higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PRINCIPLES OF COMPUTER PROGRAMMING
(First paper**)**
NQF LEVEL 3

(10041023)

11 November 2022 (X-paper)
09:00–12:00

This question paper consists of 10 pages.

263Q1N2211

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TIME: 2 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Start each question on a new page.
5. Use only a black or a blue pen.
6. Write neatly and legibly.

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SECTION A

QUESTION 1

Various options are given as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (1.1–1.10) in the ANSWER BOOK.

1.1 Which of the following examples will determine the lowest available subscript of an array?

A UBound
B LBound
C HBound
D SBound

1.2 A(n) … occurs when the result of a calculation is the lowest number that the computer can actually represent in memory.

A overflow error
B underflow error
C conversion error
D syntax error

1.3 An algorithm that traverses a list to match each item in the list against a search item whose location is to be found.

A Linear search
B Binary search
C Jump search
D List search

1.4 Which combinations of the following statements (i–iv) about the Visual Basic statement `ReDim Preserve intArrMarks(10)` are correct?

i The statement is a *dimension* statement.
ii The *Preserve* keyword helps to preserve the existing data in the array.
iii Shows an example of a dynamic array.
iv Can only be used on single dimension arrays.

A i, ii
B i, iii
C ii, iii
D iii, iv

1.5 Which combination of the following options are examples of events of the button control?

i Click
ii Move
iii Focus
iv Load

A i, ii, iii
B ii, iii, iv
C i, iii, iv
D i ii, iv

1.6 Which of the following data types is allocated 8 bytes of storage?

A Integer
B Short
C Decimal
D Long

1.7 `Math.Round(2.44)` will produce an answer of … .

A 2.5
B 3
C 2
D 2.4

1.8 The comparison operator … checks whether the values of two operands are equal or not; if values are not equal, then the condition becomes true.

A <>
B =
C >=
D <=

1.9 The VB.NET class … is used to read from and write to any location in a file.

A directorystream
B binarystream
C filestream
D memorystream

1.10 An intersection table is a table that defines a … relationship.

A one-to-one
B one-to-many
C many-to-one
D many-to-many

(10 × 1) **[10]**

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QUESTION 2

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (2.1–2.10) in the ANSWER BOOK.

2.1 A `Sub` procedure must always specify a return datatype.

2.2 The VB.Net String function `Len()` returns an integer that contains the number of characters in a string.

2.3 A foreign key is a field in a table which uniquely identifies each row/record in a database table.

2.4 The `File.Exists` function returns a Boolean value of either true or false.

2.5 The `For ... Next` loop runs a set of statements once for each element in an array.

2.6 A `Do` loop allows one to test a condition at either the beginning or the end of a loop structure.

2.7 A validation rule is one method of restricting input in a field in an MS Access database table.

2.8 The square brackets [ ] are used when initialising an array in VB.Net.

2.9 The `IsNumeric()` function returns a Boolean value that indicates whether a specified expression can be evaluated as a decimal number.

2.10 An example of a local variable is a variable declared inside a Sub or Function.

(10 × 1) **[10]**

QUESTION 3

Complete the following sentences by writing only in the missing word or words next to the question number (3.1–3.5) in the ANSWER BOOK.

3.1 … errors are those types of errors that appear only after one compiles and debugs code.

3.2 An SQL … clause is used to combine rows from two or more tables, based on a related column between them.

3.3 The last digit of a South African ID number is calculated using the Luhn … .

3.4 One can modify and edit an MS Access report in … view.

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3.5 The standard naming convention prefix for naming a form is … .

