Cambridge Assessment International Education

Cambridge International AS & A Level

THINKING SKILLS **9694/13**

Paper 1 Problem Solving **October/November 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 October/November 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

[Turn over

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).

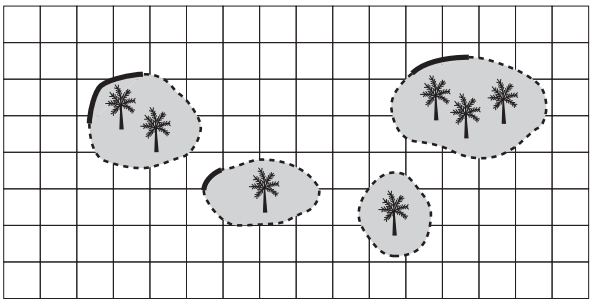
Partial credit should be indicated with a 1 (or, occasionally, a 2) at the point at which that mark has been earned.

The highlighter should be used anywhere it is helpful to clarify the marking.

	Correct item
	Incorrect item
	Individual mark of partial credit
	Double mark of partial credit
	Essential element of answer/working missing
	Judged to be not good enough to earn the relevant credit
	Benefit of doubt
	Correct follow through
	Transcription error
	Special case
	Working seen but no credit awarded; blank page checked
Highlight	Use anywhere it is helpful to clarify the marking

Question	Answer	Marks
1(a)	1 + 1 + 1 + 1: \$90 + 90 + 90 +90 = \$360 2 + 1 + 1: \$164 + 90 + 90 = \$344 2 + 2: \$164 + 164 = \$328 3 + 1: \$240 + 90 = \$330 *1 mark for any three correct*	**2**
1(b)	Option 1: \$164 + \$164 + \$164 = \$492 **ft** Option 2: \$240 + 240 = \$480 *1 mark for either correct total* Option 2 is cheaper by \$12	**2**

Question	Answer	Marks
2	5	**1**

Question	Answer	Marks
3	 *1 mark for any two marked correctly* *No incorrect additions for 2 marks*	**2**

Question	Answer	Marks
4(a)(i)	Spin: 11:00 to 11:40, Zumba: 13:00, ending at 13:30	**1**
4(a)(ii)	Spin: 14:00 to 14:40, Zumba: 15;30 to 16:00, so 2 hours	**1**
4(b)	Zumba: 13:00 to 13:30, Spin: 14:00 to 14.40 **[1]** so 1 hour 40 minutes which is less than 2 hours	**2**
4(c)	Friday, \$32	**1**
4(d)(i)	*2 marks for a clearly expressed correct answer* *1 mark for correct answer that omits the time for Spin* She cannot start the Spin class earlier than 14:00, so will be too late for last Pilates class at 14:30. *OR* The latest Pilates class starts at 14:30, so she cannot start the Spin class earlier than 11:00.	**2**
4(d)(ii)	Pilates 11:30 **[1]** Zumba 13:00 and Spin 14:00 3 hours 10 minutes **[1]**	**2**

Question	Answer	Marks
5(a)	Use offer Z twice: \$26 and \$12 for \$23 and \$16 and \$20 for \$27 **[1]** Total \$50 **[1]**	**2**
5(b)	\$28	**1**
5(c)	Difference in cost between two cheapest games is \$4 **[1]** Costs are \$12, \$16 and \$20 *OR* simultaneous equations: Cost (in \$) x, y, z: $x + y + 0.5z = 42$ and $x + 0.5y + z = 40$ or equivalent **[1]** Costs are \$12, \$16 and \$20	**2**

Question	Answer	Marks
6	The 12 litres of pink paint will require 8 litres of red and 4 litres of white. The 16 litres of orange paint will require 8 litres of red and 8 litres of yellow. *1 mark for either* Therefore a total of 26 litres of red paint, 4 litres of white and 8 litres of yellow are required. An additional 16 litres of red paint will be bought compared to buying individual colours. **[1]** 16 litres of paint will require 8 tins. The saving will be \$24 *OR* Mixing the pink paint will mean that an additional 8 litres of red paint will be bought instead of pink. **[1]** Mixing the orange paint will mean that an additional 8 litres of red paint will be bought instead of orange. **[1]** 16 litres of paint will require 8 tins. The saving will be \$24 *OR* Without mixing paints, cost = \$(19x – 15) **[1]** With mixing, cost = \$(19x – 39) **[1]** Saving = \$(39 – 15) = \$24	**3**

