Cambridge Assessment International Education

Cambridge IGCSE™

COMPUTER SCIENCE **0478/22**

Paper 2 **March 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 March 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.

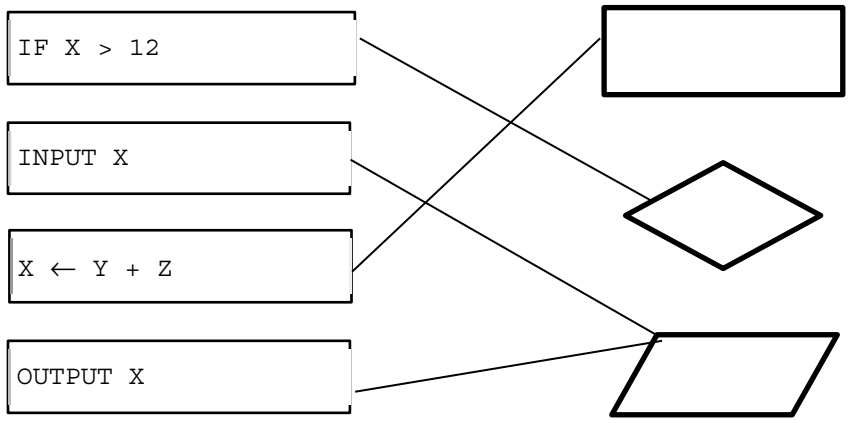
Question	Answer	Marks
	Section A	
1(a)	Variable `answer` (example only) Data type integer/int Validation two distinct different points **OR** one point and an expansion **One** mark per mark point, max **two** – restricted input to positive numbers – checked if input was numeric – ensured that input was a whole number / integer – checked if a value was input **Or** one point and an expansion **two** marks, for example – restricted input to positive numbers (1) by using a range/limit check / REPEAT… UNTIL looping until value greater than zero (1) – checked if input was numeric (1) by using a type check (1) – ensured the value input was a whole number (1) any suitable method e.g. rounding to whole number – checked if a value was input (1) by using a presence check (1)	**4**
1(b)	Variable `noAttempts` (example only) Data type integer/int Use storing the number of attempts a pupil has made on a question	**3**

Question	Answer	Marks

1(c)	**One** mark per mark point, max **six**
	MP1 initialisation (must include number of correct answers)
	MP2 input name and table number with prompts
	MP3 validate table number **and reinput**
	MP4 ensure each question uses a different multiplier
	MP5 display question
	MP6 input **and validate** answer
	MP7 check if answer correct
	MP8 update score appropriately
	MP9 repeat for 5 questions
	MP10 display score **and name** at end …
	MP11 …with an attempt to display an appropriate message dependent on score
	Example
	`Score = 0`
	`Multiplier[1] ← 2`
	`Multiplier[2] ← 5`
	`Multiplier[3] ← 7`
	`Multiplier[4] ← 8`
	`Multiplier[5] ← 11`
	`OUTPUT "Multiplication Table Test"`
	`OUTPUT "Please enter your name"`
	`INPUT Name`
	`REPEAT`
	`  OUTPUT "Please enter the table (2 to 12) you would like to be tested"`
	`  INPUT Table`
	`UNTIL (Table >=2) AND (Table <=12)`
	`FOR Count = 1 TO 5`
	`  OUTPUT ("Question ", Count)`
	`  OUTPUT (Multiplier[Count], " X ", Table, " = ")`
	`  REPEAT`
	`  INPUT Answer`
	`  UNTIL Answer > 0 AND Answer = INT(Answer)`
	`  IF Answer = Multiplier[Count] * Table`
	`  THEN`
	`  Score ← Score + 1`
	`  ENDIF`
	`NEXT`
	`OUTPUT (Name, " your score is ", Score)`
	`IF Score = 5`
	`  THEN`
	`  OUTPUT ("Well done full marks")`
	`  ELSE`
	`  OUTPUT ("Have another practice")`
	`ENDIF`
		6

