higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

COMPUTER PROGRAMMING

(First paper)

NQF LEVEL 4

(10041024)

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

This question paper consists of 9 pages.

545Q1N2222

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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 section 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 … is an OOP mechanism used to hide both data members and data functions or methods associated with an instantiated class or object.

A Abstraction
B Encapsulation
C Polymorphism
D Inheritance

1.2 Which ONE of the following types of access modifiers can be used to define a variable that will be accessible only from within the class in which it is declared?

A Public
B Protected
C Private
D Personal

1.3 In Object Oriented Programming, a SUBCLASS inherits …

A only data members.
B data members and methods.
C only methods and variables.
D only public variables.

1.4 Which TWO of the following conditions must be met for a database table to be in second normal form (2NF).

(i) each field of the table has multiple values.

(ii) there are repeating groups of data.

(iii) the table is in the 1NF (first normal form).

(iv) every non-key field is fully dependent on the primary key field.

A (i) and (iv).
B (ii) and (iii).
C (i) and (iii).
D (iii) and (iv).

1.5 … testing is a quality assurance (QA) process that determines to what degree an application meets end-users' approval.

A Unit
B Integration
C Acceptance
D System

1.6 Which ONE of the following network services translates domain names to IP addresses so that browsers can load Internet resources?

A DNS
B FTP
C SSL
D WWW

1.7 … is the fraudulent practice of sending emails, supposedly from reputable companies, in order to lure individuals to reveal personal information, such as passwords and credit card numbers.

A Cyberstalking
B Phishing
C Trolling
D Hacking

1.8 In a UML class diagram, which one of the following symbols is used to declare an attribute as *public*?

A +
B -
C /
D p

1.9 Which one of the following HTML tags is the correct way to include an external CSS stylesheet called *styles.css*?

A <a link="styles.css">
B <a href="styles.css">
C
D <link href="styles.css">

1.10 The HTML <script> tag can be used to include JavaScript from an external text file. However, this file must be saved with a … file extension.

A .jscript
B .javascript
C .js
D .java

(10 × 1) **[10]**

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QUESTION 2

Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.1–2.5) in the ANSWER BOOK.

2.1 The objected orientated programming concept of *abstraction* is used to "show" only essential attributes and to "hide" unnecessary information.

2.2 In VB.Net, a *List* can be described as a static data structure i.e. it cannot be resized at runtime.

2.3 SQL is a structured query language used to access and modify data in a relational database.

2.4 The <*head*> tag is used to define the title of an HTML page.

2.5 The industry standard guidelines for web content accessibility are organised around four principles: Perceivable, Operable, Understandable, and Robust.

(5 × 1) **[5]**

QUESTION 3

Write each of the following in full:

3.1 HTTPS

3.2 TCP/IP

3.3 URL

3.4 FTP

3.5 DOM

(5 × 1) **[5]**

QUESTION 4

Choose the correct term from those in brackets. Write only the answer next to the question number (4.1–4.5) in the ANSWER BOOK.

4.1 The *(*<*optgroup*> / <*group*>) tag is used to create HTML dropdown lists.

4.2 In VB.NET, the (*Add*() / *Insert*()) method is used to add items to a *List*.

4.3 In (1-tier / 2-tier) database architecture, the DMBS is installed on the server machine and the end-user software is installed on the client machine.

4.4 A (feasibility / requirements) study evaluates a proposed system in terms of its cost effectiveness, workability, meeting user requirements as well as the effective use of resources.

4.5 The (padding / margining) area of an HTML element is the space between its contents and its border.

(5 × 1) **[5]**

TOTAL SECTION A: 25

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SECTION B

QUESTION 5

5.1 The HOD of the NCV IT Department at The Best TVET College, reviews and updates the subject allocation for all IT lecturers before the commencement of each new academic year. The department employs multiple lecturers who teach multiple subjects across multiple levels. Each lecturer at the college only works in one department at a time. All relevant information is kept in the following data table format:

Lecturer: Lecturer Code, Title, Name and Surname
Department: Code and Department Name
Subject Allocation: Subject Code, Lecturer Code and Enrolment Date
Subject: Subject Code, Subject Name and Level

Use the details above to draw an ERD (Entity Relationship Diagram). Make sure to normalise the data to 3NF clearly indicating primary and foreign keys. (10)

5.2 Define each of the following software tests:

5.2.1 Performance testing

5.2.2 Stress testing

5.2.3 Portability testing

(3 × 2) (6)

5.3 Explain TWO objectives a database driven software application must satisfy. (2 × 2) (4)

[20]

QUESTION 6

6.1 A college lecturer created a spreadsheet in MS Excel to record the ICASS marks for all of her students as shown below.