Question	Answer	Marks
7(a)	Thursday of week 1	**1**
7(b)	The only difference between Wednesday and Thursday of week 1 is the offer starting on crisps. The reduction on packets of crisps must be 20¢ **[1]** The offer on crisps is the only offer in place on Monday (and Tuesday) of week 2, so the full price must be \$2.90 + \$0.20 = \$3.10.	**2**

Question	Answer	Marks
8(a)	1 + 2 + 3 + 4 + 5 + 6 + 7 = 28	**1**
8(b)	(R, G, Black); (O, Y, Black); (R, Blue, V); (O, G, V); (Y, G, Blue) OR (1, 4, 7); (2, 3, 7); (1, 5, 6); (2, 4, 6); (3, 4, 5) *2 marks for all five and no incorrect.* *1 mark for five correct and no more than two extras OR four correct and no more than one incorrect OR three correct and no incorrect*	**2**
8(c)	green, violet, black OR (4, 6, 7) *1 mark for Bert (1, 2, 3)* ***oe*** *OR Al (5, 6, 7) and Bert (1, 2, 4)* ***oe***	**2**

Question	Answer	Marks
9(a)	3 × $8 + $8 = $32	**1**
9(b)	4 × 2l + 4 ×1l + 2l + 1l costs $(45 + 24 + 15 + 8) = $92 *1 mark for any correct calculation for 15l except $105: e.g. $93, $95, $96, $98*	**2**
9(c)	16 litres can be bought as 8 × 2l, costing 2 × $45 = $90	**1**

Question	Answer	Marks
10(a)	Arrives at Hendy at 08:15, leaves at 08:40, arrives 09:55. Becomes the 10:00	**1**
10(b)	6	**1**
10(c)	Passes all buses from Garton that are on their journey between 08:40 and 09:55. These are the 07:30, 08:00, 08:30, 09:00, 09:30, a total of 5 *1 mark for a list with one extra/omission*	**2**
10(d)	*2 marks for 6 with a fully correct explanation* *1 mark for 6 with a vague or incomplete explanation* The first bus from Garton becomes the 08:40 from Hendy, so 07:10, 07:40 and 08:10 are needed. First bus from Hendy becomes the 08:30 from Garton, so 07:00, 07:30, 08:00 are needed, total number of buses needed is 6. *OR* Bus returns to starting point every 3 hours. 6 buses leave Garton (or Hendy) every 3 hours, so number of buses needed is 6. *OR* Since 5 buses are passed on the journey of one bus, and this bus becomes the 'next' bus, a total of 6 buses are needed.	**2**

Question	Answer	Marks
11(a)	$2 \times 2 \times 2 \times 2 \times 2 = \underline{32}$.	**1**
11(b)	In each row there are three possibilities **[1]** (nothing, left, right), and each of the five rows is independent, but all 'nothing' is excluded **[1]**: $3 \times 3 \times 3 \times 3 \times 3 - 1 = \underline{242}$ *OR* Number of 1 digit numbers = 10 Number of 2 digit numbers = 40 Number of 3 digit numbers = 80 Number of 4 digit numbers = 80 Number of 5 digit numbers = 32 *2 marks for 4 correct* *OR 1 mark for 2 correct* Total = $\underline{242}$	**3**
11(c)	*Valid reason stated sufficiently clearly, e.g.* • There are more of these than 5 digit codes • The least chance of guessing comes from using the widest possible choice • *Practical suggestions such as* to reduce mechanical wear	**1**

Question	Answer	Marks
12(a)	$\$\underline{21}$ *1 mark for any pair of calculations that satisfy two of the three criteria* *OR* *1 mark for* $2x - 7 = 3(x - 14)$ oe *OR* *1 mark for $63 (the amount Mr Alexander returned home with)*	**2**
12(b)	$\$\underline{11}$	**1**