Cambridge Assessment International Education

Cambridge International AS & A Level

THINKING SKILLS **9694/13**

Paper 1 Problem Solving **May/June 2020**

MARK SCHEME

Maximum Mark: 50

Published

Students did not sit exam papers in the June 2020 series due to the Covid-19 global pandemic.

This mark scheme is published to support teachers and students and should be read together with the question paper. It shows the requirements of the exam. The answer column of the mark scheme shows the proposed basis on which Examiners would award marks for this exam. Where appropriate, this column also provides the most likely acceptable alternative responses expected from students. Examiners usually review the mark scheme after they have seen student responses and update the mark scheme if appropriate. In the June series, Examiners were unable to consider the acceptability of alternative responses, as there were no student responses to consider.

Mark schemes should usually be read together with the Principal Examiner Report for Teachers. However, because students did not sit exam papers, there is no Principal Examiner Report for Teachers for the June 2020 series.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the June 2020 series for most Cambridge IGCSE™ and Cambridge International A & 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
	Individual mark of partial credit
	Double mark of partial credit
	Essential element of answer/working missing
	Correct follow through
	Transcription error
	Judged to be not good enough to earn the relevant credit
	Benefit of doubt
	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	Individual tins currently cost 75% of 80¢ = 60¢ each. A pack of 6 costs ($6 \times 60¢ - 60¢$) $3.00 **[1]** He can buy 6 packs of 6 for $18.00 and 3 further tins for $1.80, a total of 39 tins.	**2**

Question	Answer	Marks
2	The details of the journey after the ferry are irrelevant. I must make sure that I complete the journey on the motorway by 14:00. Working back from 14:00, **[1]** it will take 1.5 hours to complete 105 km at 70 km/h, I will need to leave at 12:30	**2**

Question	Answer	Marks
3(a)	10 minute walk, station at 09:10 catches 09:25 train **[1]** arrives at ferry at 10:50 Takes 11:00 ferry **[1],** arrives at 11:20, plus 15 minute walk, so arrives at 11:35 *SC: 1 mark for next ferry FT wrong train*	**3**
3(b)(i)	Maximises time by taking first ferry there and last ferry back **[1]** Ferries at 10:00 and 18:30 mean arrive and leave Mona's house at 10:35, 18:15 **[1]** Time at Mona's house: 10:35 to 18:15, so 7 hours 40 minutes	**3**
3(b)(ii)	18:30 ferry arrives in Portland at 18:50, so 18:55 train, arriving Mainton at 20:20. Add on 10 minute walk, so arrives home at 20:30 **[1]** Catches 08:25 train, leaves home at 08:15 Time away from home: 08:15 to 20:30, so 12 hours 15 minutes	**2**

Question	Answer	Marks
4(a)	More of all three types of ticket were sold on the 8th than any other day (during the two-week period).	**1**
4(b)	The ratio standard : 3-day : 7-day must be 3 : 2 : 1 **[1]** So the income from sales of the three types of ticket was exactly the same on the 12th.	**2**
4(c)	366 3-day tickets 218 7-day tickets *1 mark for either* 734 standard tickets 1318	**2**

Question	Answer	Marks
5(a)	B, C, F (or 01:10, 01:15 and 02:25)	1
5(b)	She needs two groups of 13:30 / 810 seconds **[1]** *Any 2 groups which add to within 5 seconds of each other [1].* H, I, J, M and K, L and N	3

Question	Answer	Marks
6(a)	There must be three 1¢ coins **[1]** in order to be able to make 63¢ exactly. It must be possible to make totals of 45¢ and 60¢ from the remaining coins. The smallest set of coins that can be used to make 45¢ is a 25¢ and two 10¢ coins. The smallest set of coins that can be used to make 60¢ is a 50¢ coin and one 10¢ coin. So: Three 1¢ coins, two 10¢ coins, one 25¢ coin and one 50¢ coin – 7 coins in total can make both amounts exactly.	2
6(b)	The same outcome could be achieved by using a second 25¢ coin instead of the 50¢ coin, so there are two possible sets of coins.	1

Question	Answer	Marks
7(a)	There are several ways to spend the minimum. (A search leading to) a cost that gives the required lengths **[1]** The least cost is $70	2
7(b)	Cost per metre is now higher the longer the plank bought **[1]** but the cost of 7.00 m length is cheaper by buying a 2.50 + a 4.50 ($8.50) than 2 planks of 3.50 m ($9.00). **[1]** Hence the best of those possibilities giving a total length of 70 m is 10 of 4.50 and 10 of 2.50. Total cost $85.	3

Question	Answer	Marks
8	Eric was away from home for 700 minutes (11h 40m) 60% of 700 minutes = 420 minutes **[1]** The outward journey took 190 minutes (3h 10m) and the journey home took 230 minutes (3h 50m) **[1]** He left his grandmother's house (3h 50m before arriving home at 20:25) at 16:35	3

Question	Answer	Marks
9	Assume that the club has 100 members. 40 are under 25, of which males are 55% = 22 **[1]** 100 – 63 = 37 members in total are male, so number of male members that are 25+ = 15 **[1]** % of 25+ that is male = 15 out of 60 = 25%	**3**

Question	Answer	Marks
10(a)	Lucy Doble could have opened the shop aged 60. The youngest current Doble could be 18. The Dobles in between could have just 20 years between them. $18 + 20 \times 4 = 98$ So 38 years. *1 mark for 18 AND 60 identified* *OR* *20×4*	**2**
10(b)	Most possible time between generations is 40 years. Maximum if current Doble is 60 and Lucy opened the shop aged 18. **[1]** $22 + 3 \times 40 + 60$ 202 years.	**2**

Question	Answer	Marks
11(a)	If all family tickets were used by one adult with one child then there would have been 3 children for every 2 adults in the theme park. If all family tickets were used by one adult with two children then there would have been 4 children for every 2 adults in the theme park. *1 mark for either of these* The number of children must be at least 50% more than the number of adults, so the pie chart cannot represent Monday, Thursday or Friday. **[1]** The number of children must be at most twice as many as the number of adults, so the pie chart cannot represent Wednesday. **[1]**	**3**
11(b)	Each adult entered on either a family ticket or an adult ticket and equal numbers of each were sold. 225 adult tickets, 225 family tickets and 450 child tickets were sold. **[1]** If all of the family tickets had been used for just one child to enter then 675 children would have been in the theme park. **[1]** 800 – 675 = 125 family tickets were used for 2 children to enter the park.	**3**

Question	Answer	Marks
12(a)	Cost from Smartex = $100 \times 4.60 - 40 \times 4.40 = \$284$ Cost from Realex = $60 \times 4.65 = \$279$ *1 mark for either correct cost* So Realex is cheaper by $5.	**2**
12(b)	Realex costs $5 more to start with Every £ she returns costs her $0.25 more with Smartex *1 mark for either insight* So they will be equal if she returns 5/0.25 = £20 **[1]** Thus spending £80 while away. Algebraic approach: Cost from Smartex = $100 \times 4.60 - (100 - y)4.40 = 20 + 4.40y$ = Cost from Realex = $4.65y$ **oe [1]** Equal costs when $20 = 0.25y$ **[1]** So costs will be equal when Vera spends y = £80.	**3**