(5 × 1) **[5]**

TOTAL SECTION A: 25

SECTION B

QUESTION 4

4.1 Study FIGURE 1 below and answer the questions the follow.

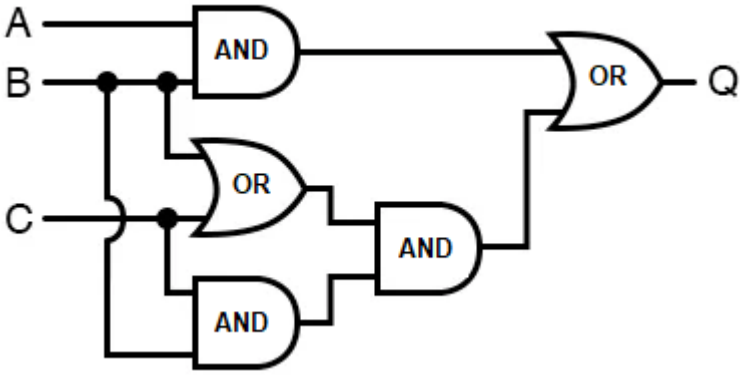


FIGURE 1: COMBINATIONAL LOGIC GATE

4.1.1 Determine the Boolean expression for the logic gate given above.

4.1.2 Simplify the Boolean expression in QUESTION 4.1.1.

(2 × 2) (4)

4.2 Determine the TWO's complement for the following numbers.

4.2.1 -17_{10}.

4.2.2 -11_{10}

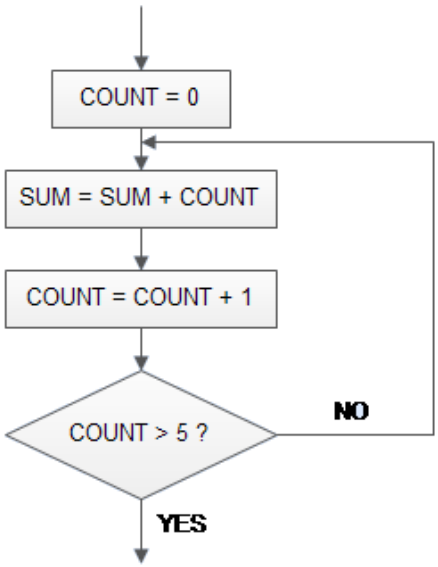
4.2.3 -123_{10}

(3 × 2) (6)

[10]

QUESTION 5

5.1 Study the following snippet of a flowchart and answer the questions that follow.



5.1.1 Create appropriate VB.NET statements to represent the flowchart snippet above by using a `For Next` loop structure.

NOTE: Assume that the datatype of variables COUNT and SUM are whole numbers that need to be declared. (6)

5.1.2 Differentiate between a `For Next` loop and a `Do` loop. (3 × 2) (6)

5.1.3 Explain ONE reason why infinite loops are considered bad programming practice. (2)

5.2 Provide a reason for the use of EACH of the following structures in VB.NET:

5.2.1 *GotFocus* event

5.2.2 *Select Case* statement

5.2.3 I P O diagram

5.2.4 Naming conventions for datatypes

5.2.5 Masked textbox

(5 × 1) (5)

5.3 Study FIGURE 2 below and answer the questions that follow.

The Do Loop statements have four different forms, as shown below:

a)

```
Do While condition
  Block of one or more VB statements
Loop
```

b)

```
Do
  Block of one or more VB statements
Loop While condition
```

c)

```
Do Until condition
  Block of one or more VB statements
Loop
```

d)

```
Do
  Block of one or more VB statements
Loop Until condition
```

FIGURE 2: DO LOOP

5.3.1 Explain the differences between a pre-test and a post-test loop. (2 × 2) (4)

[23]

QUESTION 6

6.1 Define the following programming structures in the context of file handling:

6.1.1 *EOF* function

6.1.2 *CSV* file

6.1.3 *File* path

6.1.4 *File.Exists* function

6.1.5 *BinaryWriter*

(5 × 2) (10)

6.2 Study the following snippet of code and answer the questions that follow.

```
1  Dim strArrCompLang() as String = {"ADA", "C++", "C#.NET",
       "COBOL", "Fortran", "VB.NET"}
2
3
4  Dim strArrSpokenLang() as String = {"isiZulu", "isiXhosa",
       "Sesotho", "Sepedi", "English", "Afrikaans"}
5
6
7  Dim intNumCompLang as Integer = 6
8  Dim intNumSpokenLang as Integer = 6
```

6.2.1 Briefly describe the purpose of an array. (1)

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6.2.2 Identify the type of single dimension array declared in line 1 and line 4 respectively. (1)

