



## Cambridge International AS & A Level

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THINKING SKILLS

9694/11

Paper 1 Problem Solving

October/November 2021

MARK SCHEME

Maximum Mark: 50

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**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 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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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:

<b>AG</b>	answer given (on question paper)
<b>awrt</b>	answer which rounds to
<b>ft</b>	follow through (from earlier error)
<b>oe</b>	or equivalent
<b>SC</b>	special case
<b>soi</b>	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
<b>Highlight</b>	Use anywhere it is helpful to clarify the marking

Question	Answer	Marks
1	The latest that Jane could arrive at the airport is 15:30, so she must catch a train that leaves no later than 14:45 [1]  The last train not later than this time leaves at <u>14:20</u> .	2

Question	Answer	Marks
2(a)	$\$4.50 + 4 \times \$0.80 + 2 \times \$3.60 + 2 \times \$1.00 = \underline{\$16.90}$	1
2(b)	10 cupcakes and 8 muffins cost $\$4.50 + 4 \times \$0.80 + 2 \times \$3.60$ [1] <u>\\$14.90</u>  <i>If 0 scored, award 1 mark for \$15.10 seen</i>	2
2(c)(i)	<u>\\$48</u>	1
2(c)(ii)	<u>\\$36</u>	1

Question	Answer	Marks
3	Area needing painting is $6^2 - 2 \times 3$ [1] = 30 m <sup>2</sup> Amount of paint needed is $30 \div 2.8$ , so 11 litres [1] Least cost is $4 \times \$20 + 1 \times \$10 = \underline{\$90}$  OR Area needing painting is $6^2 - 2 \times 3 = 30$ m <sup>2</sup> . [1] Large cans are more economical than small cans. 4 large cans will cover 28 m <sup>2</sup> [1] and the remaining 2 requires an extra 1 litre can. Total cost is $4 \times 20 + 10 = \underline{\$90}$	3

Question	Answer	Marks
4(a)	The total number of points scored in the first 8 rounds is $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 = 36$ Kevin must have scored the remaining $36 - 19 = \underline{17}$ points	1
4(b)	<u>3</u>	1
4(c)	Since the two scores are currently very close, it must be the case that one of the players will win two rounds and the other will win one. The final difference will be smallest if the 11 is paired with the 19 [1] Kevin scores a total of $17 + 9 + 10 = 36$ Harriet scores a total of $19 + 11 = 30$ The difference will be <u>6</u> .	2

Question	Answer	Marks
5	<p>20 tickets @\$20, 30 tickets @\$50, 50 tickets @\$70, 80 tickets @\$80 gives \$11 800. A further \$8200 needs to be raised from the \$90 tickets</p> <p><i>1 mark for \$11800 or \$8200 seen</i></p> <p>Requires 92 to be sold.</p> <p><i>1 mark for division of '8200' by 90</i></p> <p>The total number of tickets is <math>20 + 30 + 50 + 80 + 92 = \underline{272}</math></p>	3

Question	Answer	Marks
6	<p>(Summer has too large a range for B. Bright would need B to come down but C cannot. Merry would need B down but A and C cannot move down.) <u>Light [1]</u> needs to go <u>up one</u> note [1].</p>	2

Question	Answer	Marks
7(a)	<p>Argyle: <math>\\$(100 + 20 + 2.50 + 2) \times 2 \times 5 = \\$1245</math> Banton: <math>\\$(90 + 25 + 4) \times 2 \times 5 = \\$1190</math> So <u>Banton</u> is cheaper <u>by \$55</u></p> <p><i>1 mark for \$1245 or \$1190 seen or \$27.50 seen or \$55 without comment that Banton is cheaper</i></p>	2
7(b)	<p>Cost per night = <math>\\$(120 + 22 + 8) = \\$150</math> 2 nights at 10% discount + 4 nights at 25% discount with attempt at both calculations [1] = <math>\\$270 + \\$450</math>, so <u>\$720</u></p> <p><i>Award 1 mark for \$765 (from 3 nights + 3 nights)</i></p>	2
7(c)	<p>Split as 3 nights + 2 nights + Saturday. Charge for 3 nights at 15% discount is \$382.50 OR Charge for Saturday is <math>\\$150 + 20\%</math> surcharge = \$180 [1]</p> <p>Charge for 2 nights at 10% discount is \$270 Total charge = <u>\$832.50</u></p>	2

