



Cambridge International AS & A Level

THINKING SKILLS

9694/11

Paper 1 Problem Solving

May/June 2021

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 May/June 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level 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
	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(a)	The only possibility is <u>3</u> correct	1
1(b)	The only possibility is <u>7</u> correct	1

Question	Answer	Marks
2(a)	Jack's books will cost (80% of \$40 =) \$32 Jill's books will cost (\$28 + \$2 =) \$30 <i>1 mark for either of these</i> Total cost is <u>\$62</u>	2
2(b)	The greatest benefit comes from using Jill's voucher to buy the two dearest books, so the two dearest books will cost (\$28 + \$2 =) \$30 The other two books will cost (80% of \$27 =) \$21.60 <i>1 mark for either of these</i> The minimum total cost is <u>\$51.60</u>	2

Question	Answer	Marks
3(a)	The windows for medicine-taking are 09:30–12:00, 15:30–18:00 and 22:00–22:30 <i>1 mark for any two correct windows or for the durations of any two correct windows (2.5 h, 2.5 h, 0.5 h)</i> <i>OR three correct start points</i> <i>OR three correct end points</i> <i>OR 9:30, 12:00, 15:30, 18:00, 22:00 (no extras)</i> <i>OR answer of 5 hours coming from subtracting times not able to take medicine</i> <u>5.5 hours</u>	2
3(b)	First dose: any time in the interval 09:30–10:30 Second dose: any time in the interval 15:30–16:30 which is at least 6 hours after the first dose Third dose: any time in the interval 22:00–22:30 which is at least 6 hours after the second dose	1
3(c)	No. He does not have a window long enough to take two doses	1

Question	Answer	Marks
4(a)	The fixed costs are $(3 \times \$700) + (900 \times 40\text{¢})$ [1] = \$2460. From the sale of each ticket Melodia keeps \$6 [1] (75% of \$8), so the fixed costs can be covered by the sale of the first $\$2460 \div \6 = <u>410</u> tickets.	3
4(b)	(If all the available tickets and programmes are sold:) Total income = $(1200 \times \$8) + (900 \times \$1) = \$10\,500$ [1] Total to be paid to the theatre = $\$2100 + 25\% \text{ of } \$9600 + \$360 = \4860 [1] The maximum profit that Melodia can make is therefore $\$10500 - \4860 = <u>\$5640</u> . OR: Income (less 25% given to theatre) = $(1200 \times \$6) + (900 \times \$1) = \$8100$ [1] Fixed costs = $(3 \times \$700) + (900 \times 40\text{¢}) = \2460 [1] Maximum profit = $\$8100 - \$2460 = \underline{\$5640}$ OR: Profit on seats = $400 \times 3 \times \$6 - \$2100 = \$5100$ [1] Profit on programmes = $\$900 - \$360 = 540$ [1] Maximum profit = $\$5100 + \$540 = \underline{\$5640}$	3

Question	Answer	Marks
5	\$180 shared in the ratio 8 : 6 : 4 gives 18 shares of \$10, so (James receives \$80) Sarah receives \$60 (and Lucy receives \$40) (After the birthdays of Lucy and Sarah) \$180 shared in the ratio 8 : 7 : 5 would have given 20 shares of \$9, so (James would have received \$72) Sarah would have received \$63 (and Lucy would have received \$45) <i>1 mark for either \$60 or \$63 seen</i> Sarah would have received <u>\$3</u> more.	2

Question	Answer	Marks
6(a)	<u>Celia and Rachel, Celia and Jeremy</u> <i>1 mark for both pairs correct with one additional pair OR for one correct pair in a list of no more than two pairs</i>	2
6(b)	<u>390</u>	1

Question	Answer	Marks
7(a)	Episodes end at 10:15, 11:10, 12:05, 13:50, 14:45, <u>15:40</u> <i>1 mark for 1-hour break begins at 12:05 OR for final answer of 15:50 OR for 6 hours 10 minutes</i>	2
7(b)	18 episodes at 45 mins = 13.5 hours [1] $13.5/5 = 2.7$ hours, so break each Sunday = <u>18</u> minutes	2
7(c)	Friday [1] at 20:40 [1]	2
7(d)	Monday: 4 episodes + 20 mins of 5 th Tuesday: 25 mins of 5 th + 3 + 40 mins of 9 th [1] Wednesday: 5 mins of 9 th + 4 and no time to begin another so she has watched 13 complete episodes by the end of Wednesday [1] Pattern begins again, leaving 25 mins of 18 th . <u>Friday at 19:25</u> OR (Total watching time of 810 minutes): Number of watching minutes each day: 200, 200, [1] 185, [1] 200 leaving 25 so <u>Friday at 19:25</u>	3

Question	Answer	Marks
8(a)	<u>Albertong, Hackeridge and Yonderford</u> <i>1 mark for any two correct in a list of not more than four.</i>	2
8(b)	<u>23</u> tonnes. <i>Award 1 mark for 21 (tonnes)</i>	2

Question	Answer	Marks
9(a)	<u>117</u>	1
9(b)	<u>142</u>	1
9(c)	<u>6</u> <i>1 mark for sight of any one 2-hour interval starting on any hour from 9:00 to 16:00 e.g. 10:00 – 12:00</i>	2

Question	Answer	Marks
10(a)(i)	At 12:04, 1 st cyclist has cycled 1000 m [1] 2 nd gains 1000 m in 20 mins, so level at <u>12:24</u> <i>SC: 1 mark for final answer of 12:20 (starts counting at 12:00)</i>	2
10(a)(ii)	1 st has cycled for 24 mins at 15 km / h, so distance = $24/60 \times 15 = \underline{6}$ km	1
10(b)	2 nd cyclist cycles 6 km in 20 mins so he cycles 60 km in 200 mins oe [1] Finishes at 15:24 16 th cyclist leaves at 13:00, so total time is 2 h 24 mins [1] Speed is $60/2.4 = \underline{25}$ km / h <i>SC: 2 marks for final answer of 25.7... (starts counting at 12:00/13:04)</i>	3

Question	Answer	Marks
11(a)	Any sequence of 8 beginning with C and ending in T with no run of T or C longer than 2, for example: CCTTCCTT, CTTCTCT, CTCTCTCT	1
11(b)	<i>2 marks for a version of 'Player 1 continues with T, C, T'</i> <i>OR for the sequence (C)TTCCTTC</i> <i>1 mark for a version of 'Player 1 continues with T, C'</i>	2

Question	Answer	Marks
12	A search attempt in which Fay has \$16 more than Rose [1] A second attempt which gets closer to Fay having twice as much as Rose after Rose has given \$8 to Fay. [1] (Fay must have \$56 and) Rose must have <u>\$40</u> . <i>OR</i> Algebraic approach: $F - 8 = R + 8$ [1] oe $F + 8 = 2(R - 8)$ [1] oe (F = \$56 and) Rose has <u>\$40</u> <i>OR</i> Fay must have $2 \times 8 = \$16$ more than Rose. [1] That \$16 is the difference between half of the total money and a third of the total money. So \$16 is one sixth of the total / the total is \$96 [1] Fay must have \$56 and Rose must have <u>\$40</u> .	3