MODULE K ALGORITHM DESIGN · K5

Reading and writing pseudocode: mark scheme

20 marks · OCR J277 spec 2.1.2 (create, interpret, correct, complete and refine algorithms using pseudocode and Exam Reference Language / a high-level language; identify common errors) and 2.3.1 (maintainability: naming conventions, indentation, commenting)

How to use. One mark per bullet up to the maximum shown. **/** separates alternatives; **//** separates alternative statements for the same mark. Words in (brackets) are not needed for the mark. **...** means the point depends on the one before. NE = not enough; FT = follow through. Code answers in OCR Exam Reference Language or any high-level language are marked for logic: minor syntax errors are not penalised, and a repeated slip is penalised once only. Do not accept mathematical symbols such as ≥, ≤ or ≠ in code. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 2.1.2	Row 3 ticked only (a structured, code-like way of writing an algorithm that is not tied to one programming language)	**1**	2+ ticks = 0 marks. Row 1 is a flowchart, row 2 a trace table, row 4 a high-level language.

2(a) J277 2.1.2	1 mark for each correct condition:
	`speed > 70`
	`colour != "red"`
	`age >= 18 AND age <= 65` // `age > 17 AND age < 66`
		3	Allow `if` / `then` around the condition. Allow lower-case and; allow `NOT(colour == "red")`; allow <> for not equal; allow `18 <= age <= 65` (valid in a high-level language). Row 2: "red" must be in quotes. Row 3: do not accept age `>= 18 AND <= 65` (the second comparison has no variable), `OR` instead of AND, or =>.

3(a)(i) J277 2.1.2	02	**1**	Correct answer only. Allow 2.
3(a)(ii) J277 2.1.2	06	**1**	Correct answer only. Allow 6. Allow 06–11 given as a range.

QUESTION	ANSWER	MARKS	GUIDANCE
3(b) J277 2.1.2	1 mark for each output line: Inputs 5, 2: `1 more needed` ... `Stamps now: 7` Inputs 3, 5: `Free drink earned` ... `Stamps now: 0`	**4**	Ignore quotation marks round outputs. Ignore minor differences in spacing or capitals. Do not award an output line that includes code (e.g. `str(TARGET - stamps)`) instead of its value. Each output line is marked on its own. Outputs written in the wrong row score 0 for those lines.

3(c)
J277 2.3.1
	1 mark each, max 2:
	Comment(s) // line 01 explains what the code is for
	Indentation (inside the if and else) // lines 07, 08 and 10 are indented
	Meaningful / sensible identifiers / variable names // e.g. `stamps`, `cups` // naming conventions
	Use of a constant (`TARGET`) so the number of stamps only needs changing in one place
		2	Mark the first two answers only. Do not accept "sub programs" (there are none in this code). Do not accept "it is short / simple" (NE).

4(a) J277 2.1.2	1 mark for each line number, 1 mark for each matching correction: Line 04 ... ... `while unlocked == false AND attempts < 3` // `attempts <= 2` Line 09 ... ... `attempts = attempts + 1`	**4**	Line 04 as given allows four attempts; line 09 as given makes `attempts` go down, so the loop never ends until the code is correct. A correction only scores if its line number is correct. Allow line 02 changed to `attempts = 1` as the correction instead of line 04 (also gives exactly three attempts). Allow `NOT unlocked` or `unlocked == False`.

QUESTION	ANSWER	MARKS	GUIDANCE

5(a)
J277 2.1.2
	1 mark each, max 4:
	Count (variable) set to 0 (before the loop)
	Loop that runs exactly 10 times
	Input of a reading inside the loop, stored in a variable
	Check whether the reading is > 30 ... and if so add 1 to the count
	Output the count after the loop ends // outside the loop
	`count = 0`
	`for i = 1 to 10`
	`  reading = float(input("Enter reading"))`
	`  if reading > 30 then`
	`  count = count + 1`
	`  endif`
	`next i`
	`print(count)`
		4	Allow any logically valid method, e.g. a while or do until loop with its own counter, or `for i in range(10)`. Allow `0 to 9`. Do not penalise a missing cast. Do not award the selection mark for `>= 30` (30 is not more than 30). Do not award the output mark if the count is output every time round the loop. Flowcharts, bullet points or English score 0.

Total: 20 marks