	A	B	C	D	E	F	G
1							
2			Sara	Modi	Koos	Gladwin	Madiba
3		PAT 1	68	56	76	45	79
4		Test 1	34	50	70	57	60
5		PAT 2	89	32	45	45	65
6		Test 2	78	70	40	50	86
7		IE	50	83	73	74	65

6.1.1 Produce the VB.Net code statement to declare a two-dimensional array called *ICASS_Marks* that will store all the ICASS marks of the five students. (4)

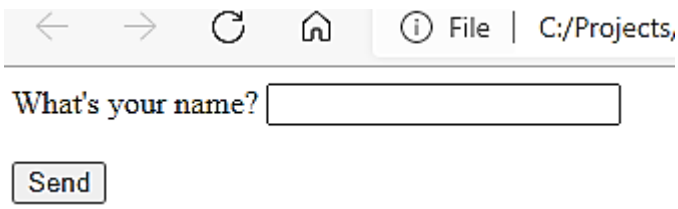
6.1.2 Identify the VB.Net data structure that will allow a user to store the marks of an unknown number of students in the college. (1)

6.1.3 Substantiate the answer to QUESTION 6.1.2. (2)

6.2 Study the HTML code snippet below and answer the questions that follow:

```
Line 6   <script type="text/javascript">
Line 7       function btn_send() {
Line 8       }
Line 9   </script>
Line 10  </head>
Line 11  <body>
Line 12          <form>
Line 13                  <input type="button">
Line 14          </form>
Line 15  </body>
Line 16  </html>
```

6.2.1 Modify the HTML web form code (i.e. Line 12 to 14) so that a user can enter and submit his/her name as shown in the screenshot below.



(4)

6.2.2 Modify the HTML code in Line 13 to include an invocation to the user defined function in Line 7. (2)

6.3 Distinguish between the <*textarea*> and <*input*> HTML elements. (2)

[15]

QUESTION 7

7.1 Briefly explain the process that occurs when an internet user enters a URL with a domain name in a web browser. The explanation should include the role of the necessary protocols. (4)

7.2 List TWO methods one can employ to manage security issues related to Internet development. (2)

7.3 Tabulate THREE differences between WYSIWYG HTML editors and advanced HTML editors. (3 + 3) (6)

7.4 What is the difference between a *hypertext* and a *hyperlink*? (2)

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7.5 Study the HTML & CSS code snippet below and answer the questions that follow:

```
<div>
   <p>Hover over the picture</p>
   <img src="rabit.jpg" />
</div>
img {
  width:250px;
  height:350px;
}
```

7.5.1 Identify the components (selector, property and value) of the CSS rule in the code snippet above. (3)

7.5.2 Change the element selector in the code snippet to an *id* selector. Use the keyword *'mypic'* as the id. (3)
[20]

QUESTION 8

8.1 Study the VB.NET source code below and answer the questions that follow:

```
1  Public Class clsShape
2      Private _color As String
3      Protected _Area As Decimal
4      Public Overridable Sub CalcArea()
5      End Sub
6  End Class
```

```
1  Public Class clsRectangle
2      Inherits clsShape
3      Private _Length As Integer
4      Private _Breadth As Integer
5      Public Overrides Sub CalcArea()
6          _Area = (_Length * _Breadth)
7      End Sub
8  End Class
```

```
1  Public Class clsSquare
2      Inherits clsShape
3      Private _Side As Integer
4      Public Overrides Sub CalcArea()
5          _Area = (_Side * _Side)
6      End Sub
7  End Class
```

8.1.1 Draw an UML class diagram to represent the source code. Show the class names, data members and methods. (10)

8.1.2 Produce the VB.Net code statements that will create the read-only property method to access the area of the shape in the code snippet above. (4)

8.2 Briefly explain each of the following OOP terms:

8.2.1 Constructor

8.2.2 Class 

8.2.3 Superclass

(3 × 2) (6)
[20]

TOTAL SECTION B: 75
GRAND TOTAL: 100

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