MODULE M PROGRAMMING · M6

Relational (comparison) operators: mark scheme

21 marks · Cambridge 0478 syllabus 8.1.4(f) (relational operators, limited to =, <, <=, >, >=, <>; the result is always BOOLEAN), 8.1.4(b) (selection), 8.1.4(c) (iteration)

How to use. One mark per bullet point up to the maximum shown. **//** separates alternative answers. Words in (brackets) are not needed for the mark. In code answers, ignore minor syntax slips, but the relational operator must be a correct pseudocode operator: do not accept ≥, ≤, ≠, =>, =<, ==, !=, or the comparison written in English. A comparison with the operands the other way round and the operator reversed is equivalent (e.g. `72 <= Passengers` // `Passengers >= 72`) and is accepted.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) 0478 8.1.4(f)	One mark for each correct row: <> … not equal to Less than or equal to … <= = … equal to // is the same as	**3**	Row 2: do not accept =< or ≤. Row 3: do not accept "assigns a value" (assignment is ←).
1(b) 0478 8.1.4(f)	BOOLEAN	**1**	Any case. Do not accept TRUE / FALSE alone (these are the values, not the data type).
2(a) 0478 8.1.4(f)	One mark for each correct row: `Booked < Seats` … FALSE `Booked <= Seats` … TRUE `Row <> 'D'` … TRUE `Groups * 6 > Seats` … FALSE	**4**	Accept T / F, 1 / 0, any case. Row 4: 6 * 6 = 36, and 36 > 40 is FALSE.
3(a) 0478 8.1.4(f)	`Passengers >= 72`	**1**	Accept `Passengers > 71`. Accept within `IF ... THEN`. Do not accept `Passengers > 72` (72 passengers would not count as full).
3(b) 0478 8.1.4(f)	`Charge < 15`	**1**	Accept `15 > Charge` // `Charge <= 14` (whole-number charge). Do not accept `Charge <= 15` (a charge of 15 would show the warning).
3(c) 0478 8.1.4(f)	`Password <> "Kestrel9"`	**1**	Accept `NOT(Password = "Kestrel9")`. The string must be in quotes. Do not accept `!=`.

QUESTION	ANSWER	MARKS	GUIDANCE
4(a) 0478 8.1.4(f), 8.1.4(b), 8.1.4(c)	One mark for each line number identified with a correct correction: Line 04 … `IF Temp >= 8` // `IF Temp > 7` Line 10 … `WHILE Temp > 4 DO` // `WHILE Temp >= 5 DO` Line 15 … `IF Door <> 'C'` // `IF NOT(Door = 'C')`	**3**	Line number and correction are both needed for the mark. Accept the condition alone (e.g. `Temp >= 8`). Accept `4 < Temp` for line 10. Accept double quotes around C. Do not accept a change to any other line.
5(a) 0478 8.1.4(f), 8.1.4(b)	One mark for each correct output: 60 … Generating 25 … Generating 24 … Too little wind	**3**	Ignore quotation marks and capital letters. 60 is not greater than 60, and 25 is not less than 25, so both output Generating.

6(a)
0478 8.1.4(f), 8.1.4(b)
	One mark per bullet point:
	Input of the water level (e.g. `INPUT Level`)
	Check for more than 180 (`Level > 180`) and output Overflow warning
	Check for 20 or less (`Level <= 20` // `Level < 21`) and output Refill needed
	Output Level normal for all other levels, with IF / ELSE / ENDIF structure so only one message is output
	Example answer:
	`OUTPUT "Enter the water level in cm"`
	`INPUT Level`
	`IF Level > 180`
	`  THEN`
	`  OUTPUT "Overflow warning"`
	`  ELSE`
	`  IF Level <= 20`
	`  THEN`
	`  OUTPUT "Refill needed"`
	`  ELSE`
	`  OUTPUT "Level normal"`
	`  ENDIF`
	`ENDIF`
		4	Max 4. Pseudocode expected. Allow three separate IF statements with full conditions, e.g. `IF Level > 20 AND Level <= 180`; do not accept `Level > 20 AND <= 180` (no identifier on the second side). Allow `Level >= 181` for > 180. Wrong boundary (`>= 180` or `< 20`) loses that bullet. Do not award bullet 4 if two messages can be output for one level. A prompt and DECLARE statements are not required. Ignore minor spelling slips in the messages.

Total: 21 marks