Cambridge International AS & A Level

THINKING SKILLS   **9694/11**

Paper 1 Problem Solving   **October/November 2020**

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 2020 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 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
1	Individual mark of partial credit
2	Double mark of partial credit
∧	Essential element of answer/working missing
FT	Correct follow through
TE	Transcription error
NGE	Judged to be not good enough to earn the relevant credit
BOD	Benefit of doubt
SEEN	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)	<u>A</u> and <u>C</u>	**1**
1(b)	She needs to add a vote that would apply to location B but not to location D. Swimming achieves this.	**1**

Question	Answer	Marks
2	Difference between mugs is cost of 4 letters = $12.60 − $9.40 = $3.20 One letter costs $0.80 OR the mug costs $5.40 **[1]** Penelope's mug has one fewer letter than Alexander's, so costs $12.60 − $0.80 = <u>$11.80</u>	**2**

Question	Answer	Marks
3	$1 pays for 3 hours and 30 minutes **[1]**, so he has paid for <u>60</u> additional minutes. *If 0 scored, can award 1 mark for the cost of his parking is 75¢.* *SC: 1 mark for answer of 50 minutes (neglects change in rate).*	**2**

Question	Answer	Marks
4	Houses considered are Beeches, Oakwood and Pines **[2]** *1 mark for a single addition and/or omission* the garden of Pines is too small and Oakwood is cheaper than Beeches, so they buy Oakwood **[1]**	**3**

Question	Answer	Marks
5(a)	Takes the 12:20 ferry so arrives on the island at 12:45. **[1]** Returns on 16:00 ferry, arriving at <u>16:25</u>	**2**
5(b)	10 ferries to the island and 11 ferries back. 250 there and 275 back **[1]**	**1**
5(c)(i)	Greatest number of tourists arriving by 11:30 = $4 \times 30 = 120$ **[1]** Least number leaving by 11:30 = $1 \times 5 = 5$, so greatest number on island = $120 – 5 = \underline{115}$	**2**
5(c)(ii)	Least number arriving = $4 \times 5 = 20$ **[1]** 15 of these could have left on the 11:00 ferry. So there must be at least <u>5</u> tourists on the island at 11:30. *SC: 1 mark for 0 (fails to notice that not all 20 could have left)*	**2**

Question	Answer	Marks
6	The total paid for members' tickets = 136 × $40 = $5440 **[1]** The total paid for guest tickets = $9140 – $5440 = $3700, so number of guests is $3700 ÷ 50 = 74. **[1]** (183 – 74 = 109, so) 109 members attended and number who did not attend is 136 – 109 = <u>27</u>	3

Question	Answer	Marks
7(a)	(On the day that he attends the course) George would have entered the information for 100 records. **[1]** He completes 10 records more each hour than he did previously, so it will take 10 hours to complete an additional 100 records. <u>Thursday 11:00</u>	2
7(b)	The cost to the company is $50 + 4 × $10 = $90 **[1]** Entering the data for each record used to cost the company $10.00 ÷ 25 = $0.40 Each record now costs the company $10.50 ÷ 35 = $0.30 *1 mark for either calculation of price per record.* Each record therefore saves $0.10 and so $90 ÷ $0.10 = <u>900</u> records need to be completed. *(901 represents first actual saving)*	3

Question	Answer	Marks
8(a)	The square numbers between 10 and 99 are 16, 25, 36, 49, 64 and 81, none of which contain <u>7</u> or <u>0</u>.	1
8(b)	Each passcode must start and end with 1, 4 or 6 and so must be of one of the following forms: 16**81 49**64 64**16 64**36 For each of these there are four possibilities for the two middle digits, Making <u>16</u> possibilities. *1 mark for any one of the four forms identified.*	2
8(c)	1 + 6 = 7; 2 + 5 = 7; 3 + 6 = 9; 4 + 9 = 13; 6 + 4 = 10; 8 + 1 = 9 Of these digit sums, only 9 + 9 + 7 = 25 produces a square number, so my current passcode must contain 36, 81 and either 16 or 25. Only <u>163681</u> satisfies all the criteria. *1 mark for listing the possibilities for one of the four forms,* *e.g. for 16**81, [with ** as 25; 36; 49; 64] seen*	2

Question	Answer	Marks
9(a)	The cube can hold 27 candles and costs $5.40 per box sent. The cuboid can hold 24 candles and costs $5.00 per box sent. So for full boxes the cube is cheaper per candle. **[1]** *OR* *1 mark for $45.00 (cuboid) or $40.00 (without the boxes)* 216 candles can be packed into 8 full cubes at a total cost of $8 \times \$5.40 = $ <u>$43.20</u>	**2**
9(b)	Any combination of boxes giving a total greater than 200 **[1]** Improvement towards 3 cubes + 5 cuboids **[1]** Least amount = <u>$41.20</u>	**3**

Question	Answer	Marks
10(a)	*1 mark for evidence of correct sectors for M, F, Su identified.* <u>5</u>	**2**
10(b)	<u>Tuesday</u>	**1**

Question	Answer	Marks
11(a)	A team with a score of 94 could achieve a final total of 100 if they won their match. **[1]** If all four of the top teams had draws with no goals, then the highest team would also have 100 and so the claim would not be true. **[1]** *Alternatively:* If 94 team wins and others have no score draws, there would be tie for first place **[1]** They would each score 100 **[1]**	**2**
11(b)	If either of the current top two teams wins the match then their total will be higher than any other team can achieve. **[1]** If there is a draw then the top score between those two teams will be either 101 or 100. If one of the teams currently on 96 wins their match they will have 102 and therefore be the winner of the league. **[1]** If the result of the match between the teams currently on 96 is a draw then their total scores will increase to either 98 or 99 and therefore the team currently in first place will win. **[1]** *Alternatively:* First two teams maximum totals for the four possible outcomes of their game: 104, 101, 100, 103 **[1]** 3rd and 4th teams maximum totals for the four possible outcomes of their game: 102, 99, 98, 102 **[1]** First set of totals are distinct from second set, so no two teams can be equal **[1]**	**3**

Question	Answer	Marks
12(a)	Bulbs flash together every 30 seconds. **[1]** Number of times before 12:05 is <u>9</u>.	**2**
12(b)	All on at 13:00. 8 seconds later, red flash, blue do not and white are still on, so proportion on is <u>2/3</u>	**1**
12(c)(i)	Red on 0–1, 2–3, 4–5, 6–7 ……. 28–29 Blue on 0–1, 3–4, 6–7, 9–10 …… 27–28 White on 0–1, 5–6, 10–11, 15–16, ….. 25–26 *1 mark for all three patterns (partially) listed or two patterns fully listed* *[may be implied by earning the second mark].* Numbers that are not multiples of 2, 3 or 5: 1–2, 7–8, 11–12, 13–14, 17–18, 19–20, 23–24, 29–30 *1 mark for at least three of these identified.* A total of <u>8</u>	**3**
12(c)(ii)	Intervals 6–7, 10–11, 12–13, 15–16, 18–19, 20–21, 24–25. *1 mark for listing or rationale leading to at least five of the above.* Total <u>7</u>	**2**