8   Programming

8.1   Programming concepts

Candidates should be able to:

Notes and guidance

1   Declare and use variables and constants

2   Understand and use the basic data types

- Including:
  – integer
  – real
  – char
  – string
  – Boolean

3   Understand and use input and output

4   (a) Understand and use the concept of sequence

(b) Understand and use the concept of selection

- Including:
  – `IF` statements
  – `CASE` statements

(c) Understand and use the concept of iteration

- Including:
  – count-controlled loops
  – pre-condition loops
  – post-condition loops

(d) Understand and use the concepts of totalling and counting

(e) Understand and use the concept of string handling

- Including:
  – length
  – substring
  – upper
  – lower
- The first character of the string can be position zero or one

8.1 Programming concepts continued	
Candidates should be able to:	Notes and guidance

(f) Understand and use arithmetic, logical and Boolean operators

- Arithmetic, limited to:
  - +
  - −
  - /
  - *
  - ^ (raised to power of)
  - `MOD`
  - `DIV`
- Logical, limited to:
  - =
  - <
  - <=
  - >
  - >=
  - <> (not equal to)
- Boolean, limited to:
  - `AND`
  - `OR`
  - `NOT`

5   Understand and use nested statements

- Including nested selection and iteration
- Candidates will **not** be required to write more than three levels of nested statements

6   (a) Understand what is meant by procedures, functions and parameters

(b) Define and use procedures and functions, with or without parameters

- Procedures and functions may have up to two parameters

(c) Understand and use local and global variables

7   Understand and use library routines

- Including:
  - MOD
  - DIV
  - ROUND
  - RANDOM

8.1 Programming concepts continued

Candidates should be able to:

8 Understand how to create a maintainable program

Notes and guidance

- Including appropriate use of:
  - meaningful identifiers
  - the commenting feature provided by the programming language
  - procedures and functions
  - relevant and appropriate commenting of syntax
- Use meaningful identifiers for:
  - variables
  - constants
  - arrays
  - procedures and functions

8.2 Arrays

Candidates should be able to:

1 Declare and use one-dimensional (1D) and two-dimensional (2D) arrays

2 Understand the use of arrays

3 Write values into and read values from an array using iteration

Notes and guidance

- Including the use of variables as indexes in arrays
- The first index can be zero or one
- Including nested iteration

8.3 File handling

Candidates should be able to:

1 Understand the purpose of storing data in a file to be used by a program

2 Open, close and use a file for reading and writing

Notes and guidance

- Including:
  - read and write single items of data
  - read and write a line of text