6.2.3 Explain ONE reason why a two-dimensional array is different from a one-dimensional array. (2)

6.2.4 Identify TWO other VB.Net statements that are commonly used together with the type of array identified in QUESTION 6.2.2.(1 × 2) (2)

6.2.5 Identify the subscript value for the *strArrSpokLang()* array that will yield a result of "Sesotho". (1)

6.2.6 Identify the subscript value for the *strArrCompLang()* array that will yield a result of "VB.Net". (1)

6.2.7 Identify the *UpperBound* of both arrays. (2)

6.2.8 Explain the purpose of the *curly* brackets used in line 1 and line 4 respectively. (2)

[22]

QUESTION 7

7.1 uKhahlamba Tours uses custom designed software that has been developed to keep track of all their tours in a central database.

A snippet of one of the tables in the database named ToursInfo that is used to store information on the different tours and clients is shown in FIGURE 3 below.

ToursInfo : Table

Field Name	Data Type
TourID	Number
TourName	Text
TourGuide	Text
TourStartDate	Date/Time
TourEndDate	Date/Time
SurnameClient1	Text

FIGURE 3: ToursInfo database table

7.1.1 The database table shown above has no primary key defined.

(a) Explain the purpose of a *primary key.* (2)

(b) Identify an appropriate field that can be used as a primary key. (1)

(c) Explain the purpose of a *foreign key.* (2)

(d) Identify a field that can be used as a foreign key. (1)

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(e) Define the term, *composite primary key*. (2)

(f) Suggest a suitable prefix that can be used when naming an MS Access database table. (1)

7.1.2 The general properties for the SurnameClient1 field are shown in FIGURE 4 below.

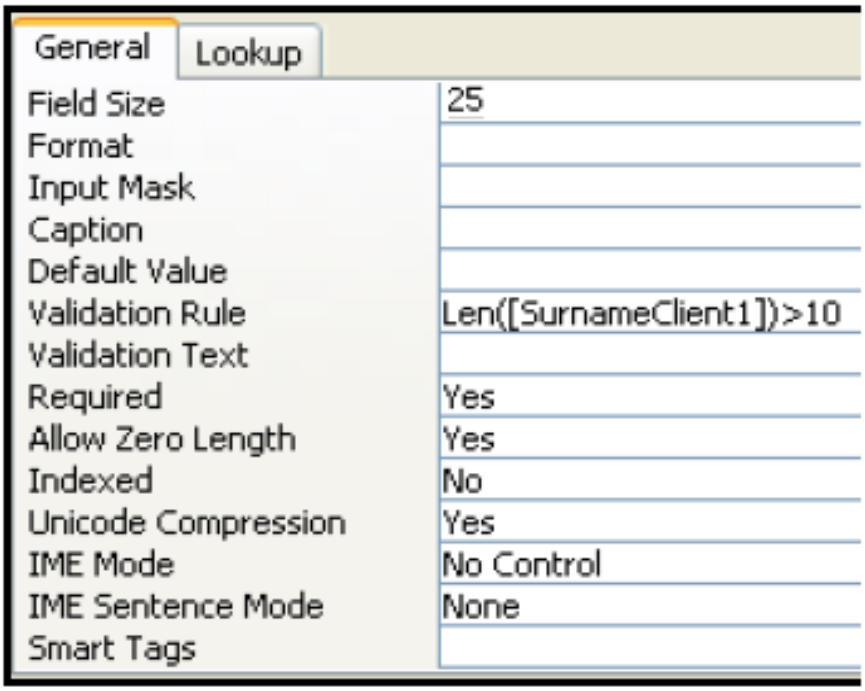

FIGURE 4: SurnameClient1 properties

(a) Explain what it means to specify a field size of 25 for this field. (2)

(b) Explain the purpose of a validation rule in an MS Access table. (2)

(c) Determine whether the validation rule applied to this field is suitable. (1)

(d) Give TWO reasons for your answer in QUESTION 7.1.2 (c). (2)

(e) Explain the purpose of the *Required* property. (2)

(f) Explain ONE way in which an *Input Mask* can be applied to this field. (2)
[20]

TOTAL SECTION B: 75
GRAND TOTAL: 100

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