



Cambridge International AS & A Level

THINKING SKILLS

9694/12

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.

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	The journey to the caravan will take $150 \div 90 = 1$ hour 40 minutes. [1] There is a total of 4 hours between the time that Fred can set off and the time that he must arrive at the caravan. The time that Fred can spend visiting his friend is 4 hours – 1 hour 40 minutes = <u>2 hours 20 minutes</u> .	2

Question	Answer	Marks
2	$(8 \times 1) + (8 \times 2) + (2 \times 3) = 30$ cats share their home with 1 dog. $(5 \times 1) + (9 \times 2) + (4 \times 3) = 35$ cats share their home with 2 dogs. $(1 \times 1) + (3 \times 2) + (2 \times 3) = 13$ cats share their home with 3 dogs. <i>Alternatively:</i> $1 \times (8 + 5 + 1) = 14$ solitary cats share their home with at least 1 dog. $2 \times (8 + 9 + 3) = 40$ paired cats share their home with at least 1 dog. $3 \times (2 + 4 + 2) = 24$ triumvirate cats share their home with at least 1 dog. The total is <u>78</u> . <i>1 mark for any one total from 30, 35, 13, 40, 24. (Not 14.)</i> <i>SC: 1 mark for $7 + 8 + 2 + 5 + 9 + 4 + 1 + 3 + 2 = 41$</i> <i>(the number of houses with at least one cat and at least one dog)</i>	2

Question	Answer	Marks
3(a)	The price would be \$0.04 per 100 g $40 \times \$0.04 = \underline{\$1.60}$	1
3(b)	1 kg = \$0.20 [1] Therefore a parcel weighing 1 kg (or any amount less than 1 kg) would cost $\$1.20 - 2 \times \$0.20 =$ <u>\$0.80</u>	2

Question	Answer	Marks
4(a)	$0.5 + 1 + 1.5 = \underline{3}$ metres	1
4(b)	She can put up 4 shelves [1] of lengths 0.4 m, 0.8 m, 1.2 m and 1.6 m [1]	2

Question	Answer	Marks
5(a)	20158 – 5902 – 7517 = 6739 OR 20610 – 7517 – 6354 = 6739	1
5(b)	The number of hits in April was (e.g. 18711 – 7351 – 6277 =) 5083, so May [1] is one of the months The number of hits in December 2017 [1] was (20 207 – 5908 – 7847 =) 6452 So January [1] is the only other month <i>Maximum 1 mark if other months included.</i>	3

Question	Answer	Marks
6(a)	Number of tokens needed = 38 [1] Least cost = $4 \times \$20 = \80	2
6(b)(i)	Use rides with lowest number of tokens: 3 Chair (1) + 3 Teacups (2) + 2 Ghost Train (3), so number of rides = 8	1
6(b)(ii)	1 Teacups (2) + 2 Big Drop (6) + 1 Chair (1) 1T (2) + 2W (5) + 1G (3) 2T (2) + 1B (6) + 1W (5) Number of rides = 4	1
6(c)	Using rides needing least tokens: Adults: $2 \times (1 + 2 + 2 + 3) = 16$ Children $2 \times (19 + 1) = 40$ <i>1 mark for either</i> Total of 56 tokens [1] cost $5 \times \$20 + 1 \times 12 + 1 \times \$3 = \$115$	3

Question	Answer	Marks
7	Each floor requires $30 \times 20 = 600$ tiles. Jasmine, in ratio 4 : 5 : 1 needs 240R, 300B and 60W Katie, with Red to White in ratio 1 : 2 needs 200R and 400W Lucy, with Red to Blue in ratio 1 : 3 needs 150R and 450B. <i>1 mark for correct numbers of tiles for one of the girls</i> <i>OR 2 marks for correct numbers of tiles for two of the girls</i> Totals: 590 Red, 750 Blue and 460 White. <i>1 mark for correct total for at least red or white</i> Difference between the total number of white tiles and the total number of red tiles that are needed is <u>130</u>	4

Question	Answer	Marks
8(a)(i)	At least one household has two cars, and at least two have one car. Minimum total is <u>4</u> cars.	1
8(a)(ii)	Maximum would be when 21 households have no car, 20 have 1 car and 19 have 2 cars. Total is <u>58</u> cars.	1
8(b)	The number with no car will now have to be bigger than 21, and the number with 2 cars less than 19. Any answer with a total of 60 with twice as many having 1 car as 2, and with more having 0 cars as have 1. [1] Actual maximum is when 27 have no car, 22 have 1 car, and 11 have two cars. Total <u>44</u> cars.	2

Question	Answer	Marks
9(a)	Group is 4 adults + 3 children: 1 Special + 2 Adults + 1 Child [1] $\$120 + \$80 + \$25 = \225 <i>SC: 1 mark for \$230 (Small group + 1 Child)</i>	2
9(b)	Next year, 5 Adults + 2 Children: 1 Small Group + 1 Child, costing \$230 [1] <u>\$5</u>	2
9(c)	Group is 19 Adults + 10 Children. 2 Large group + 9 Children costs \$640 + $\$225 = \865 <i>SC: 1 mark for sub-optimal \$885 or \$890</i>	2
9(d)	Tickets for 20 Adults + 9 Children are still 2 Large group + 9 Children	1

Question	Answer	Marks
10	Suppose there are 36 fish: 24 red and 12 yellow <i>1 mark for a supposed number divided 2R:1Y</i> Of the 24 red, 6 are venomous; of the 12 yellow, 4 are venomous <i>1 mark for correct venomous numbers for their total</i> 10 venomous of which 6 are red, so $6/10 = \underline{3/5}$ OR: Proportion that are red venomous is $\frac{1}{4} \times \frac{2}{3} = \frac{1}{6}$ Proportion that are yellow venomous is $\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$ <i>1 mark for either</i> Of venomous, proportion that are red is $\frac{1/6}{(1/6 + 1/9)}$ [1] $= \underline{3/5}$	3

Question	Answer	Marks
11(a)	<u>16 – 9</u>	1
11(b)	If Alex had beaten Gemma in the second game, then Gemma would have scored 12 points in her first game. [1] Since this would not have been a winning score, Gemma would have two losses. Alex must have beaten Janet in her second game.	2
11(c)	Alex 4 – 21 Gemma [1] Janet 15 – 10 Richard [1]	2

Question	Answer	Marks
12(a)	At 14:00, Jane has cycled for 1 hr, a distance of 15 km. Distance from Alton = <u>3 km</u>	1
12(b)	Speeds in ratio 5:3 [1] so they meet $\frac{5}{8}$ of distance from Alton $\frac{5}{8}$ of 6 = <u>3.75 km</u>	2
12(c)	At 14:30, Jane has cycled 22.5 km, so distance from Alton = 1.5 km [1] In this time, Katy has cycled 13.5 km, so she is 1.5 km from Basing [1] Katy needs to cycle 3 km and this takes <u>20 minutes</u>	3