Cambridge International AS & A Level

THINKING SKILLS **9694/13**

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	All 32 slots for one doctor 8 slots for each of two other doctors = 16 slots 4 slots for each of the two doctors working a half day = 8 slots <u>56</u> slots in total. *1 mark for any two of 32 and 16 OR 32, 8 and 4*	**2**

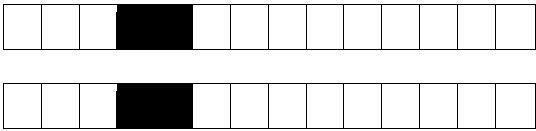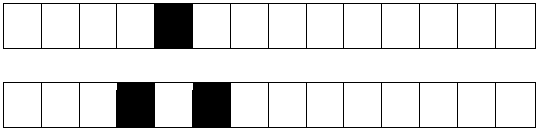| Question	Answer	Marks
2(a)	<u>3</u> (ABD, ADB, BAD)	**1**
2(b)	4 **[1]** Via AB, BD, AD, or B *1 mark for at least three correct and none wrong*	**1**

Question	Answer	Marks
3	This is not the only possibility: the other possibility is $5 for chocolate (and $3 for plain.) *1 mark for finding cost of plain biscuits as $8 each when chocolate biscuits cost $2*	**2**

Question	Answer	Marks
4(a)	First train after 08:30 is at 08:35, arriving in Odiham at 09:25 **[1]** First train back after 11:25 is at 11:40, arriving in Juno at <u>12:30</u>	**2**
4(b)	To arrive in Ninar by 13:45 he needs to catch the train arriving at 13:35 **[1]** This leaves Kepler at 13:04, so needs to leave home at <u>12:54</u>	**2**

Question	Answer	Marks
5(a)	In the 15 hours = 900 minutes from 7.30 am to 10.30 pm, the clock will have only moved forward by $900 \times 0.95 = 855$ minutes. So it will be showing <u>9.45</u> pm *1 mark for 855 / 45 (minutes) OR 57 / 3 minutes per hour OR 1368 / 72 minutes per day*	**2**
5(b)	<u>10.57</u> pm ***ft*** *their (a) + 72 minutes*	**1**

Question	Answer	Marks
6(a)	(With almost exactly 5 months between them) the closest in age are <u>Spruce and Hawthorn</u>. *1 mark for Cherry and Elder OR Elder and Lime*	**2**
6(b)	<u>Elder, Lime and Yew</u> *1 mark for three squad members with a total of more than 150 appearances, but fewer than 300 points, e.g. Willow, Yew and Elder* *OR* *more than 300 points but fewer than 150 appearances, e.g. Yew, Pine and Elder.*	**2**
6(c)	The only squad member with fewer than 43 appearances **and** more than 94 points is <u>Pine</u>.	**1**

Question	Answer	Marks
7(a)	Voucher 1: $(9.6 \times 0.6) + 3.50$ **oe** Voucher 2: $(9.6 + 3.5) \times 0.7$ **oe** *1 mark for either* Voucher 2 costs $\underline{9.17}$, which is less than voucher 1 ($9.26)	**2**
7(b)	Voucher 1: $(9.6 \times 0.6) + 2.50$ **oe** Voucher 2: $(9.6 + 2.5) \times 0.7$ **oe** *1 mark for either* Voucher 1 costs $\underline{8.26}$, which is less than voucher 1 ($8.47)	**2**
7(c)	$\underline{3.20}$ *1 mark for setting up an equation equivalent to* *$9.6 \times 0.6 + d = (9.6 + d) \times 0.7$* *OR* *1 mark for recognition of 'main divided by 3'* *OR* *1 mark for a search involving a specific calculation equivalent to* *$9.6 \times 0.6 + d = (9.6 + d) \times 0.7$ where d is between 2.50 and 3.50* *OR* *1 mark for using the ratio of price differences 9¢ : 21¢ = 3:7*	**2**

Question	Answer	Marks
8(a)(i)	There are three places where there is a jolt, scoring, respectively <u>1 + 2 + 2</u> (*or vice versa*)	**1**
8(a)(ii)	Removing an extra stone to make both tracks the same will remove the two twists, (reducing the total score to 2 points).	**1**
8(b)	This combination (or inverted) at any slide but not at end. **[1]** Maximum jolting from both changing at once, so 2 + 5 + 5 + 2 = 14 **[1]**	**2**

Question	Answer	Marks
9(a)	21 **[1]** 51 and 52 **[1]**	**2**
9(b)	<u>140</u> *1 mark for 26 (the sheet number) / 25 more sheets* *OR for noting that the odd numbers on any sheet add up to the total*	**2**

Question	Answer	Marks
10(a)(i)	Multiplication by 5 means that there would be another 5 or a 0 (in the 4th position) **[1]** 0 would cause other digits to be 0 as well (in the 5th and/or 6th position) **[1]** *OR* 5 multiplied by odd ends in 5, so repeat **[1]** 5 multiplied by even ends in 0, which makes later digits 0 **[1]**	**2**
10(a)(ii)	(Multiplication involving 2 means that) the 3rd digit would be 0 or 1. **[1]** 1 as the third digit would cause the 6th digit to be the same as the 4th. **[1]**	**2**
10(b)	<u>392714</u>	**1**
10(c)	<u>796318</u> *1 mark for recognition that the passcode must contain 1, 3, 7 and 8, e.g. an answer of 976318 (which begins with the same digit as the current passcode).*	**2**

Question	Answer	Marks
11(a)	At 10:00 the car park had not yet been open for 4 hours, so the number of cars that had left by this time is $50 \div $2 = 25$. **[1]** There are now 100 – 43 = 57 cars in the car park, so the number of tickets issued is 25 + 57 = <u>82</u>.	**2**
11(b)	At 12:00, when the car park had been open for exactly 4 hours (but not over 4 hours), the number that had paid $2 each as they left is $152 \div $2 = 76$. **[1]** Between 12:00 and 13:00, $62 was taken. $12 \times $5 + 1 \times $2 = 62, so the minimum number of cars leaving during this time was 13. **[1]** Between 13:00 and 14:00, $73 was taken. $13 \times $5 + 4 \times $2 = 73, so the minimum number of cars leaving during this time was 17. **[1]** At 14:00 there were 100 – 52 = 48 cars parked, so the minimum number of tickets issued so far is 48 + 76 + 13 + 17 = <u>154</u>. *SC: 2 marks final answer of 151 (considers takings of $135 between 12:00 and 14:00, so concludes a minimum of 27 cars leaving during this time).*	**4**

Question	Answer	Marks
12(a)	The total weight (25.1 tonnes) is higher than the limit of 25 tonnes.	**1**
12(b)	*1 mark for identifying the weights needed for the two sections after removing any one box, for example, 1.4 tonne box removed leaves 11.8 and 11.9* *1 mark for getting a combination of boxes that comes within 0.5 tonnes* *1 mark for any of the valid solutions with weight removed stated* *Examples:* 1.4 tonne box removed:	**3**

1.4 tonne box removed:

Section 1	Section 2
3.7	2.1
3.2	3.9
2.4	1.2
2.6	4.6

1.2 tonne box removed

Section 1	Section 2
3.7	2.1
3.2	3.9
2.4	1.4
2.6	4.6