MODULE M PROGRAMMING · M6

Comparison operators: mark scheme

22 marks · OCR J277 spec 2.2.1 (the use of operators; recognise and use the comparison operators ==, !=, <, <=, >, >=; selection and condition-controlled iteration)

How to use. 1 mark per bullet up to the maximum shown. **/** separates alternative answers. Words in (brackets) are not needed for the mark. In code answers, accept any logically valid method and ignore minor syntax slips, but the comparison operator itself must be correct: do not accept maths symbols (≥, ≤, ≠), => or =<, or the comparison written in English. A comparison with the operands the other way round and the operator reversed is equivalent (e.g. `630 < load` = `load > 630`) and is accepted.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) J277 2.2.1	1 mark per row: != … Not equal to / is not the same as Greater than or equal to … >= == … Equal to / is the same as / checks whether two values are equal	**3**	Row 2: do not accept => or ≥. Row 3: do not accept "assigns / stores a value" (that is =). Do not accept "not" alone for row 1.
1(b) J277 2.2.1	Boolean	**1**	Accept Bool. Accept "Boolean (True or False)". Do not accept "True / False" alone (these are the values, not the data type).
2(a) J277 2.2.1	1 mark per row: `stock > reorder` … False `stock >= reorder` … True `size != "M"` … False `boxes * 4 <= stock` … True	**4**	Accept T / F, TRUE / FALSE, 1 / 0. Row 1 and row 2: 12 compared with 12, so only >= is True. Row 4: 3 * 4 = 12, and 12 <= 12 is True.
3(a) J277 2.2.1	`load > 630`	**1**	Accept `if load > 630 then`. Accept `load >= 631` / `load > 630.0`. Do not accept `load >= 630` (630 kg would sound the alarm).
3(b) J277 2.2.1	`weight <= 2`	**1**	Accept `weight <= 2.0`. Do not accept `weight < 2` (a 2 kg parcel would be left out) or `weight =< 2`.
3(c) J277 2.2.1	`code == "B4X9"`	**1**	Accept single quotes. The value must be in quotes (code is a string). Do not accept a single = (in OCR Exam Reference Language this is assignment).

QUESTION	ANSWER	MARKS	GUIDANCE
4(a) J277 2.2.1 (2.1.2 logic errors)	1 mark for each line number, 1 mark for each correct corrected line: Line 02 … `if temp >= 30 then` Line 08 … `while moisture < 40`	**4**	The correction mark is for the correction of the line identified. Accept equivalents: `temp > 29` / `30 <= temp` (temp is an integer); `moisture <= 39` / `40 > moisture`. Accept the condition alone without `if`/`then`/`while`. Do not accept `temp => 30`. A correction that changes other lines (e.g. swapping the two prints) scores 0 for that error.
5(a) J277 2.2.1	1 mark per row: 70 … OK 30 … OK 29 … Too slow	**3**	Ignore quotation marks and capital letters. 70 is not more than 70, and 30 is not less than 30, so both give OK.

6(a)
J277 2.2.1
	1 mark each:
	Input of the water level, stored in a variable
	Checks if level is more than 180 (`level > 180`) and outputs Overflow warning
	Checks if level is 20 or less (`level <= 20` / `level < 21`) and outputs Refill needed
	Outputs Level normal in all other cases … with only one message output for any level (e.g. `elseif` / `else`, nested `if`s, or separate `if`s with full conditions)
	Example answer (ERL):
	`level = int(input("Enter water level"))`
	`if level > 180 then`
	`  print("Overflow warning")`
	`elseif level <= 20 then`
	`  print("Refill needed")`
	`else`
	`  print("Level normal")`
	`endif`
		4	Allow any logically valid method and any high-level language. Allow missing casting. Allow `level >= 181` for > 180. A middle check written as `level > 20 AND level <= 180` is accepted; `level > 20 AND <= 180` (no variable on the second side) is not. Do not award bullet 4 if two messages can be output for one level (e.g. 200 gives Overflow warning and Level normal). Wrong boundary (`>= 180` or `< 20`) loses that bullet. Do not accept ≥, ≤ or comparisons in English. Minor spelling slips in the messages are ignored.

Total: 22 marks