



Cambridge International AS & A Level

THINKING SKILLS

9694/11

Paper 1 Problem Solving

May/June 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 May/June 2022 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 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 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(a)	The smallest maximum distance for any manager is 10 for the Grand Hotel [1] $2 \times 20 + 0.5 \times (9 + 7 + 8 + 10)$ $= \$57.00$	2
1(b)	Central: $2 \times 19 + 0.5 \times (4 + 12 + 5 + 11)$ $= \$54.00$	1

Question	Answer	Marks
2(a)	<u>Tuesday</u>	1
2(b)	<u>2</u>	1

Question	Answer	Marks
3(a)	Total draw money, $(203 \times \$15 =)$ \$3045 Prize money, $(12 \times \$60 =)$ \$720 <i>1 mark for either</i> Amount donated to local charity in one year = $\$3045 - \$720 = \$2325$	2
3(b)	Total prize money, \$840 Total membership fees, $(203 \times \$17 =)$ \$3451 <i>1 mark for either</i> Amount donated to local charity in next year = $\$3451 - \$840 = \$2611$ OR $(\$2325 + \$406 =)$ \$2731 $(\$2325 - \$120 =)$ \$2205 $(\$406 - \$120 =)$ \$286 <i>1 mark for any one of these</i> Amount donated to local charity in next year = $\$2325 + \$286 = \$2611$	2

Question	Answer	Marks
4	(I paid \$36 per week, which is a reduction of) \$14 [1] . This must have been 2 days of a reduction per day of <u>\$7</u> .	2

Question	Answer	Marks
5(a)	2185 [1] 5408 [1] <i>If 3 or more answers are given, award 1 mark for 2 correct with 1 incorrect No marks if more than 1 incorrect</i>	2

Question	Answer	Marks
5(b)	Only a small square gives the maximum, so, (with digits in any order): 1245 OR 2356 OR 4578 OR 5689	1

Question	Answer	Marks
6	117 grams rounds up to 120 grams, which is 50 grams + 7×10 grams, so the postage cost is $65\text{¢} + 7 \times 4\text{¢}$ = 93¢ [1] <i>1 mark for any correct construction of 93¢ from the stamps available, e.g. $5 \times 15\text{¢} + 1 \times 12\text{¢} + 3 \times 2\text{¢}$ or $1 \times 15\text{¢} + 6 \times 12\text{¢} + 3 \times 2\text{¢}$</i> $3 \times 15\text{¢} + 4 \times 12\text{¢}$ uses the minimum number of stamps, which is 7.	3

Question	Answer	Marks
7(a)	27 customers have completed their 5-minute appointments [1] Time that has elapsed after 09:00 is $27 \times 5 = 135$ minutes so <u>11:15</u> <i>If 0 scored, award 1 mark for final answer of 11:20</i>	2
7(b)	17 appointments per advisor at 10 minutes each [1] So Sam's appointment would begin at <u>11:50</u>	2
7(c)(i)	Appointment 048 is just ending, then 14×5 minutes, so <u>70</u> minutes	1
7(c)(ii)	Appointment 048 is just beginning, then another 14×10 minutes, so <u>150</u> minutes	1

Question	Answer	Marks
8(a)	$(37 - 18 = 19, \text{ so})$ he scored a total of 38 points in the two games [1] 5th game's score plus half of 8 and half of 4th game's scores is 34.5 [1] <u>15 and 23</u> in either order OR $x + y = 38$ [1] $y + \frac{1}{2}(8 + x) = 34.5$ [1] <u>15 and 23</u>	3
8(b)	In his first two games he scored a total of $100 - 18 - '38' - 8$ [1] ft (= 36 points) His first RPR was therefore $8 + (36 \div 2) = \underline{26}$	2

Question	Answer	Marks
9(a)	<u>4</u>	1
9(b)	arrivals (from Benbow) at 08:54, 11:09, 13:24; 15:39 and 18:04 arrivals (from Livesey) at 10:22, 12:37, 15:07 and 17:27 <i>1 mark for either complete correct list</i> <u>15:07 to 15:39 OR 32 minutes</u>	2
9(c)	the 10:15 ferry from Benbow to Livesey arrives at 11:08 [1] <u>1 hour 49 minutes / 109 minutes</u> earlier than the 11:45 ferry	2
9(d)	(At 8:30 the Benbow to Smollett ferry will have) 24 minutes remaining [1] The two ferries will meet halfway, at <u>08:42</u>	2

Question	Answer	Marks
10	<i>Scheme for 95 rubies (maximum 4 marks):</i> Rubies added 950 seconds to the timer So 95 rubies [1] D + E = 149 (may be in words) oe [1] 83 emeralds and 83 sapphires [1] 66 diamonds [1] <i>4 marks for correct numbers of all four gems</i> OR <i>Scheme for incorrect number of rubies (maximum 2 marks):</i> D + E = 149 (may be in words) oe [1] Correct number of emeralds, sapphires, diamonds for their number of rubies [1] ft	4

Question	Answer	Marks
11(a)	2140 down to 214 = <u>\$1926</u> .	1
11(b)	Xiland gives the smallest amount, from \$1094.09 – 194.9 = <u>\$899.19</u> <i>1 mark for final answer of \$899.82 or \$900</i> OR <i>1 mark for clearly using 1094.(..) or 1076.(..) and contributing to final answer</i>	2
11(c)	\$9900.xx – \$99.xx = <u>\$9801</u>	1

Question	Answer	Marks
12(a)	When Ben starts, Adam is 10 metres from the far end and heading away from Ben OR Adam turns 25 seconds after Ben begins, when Ben is 15 metres from the start OR The distance between them then reduces by 1 metre per second 1 mark for any one of these They pass each other 24 metres (from the start) OR They have a total of 40 metres to travel before they meet 1 mark for either so when they pass each other Ben has been swimming for <u>40</u> seconds <i>OR algebraic method</i> Suppose that they pass after Ben has swum x metres, then Adam will have swum $10 + (30 - x)$ metres $x/0.6 = (40 - x)/0.4$ [1] so $x = 24$ [1] Ben will swim 24 metres taking <u>40</u> seconds	3
12(b)	The difference between the distances they have swum reduces by 0.2 metres per second, so when they have both swum the same distance Ben will have been swimming for $80 \div 0.2 = 400$ seconds [1] In this time Ben has swum $400 \times 0.6 = \underline{240}$ metres OR both have swum <u>480</u> metres in total OR Adam swims 80 metres in $80 \div 0.4 = 200$ seconds Ben swims for 200 seconds less than Adam Let T be time for Adam's swim, then $0.4T = 0.6(T - 200)$ [1] $T = 600$, so distance swum by each is <u>240</u> metres OR <u>480</u> metres in total	2

Question	Answer	Marks
13	For example, suppose for convenience that the distance up hill is 9.6 km. This means that the journey up and down takes 4 hours. Since the speed up the hill is 4 km/h, going up must take $9.6/4 = 2.4$ hours [1], leaving 1.6 hours to descend 9.6 km, meaning that the average speed going down is $9.6/1.6 = \underline{6}$ km/h. OR Suppose that distance each way is d km and speed down is v km/h Time going up is $d/4$, time for up and down is $2d/4.8$, so $2d/4.8 = d/4 + d/v$ [1] leading to $v = \underline{6}$ km/h	2