Question	Answer	Marks
8(a)	$3 \times \$36 + 2 \times \$12 = \$132$	1
8(b)	Least cost is for 6 white and 8 blue costumes = $\$50 + \$72 = \$122$ <i>1 mark for sub-optimal answers \$124, \$126 or \$132 or indication that 8 blue is optimal.</i>	2
8(c)	Before, price of 100 white + 200 blue = $25 \times \$30 + 50 \times \$36 = \$2550$ [1] 300 at new price - $\$300 = \$2550$ [1] New price = $\$2850/300 = \$9.50$	3

Question	Answer	Marks
9(a)	All entries in the points scored and conceded columns must be expressible as $7m + 5n$ , where $m$ and $n$ are whole numbers. [1] <b>soi</b> <u>Zeta's total points scored of 23 points</u> is not.	2
9(b)	The sum of the entries in the points scored and points conceded columns should be the same. [1]  In the table as printed the sum of the points scored column entries is 1 less than the sum of the entries in the goals conceded column. Hence, since there is only one misprint, Zeta must have scored a total of <u>24</u> points.	2

Question	Answer	Marks
10	(A will be cheaper than B and C if) number of guests is at least 60 [1] A search using 60 – 79 with values found for at least A and D [1] A second search using 61 – 79 that moves closer to 76 [1] <u>76</u>  <i>SC: 3 marks for final answer of 75</i>  <i>OR</i> (B will be cheaper than A if there are fewer than 60 bought and C will be cheaper than A if 80 or more are bought. Therefore) A will be cheaper than B and C in the range 60–79. [1] 60 gifts from store D would cost $3 \times 35 = \$105$ 60 gifts from store A would cost 90% of $60 \times 2 = \$108$ . [1] Each of the next 19 gifts will cost \$1.80 from store A and \$2 from store D, so the difference reduces by \$0.2 for each extra person [1] so the prices will be equal if 75 are bought and then store A will be cheaper if there are at least <u>76</u> guests  <i>SC: 3 marks for final answer of 75</i>	4

Question	Answer	Marks
11(a)	<p>He cannot have paid with four 5¢ coins, or he would have received only one coin in change OR He cannot have paid with one 25¢ coin, or he would have received only two coins in change [1] (In neither case would he now have ten coins) So he must have paid with a \$1 coin.</p> <p><i>If 0 marks scored, 1 mark for showing \$1 coin works with details of the five coins given in the change</i></p>	2
11(b)	<p>Following his first purchase, Max must have had one 1c coin, one 5c coin and three 25c coins and an additional 5 coins. Since he would have been able to make a total of 31c exactly, he cannot have had any more coins with a value of 1c, 2c or 5c. [1] Since his first purchase had to be made with a \$1 coin he cannot have had any 25c coins originally, and therefore cannot have more than three 25 coins following the first purchase. [1] Therefore the remaining 5 coins must all be \$1 coins. So Max had \$5.81 before his second purchase and so he now has <math>5.81 - 0.32 =</math> <u>\$5.49</u>.</p> <p><i>SC2: 2 marks for final answer of \$5.81.</i></p>	3

Question	Answer	Marks
12(a)	<u>\$5.75</u>	1
12(b)	<p>1 tea and 1 coffee costs \$4.25 [1] <math>\\$15.75 + 2 \times \\$4.25 =</math> <u>\$24.25</u> OR 3 tea + 6 coffee + 3 cakes costs <math>3 \times \\$10 = \\$30</math> [1] Subtract cost of 1 coffee + 1 cake = \$5.75 giving <u>\$24.25</u></p>	2

Question	Answer	Marks
13	<p><u>36 minutes</u> <i>1 mark for any systematic approach that yields a schedule consistent with the information for the first two 'rounds'.</i> OR <i>2 marks for answer of 38 minutes.</i></p> <p>Example giving 36 minutes: 1 C(8) B(8) (2) D(8) A(10) 2 D(8) C(8) A(10) (2) B(8) 3 A(10) D(8) (2) B(8) C(8) 4 B(8) (4) A(2) (6) C(8) D(8)</p>	3