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)

3 December 2020 (Y-paper)
13:00–15:00

This question paper consists of 9 pages.

273Q1N2003

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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 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 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 is a declaration of an abstract data type (ADT) in Visual Basic.Net?

A `Dim intStudents as Integer`
B `Dim decStudents as Decimal`
C `Dim blnStudents as Boolean`
D `Dim strStudents() as String`



1.2 Which of the following can be used to limit input errors?

A screen
B debugger
C mask
D cyclic redundancy check

1.3 The *Binary Search* is an example of a(n) …



A abstract data type.
B trace table.
C query.
D algorithm.

1.4 Which combinations of the following statements (i – iv) about the Visual Basic statement `Dim strArrCars(99)` are correct?

i The statement is a *dimension* statement
ii The statement will create an array of 99 elements
iii The statement creates a single dimensional array
iv The statement will produce a syntax error

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



1.5 Which combination of the following options are examples of *event handlers*?

i click
ii land
iii mouse hover
iv move

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

1.6 A ... number can have either a positive value or negative value.

A signed
B string
C character
D Boolean

1.7 When passing multiple parameters to a function, each parameter must be separated by a ...

A comma.
B semi-colon.
C inverted comma.
D parentheses.

1.8 In Visual Basic the += is an example of a(n) … operator.

A assignment
B addition assignment
C not is equal
D equals to more

1.9 Arrays, text files and databases are all examples of …

A abstract datatypes.
B fixed datatypes.
C logical datatypes.
D structured datatypes.

1.10 Which ONE of the following is considered as a bad choice in an entity relationship in a database?

A 1 : 1
B 1 : M
C M : 1
D M : N

(10 × 1) **[10]**

QUESTION 2

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

2.1 A `for` statement must always be followed by a `Next` statement.

2.2 The Visual Basic property `Now()` returns a date value containing the current date and time according to your system.

2.3 A database table can have TWO primary keys.

2.4 The `StreamWriter` class is used to read data from a text file.

2.5 An infinite loop is a loop that repeats itself a million times.

2.6 A `While` loop is an example of an iteration structure.

2.7 A database represents a highly organised collection of information.

2.8 The `ReDim` statement can be used to change the dimension of a fixed array.

2.9 `Math.Ceiling(1043.75133)` will produce an answer of 1043.

2.10 A *constant* is a named variable that keeps changing its value during program execution.

(10 × 1) **[10]**

QUESTION 3

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

3.1 A/An integer … error will occur if a very small integer number is divided by a very large integer number.

3.2 The SQL command … will remove one or more records from a table.

3.3 The … algorithm repeatedly steps through a list, compares adjacent elements and swaps them if they are in the wrong order.

3.4 A single row of a table, which contains a single record for that relation, is called a …

3.5 … focuses on the interaction between computer interfaces and people.

(5 × 1) **[5]**

TOTAL SECTION A: 25

SECTION B

QUESTION 4

4.1 Translate the following truth table into a Boolean expression:

A	B	C	Q (Output)
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

(2)

4.2 Draw the truth table for the Boolean expression:

A AND (NOT B) AND C (4)

4.3 Explain the difference between static RAM and dynamic RAM. (2 × 1) (2)

4.4 Name TWO advantages of using a complex instruction set computer (CISC). (2)

[10]

QUESTION 5

5.1 Study the following VB.Net code snippet and answer the questions.

```
1    for i as Integer = 0 to 5
2          for j as Integer = 2 to 4
3
4          Messagebox.Show("Hello World")
5
6          next j
7         next i
```

5.1.1 Identify the type of VB.Net control structure that is being used in the code above. (2)

5.1.2 Explain the purpose of the structure identified in QUESTION 5.1.1. (2 × 2) (4)

5.1.3 Identify FOUR other types of control structures that can be used in VB.Net. (4)

5.1.4 How many times will the message, *Hello World,* appear on the screen? (2)

5. 2 Study the following VB.Net code snippet and answer the questions.

```
1  Dim decWages as Decimal = 6500.45
2
3  Const strTemp as String = "Hello World"
4
5  Dim strProgramme as String = "National Certificate
       Vocational"
6
7  Dim intResult as Integer
8
9  intResult = Round(decWages)
10
11 intResult += intResult
12
13 intResult = Sqrt(intResult)
14
15 strProgramme = strTemp
```

5.2.1 Identify the value of the integer variable `intResult` in line 9. (2)

5.2.2 Identify the value of the integer variable `intResult` in line 11. (2)

5.2.3 Briefly explain the purpose of the function name `Sqrt()`. (2 × 1) (2)

5.2.4 Identify the value of the string variable `strProgramme` in line 15. (2)

5.3 Explain the purpose of each of the following VB.Net exception statements.

5.3.1 `Try`

5.3.2 `Catch`

5.3.3 `Throw`

(3 × 1) (3)

[23]

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QUESTION 6

6.1 Define the following terms with regards to file handling:

6.1.1 Stream Reader

6.1.2 Stream Writer

6.1.3 Writeline

6.1.4 Readline

6.1.5 Concatenation

(5 × 2) (10)

6.2 The following snippet of incomplete code relates to a commonly used sorting technique. The following sorting technique sorts SIX numbers in ascending order.

```
1  Dim intArrHeight() As Integer
2  Dim x, y As 6.2.4(a)
3
4      Dim intTempWeight As Integer = 0
5
6      For x = 0 To UBound(6.2.4(b)) - 1
7          For y = x + 1 To UBound(intArrHeight)
8            If intArrHeight(x) 6.2.4(c) intArrHeight(y) Then
9                  intTempWeight = intArrHeight(y)
10                 6.2.4(d) = intArrHeight(x)
11                 intArrHeight(x) = 6.2.4(e)
12           End If
13         Next 6.2.4(f)
14     Next x
```

6.2.1 Identify the sorting method used above. (1)

6.2.2 Briefly explain TWO advantages of the sorting technique identified in QUESTION 6.2.1. (2)

6.2.3 Identify ONE other sorting method. (1)

6.2.4 Complete the code above by providing answers for QUESTIONS 6.2.4 (a–f). (6)

6.2.5 Explain how one changes the above code to sort in descending order. (2)

[22]

QUESTION 7

7.1 Study the following diagram, FIGURE 1, and answer the questions.

STUDENTS

Field Name	Data Type	Description
STU_ID	Text	Students SA ID Number
STU_FNAME	Text	Students First Name
STU_LNAME	Text	Students Last Name
STU_GENDER	Yes/No	Students Gender
STU_AGE	Number	Students Age
STU_ADDRL1	Text	Students Address Line 1
STU_ADDRL2	Text	Students Address Line 2
STU_ADDRPC	Number	Students Postal Code
STU_TEL	Number	Students Telephone Number
STU_EMAIL	Text	Students Email Address

FIGURE 1

7.1.1 Identify the structure represented by FIGURE 1. (1)

7.1.2 Define the following terms:

(a) Primary Key

(b) Foreign Key

(c) Data type

(d) Record

(4 × 2) (8)

7.1.3 Identify the field name of the primary key. (1)

7.1.4 Identify the name of the data entity in the example above. (1)

7.1.5 From the example above, list the names of ANY TWO data attributes. (2)

7.1.6 What maximum limit could a programmer set for the size of the field name STU_ID? (1)

7.1.7 Give a reason for your answer in QUESTION 7.1.6. (1)

7.2 Explain TWO reasons why a database is a more efficient structure than a text file or any other data structure. (2 × 2) (4)

7.3 Briefly explain what is meant by a one-to-many relationship. (1)

[20]

TOTAL SECTION B: 75
GRAND TOTAL: 100

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