Question	Answer	Marks
1(d)	Explanation **One** mark per mark point illustrated with a suitable programming statement, max **four** MP1 extra prompt and input to choose the number of questions and/or mixed set MP2 method of choosing number of questions and/or mixed set MP3 extra prompt and input for number of questions MP4 explanation of validation for either input MP5 how the end value for the question loop was changed if required MP6 how the program was changed to allow for mixed tables MP7 … how the program ensured that the test used more than one multiplication table	**4**
1(e)	Explanation **One** mark per mark point, max **three** MP1 how to provide 3 answers, including the correct one MP2 how to ensure that all 3 answers are different MP3 how 3 answers are displayed e.g. output all 3 answers as a numbered list MP4 how to select the correct answer e.g. input the number of the correct answer MP5 how to ensure that the correct answer is not always in the same position	**3**

Question	Answer	Marks
	Section B	
2(a)	– 12 – 13 – 07 – 15	**4**
2(b)	– 27 (example many correct answers any whole number 1-99 inclusive) – 106 (example many correct answers) – 99/1	**3**
2(c)	**One** mark per mark point, max **four** – **new** variable for minimum… – … set to first value/high value – … at start of program / before line 4 – test input / D for less than minimum – … replace value minimum if input less than – … after line 7 and before line 14 – new output for minimum (with appropriate message) – … at end of program // after line 14	**4**

Question	Answer	Marks
3	**Pseudocode statement** **Flowchart symbol**  **One** mark for a single line to decision box from `IF X > 12` **One** mark for a single line to process box from `X ← Y + Z` **Two** marks for two single lines from `INPUT X` and `OUTPUT X` to output box **OR** **One** mark for a single line from `INPUT X` or `OUTPUT X` to output box // two single lines from `INPUT X` and `OUTPUT X` to process box	**4**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(a)</td><td>
One mark for each correct column
<table>
<tr><th>Bag Weight</th><th>Accept</th><th>Over</th><th>Under</th><th>Error</th><th>Total</th><th>OUTPUT</th></tr>
<tr><td></td><td>0</td><td>0</td><td>0</td><td></td><td></td><td>(Enter weight of first cookie bag)</td></tr>
<tr><td>1.05</td><td>1</td><td></td><td></td><td>0</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>0.99</td><td>2</td><td></td><td></td><td>0</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>1.2</td><td></td><td>1</td><td></td><td>1</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>0.85</td><td></td><td></td><td>1</td><td>2</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>1.1</td><td>3</td><td></td><td></td><td>0</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>0.9</td><td>4</td><td></td><td></td><td>0</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>1.5</td><td></td><td>2</td><td></td><td>1</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>0.95</td><td>5</td><td></td><td></td><td>0</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>1.05</td><td>6</td><td></td><td></td><td>0</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>1.00</td><td>7</td><td></td><td></td><td>0</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>1.07</td><td>8</td><td></td><td></td><td>0</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>0.89</td><td></td><td></td><td>2</td><td>2</td><td></td><td>(Weight of next bag?)</td></tr>
<tr><td>-10</td><td></td><td></td><td></td><td></td><td>4</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>Number of bags weighed 4</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>Number overweight 2</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>Number underweight 2</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td><td>7</td></tr>
<tr><td>4(b)</td><td>Error <code>Total ← Accept - Over - Under</code> // line 26
Correction <code>Total ← Accept + Over + Under</code></td><td>2</td></tr>
</table>

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(a)</td><td>One mark for data type and reason
SIZE text, expressed as a single word // Boolean, only two choices
PRICE currency, needs to be expressed as Rupees/money
NUMBERSOLD number, integer values/could be used in calculations</td><td>3</td></tr>
<tr><td>5(b)</td><td>
<table>
<tr><td>Field:</td><td>SIZE</td><td>FILLING</td><td>PRICE</td><td>NUMBERSOLD</td></tr>
<tr><td>Table:</td><td>CHOCBAR</td><td>CHOCBAR</td><td>CHOCBAR</td><td>CHOCBAR</td></tr>
<tr><td>Sort:</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Show:</td><td>☐</td><td>☑</td><td>☑</td><td>☑</td></tr>
<tr><td>Criteria:</td><td>= "small"</td><td></td><td></td><td><10</td></tr>
<tr><td>or:</td><td></td><td></td><td></td><td></td></tr>
</table>
One mark for correct rows Field, Table and Sort
One mark for correct Show row
One mark for correct Criteria row</td><td>3</td></tr>
</table>