Cambridge International AS & A Level

THINKING SKILLS **9694/13**

Paper 1 Problem Solving **October/November 2022**

MARK SCHEME

Maximum Mark: 50

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Published

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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 2022 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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	My driving speed must be double my walking speed. So I must walk at 5 km/h and drive at 10 km/h. **[1]** So my work must be <u>2.5 km</u> away.	**2**

Question	Answer	Marks
2(a)	Goldy's new diet is 800 g, which is 2% of her weight. Her weight is $0.8 \times 100/2 = $ <u>40 kg</u>	**1**
2(b)	New amount is 1050 g per day Which is 250 g more per day / 7350 g total per week **[1]** $250 \times 7 = $ <u>1750 g</u> per week	**2**

Question	Answer	Marks
3(a)	Buses arrive at Delta street at the following minutes past the hour: #5: 12 27 42 57 # 11: 04 24 44 *1 mark for either* Smallest gap is <u>2 minutes</u>	**2**
3(b)	First bus 14:24; arrives Bravo Lane at 14:55. 15:03 from Bravo Lane arrives Tango Park at 15:16. **[1]** Second bus 14:27; arrives India Road at 14:39. 14:41 from India road arrives Tango Park at 15:06. **[1]**	**2**

Question	Answer	Marks
4	00:00 to 23:59 in day + 25 hours time zone so <u>49 hours</u>	**1**

Question	Answer	Marks
5(a)	<u>Son then daughter</u>	**1**
5(b)	<u>2: Daughter then son</u>.	**1**
5(c)	Just one (sister) **[1]** The sons must all be older than the first daughter **[1]**	**2**

Question	Answer	Marks
6(a)	<u>15</u>	1
6(b)	Total length of intervals ('15' – 1) × 5 = 70 **[1]** Total length of matches = 490 – '70' = 420 **[1]** 420 – (15 × 20) = 120 minutes extra, so number of draws = 120/10 = <u>12</u> *OR* Total length of normal matches and intervals = 14 × 25 + 20 = 370 **[1]** Total length of day = 490 490 – 370 = 120 minutes extra **[1]** so number of draws = 120/10 = <u>12</u>	3

Question	Answer	Marks
7(a)	<u>Erin</u>	1
7(b)	Bernie **[1]** and Callum **[1]**	2

Question	Answer	Marks
8	6 sunny days and 10 non-sunny days would result in growth of $6 \times 5 - 10 \times 3 = 0$ grams **[1]**. Changing one non-sunny day into a sunny day would result in the required increase of 5 + 3 = 8 grams, so this means having <u>7</u> sunny days and 9 non-sunny days. *OR* Any correct calculation for a number of sunny days and a number of non-sunny days, 16 days in total, and an attempt to improve **[1]** For increase of 8 grams, number of sunny days = <u>7</u>	2

Question	Answer	Marks
9(a)	<u>960</u>	1
9(b)	53 people in queue, so Jacob will be on the 5th ride after 10:20 **[1]** <u>10:48</u>	2
9(c)	<u>17:24</u>	1
9(d)	Worst scenario is 10 people per ride **[1]**. Lee is 73rd in queue, so he will be on the 8th ride after 11:27. This is the <u>12:12</u> ride.	2

Question	Answer	Marks
10(a)	In one hour they will have cleaned 1/4+1/5+1/6+1/20 = 2/3 of the glass *1 mark for an attempt to add the fractions* If 2/3 cleaned in one hour then cleaning all will take <u>1 hour 30 minutes</u>	**2**
10(b)	In one hour the original 4 clean 2/3 of the glass. Hence Sheena must clean the other 1/3. To clean all the glass by herself would take <u>3 hours</u>	**1**

Question	Answer	Marks
11(a)	Gino walks 170 km in first 7 days **[1]** He has walked 680 km by 28th, 730 km by 30th, so on last day he needs to walk <u>45</u> km	**2**
11(b)	Considering weeks from Tuesday to Monday, Kim walks 120 km for the first 5 weeks **[1]** and 105 km in the week 6, total 705 km, leaving 70 km **[1]** from Tuesday 12th September. Distances 15, 25, 15, 15, So <u>Friday 15 September 15 km</u> *SC: 2 marks for 15 September and 15 km.* *OR* Kim walks 200 km in 12 days **[1]** She will finish on the 46th day OR 39 days of walking **[1]**	**3**

Question	Answer	Marks
12(a)	For example: 9 × 1st class: 5 × 40 + (4 × 30 + 4 × 10) **[1]** 15 × 2nd class: 10 × 25 + 3 × (2 × 10 + 5) + 2 × (5 × 5) **[1]** <u>24 letters</u>	**3**
12(b)	By using the 30c stamps to post 2nd class letters **[1]** He can post two additional letters, so <u>26</u>	**2**

Question	Answer	Marks
13(a)	The worst case would be where everyone paid with a $10 note. **[1]** For example: 3 people paying with a $10 note would require a total of $21 in $1 coins, which would require 7 people paying with coins. **[1]** If more than 10 people paying with $10 note, not enough $1 coins are available, so the minimum number of people is <u>11</u> *SC: 2 marks for answer of 10*	**3**
13(b)	The 3 players who paid $6 must have received a total of 12 $1 coins for their change **[1]** For example: 3 people paying with a $5 note would require a total of $(3 × 2 + 12) in $1 coins, which would require 6 people paying with coins. **[1]** Since 34 = 7 + 5 × 5 + 2, the number of people paying with notes is at most 3 + 5 × 3 + 1 = <u>19</u>	**3**
13(c)	If a person pays with a $10 note and there is no $5 note to give in the change then 7 $1 coins are needed for the change. If a person pays with a $10 note and there is a $5 note to give in the change then: 2 $1 coins must be given in change to the person paying with the $10 note 2 $1 coins have been given to the person who paid with the $5 note. 3 $1 coins have not been collected from the person who paid with the $5 note instead of paying the exact amount. *1 mark for any two of these three.* 2 + 2 + 3 = 7, so the number of coins that Li has is the same either way.	**2**