MODULE M PROGRAMMING · M5

Arithmetic operators, including MOD, DIV and exponentiation

Original practice questions · 20 marks · ~25 minutes · OCR J277 spec 2.2.1

Name _____ Date _____

Instructions. Answer all questions in the spaces provided. The marks for each part are shown in brackets [ ]. The total for this worksheet is **20 marks**. Code is written in OCR Exam Reference Language. No calculator.

1

Total: 5 marks

(a) Complete the table to show the value that each expression gives. **[5]**

Expression	Value
`17 MOD 5`	
`17 DIV 5`	
`3 ^ 4`	
`9 / 2`	
`2 + 3 * 4`	

2

Total: 3 marks

A fitness watch and a garden-planning program use the statements below. Each statement is missing one arithmetic operator.

(a) Complete each statement by writing the missing arithmetic operator in the gap. **[3]**

What the statement must do	Statement
Store the number of **whole** minutes in `totalSeconds`	`minutes = totalSeconds ..... 60`
Store the number of seconds left over after the whole minutes	`seconds = totalSeconds ..... 60`
Store the area of a square flower bed with sides of length `side`	`area = side ..... 2`

3 **Total: 3 marks**

A machine in a factory makes 100 items in a batch, numbered 1 to 100. This program tells a quality checker which items to inspect.

```
01 for item = 1 to 100
02     if item MOD 25 == 0 then
03         print("Inspect item " + str(item))
04     endif
05 next item
```

(a) State how many times the program outputs a message. **[1]**

(b) State the **first** message the program outputs. **[1]**

(c) Line 02 is changed by mistake to `if item DIV 25 == 0 then` **[1]**
State how many times the program now outputs a message.

4 **Total: 4 marks**

A small farm packs its eggs into boxes. Each box holds 6 eggs. This program runs for three days.

```
01 for day = 1 to 3
02     eggs = int(input("Eggs collected: "))
03     boxes = eggs DIV 6
04     spare = eggs MOD 6
05     print(str(boxes) + " boxes, " + str(spare) + " spare")
06 next day
```

(a) The farmer enters **20**, then **36**, then **5**. Complete the trace table. Use one row each time round the loop. **[3]**

day	eggs	boxes	spare	Output

(b) On another day the farmer enters **47**. State what the program outputs. **[1]**

5 **Total: 5 marks**

A company that hires out a function room seats guests at round tables. Each table seats 8 guests. A table that is only partly full still counts as one table.

(a) Write a program that: **[5]**

- asks the user to enter the number of guests
- calculates the number of tables needed so that every guest has a seat
- outputs the number of tables needed
- outputs the number of empty seats there will be at those tables.

For example, 41 guests need 6 tables, with 7 empty seats.

You must use either OCR Exam Reference Language or a high-level programming language that you have studied.

Total for this worksheet: 20 marks