $315 + 16 × ($41 + $26) = $<u>1443</u> *Trial and error method:* *For any given distance greater than zero calculate amount Ian raised* **[1]** *Calculate amount Barbara would raise for 10 km greater distance* **[1]** *Choose new value which will move difference closer to $19 and correct calculation of both values* **[1]** *Correct answer of* $<u>1443</u> *Algebraic:* If Ian walks d km: $19 + 56 + 41d = 55 + 26(d + 10)$ **[2]** *1 mark for either side correct* $d = 16$ **[1]** Ian raises $712 and Barbara raises $731, so total is $<u>1443</u>	**4**