**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2021

INFORMATION TECHNOLOGY P2

MARKS: 150

TIME: 3 hours

This question paper consists of 12 pages.

INSTRUCTIONS AND INFORMATION

1. This paper consists of SIX sections:

    SECTION A: Short questions (15)
    SECTION B: System Technologies (25)
    SECTION C: Communication and Network Technologies (22)
    SECTION D: Data and Information Management (24)
    SECTION E: Solution Development (25)
    SECTION F: Integrated Scenario (39)

2. Read ALL the questions carefully.

3. Answer ALL the questions.

4. The mark allocation generally gives an indication of the number of facts/reasons required.

5. Number the answers correctly according to the numbering system used in this question paper.

6. Write neatly and legibly.

SECTION A: SHORT QUESTIONS

QUESTION 1

1.1   Give the correct computer term for each of the following descriptions. Write only the term next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK.

      1.1.1   The grouping of attributes and behaviour of an object in one entity   (1)

      1.1.2   A group of related fields about an item or person that is captured in a table   (1)

      1.1.3   The time taken for a disk drive to locate the area on the disk where the data to read, is stored   (1)

      1.1.4   Initiatives to design, use and dispose of technology in an environmentally or eco-friendly way   (1)

      1.1.5   … is an artificial environment that is created with software   (1)

      1.1.6   Is a company or organisation that provides you with either a wired or wireless connection to the internet   (1)

      1.1.7   … is anything electronic or related to electronics that is thrown away   (1)

      1.1.8   Refers to applications that are hosted in the cloud and that users pay a monthly subscription to access   (1)

      1.1.9   A type of reasoning that works with probabilities in order to arrive at a decision   (1)

      1.1.10   Refers to a device that makes communication between networks over the internet possible by directing data to its correct destination   (1)

1.2   Various options are provided as possible answers to the following questions. Choose the answer and write only letter (A–D) next to the question numbers (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 D.

      1.2.1   The process of developing an impressive software/application in a relatively short period of time is called …

           A   object based programming.
           B   rapid application development (RAD).
           C   extensive programming.
           D   object-oriented application.   (1)

      1.2.2   CSV means …

           A   Comma Separated Values.
           B   Comma Solution Values.
           C   Cine Solution Valves.
           D   Comma Sifting Values.   (1)

      1.2.3   A single processor that splits its time between different processes is called …

           A   multiprocessing.
           B   online processing.
           C   multitasking.
           D   multithreading.   (1)

      1.2.4   WAP means …

           A   Wired Access Point.
           B   Wireless Access Print.
           C   Wireless Access Point/Protocol.
           D   Wireless Arm Point.   (1)

      1.2.5   What will the value of iAnswer be when the following statement is executed?

           iAnswer : = 20 DIV (10 – 20 DIV 3);

           A   6
           B   5
           C   4
           D   3   (1)

                            TOTAL SECTION A: **15**

SECTION B: SYSTEMS TECHNOLOGIES

QUESTION 2

Since the dawn of the computing age, people have wondered if a computer would ever be capable of thought. As computer processors and software become more powerful, the question is debated more hotly. People that believe computers can think argue that, if a person had a conversation with a computer and was convinced that the computer was really a human, then the computer is intelligent.

2.1   Gone are the days where you had to e-mail yourself so that you could work at home. Gone is the hassle of copying files to and from USB flash drives.

      2.1.1   Briefly explain the concept *cloud application.*   (1)

      2.1.2   List TWO well-known examples of cloud applications.   (2)

      2.1.3   Explain what does it mean if a cloud application has a *local front end.*   (1)

      2.1.4   Name any TWO examples of cloud office software.   (2)

      2.1.5   Cloud computing offers several important benefits to users. List any TWO benefits.   (2)

      2.1.6   Write *SLA* in full.   (1)

2.2   There are various scientific and mass events world-wide, as well as specialised training to promote augmented reality technologies.

      2.2.1   Briefly explain the purpose of *augmented reality technology.*   (1)

      2.2.2   List any TWO uses of augmented reality.   (2)

      2.2.3   Name TWO advantages of augmented reality.   (2)

      2.2.4   List any TWO hardware requirements for augmented reality.   (2)

2.3   Differentiate between *archiving* and *backup.*   (2)

2.4   Virtualisation is a wonderful invention in technology.

      2.4.1   Briefly explain the concept *virtualisation.*   (1)

      2.4.2   List TWO uses of virtualisation.   (2)

      2.4.3   List TWO benefits of virtualisation.   (2)

2.5   Errors and corrupted computer files are hard to detect. It can cause everything from videos not loading, applications crashing or even your operating system not opening. List any TWO utilities that can be used to identify corrupt files.   (2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

Networks help to make life much easier, more enjoyable, makes people more productive, saves time and money, increases social opportunities and can improve knowledge.

3.1   Networks are incredibly powerful tools that most modern people and businesses depend on daily.

      3.1.1   Name THREE essential equipment that you need to setup a basic network.   (3)

      3.1.2   Write the word WWW in full.   (1)

3.2   Files can be shared on the internet simply by making them downloadable from the website. The problem with this is that all the traffic for a file shared this way has to be managed by a single webserver. The server can become slow and unresponsive if too many people are trying to access the file.

      3.2.1   Briefly explain the concept *BitTorrent*.   (1)

      3.2.2   Name THREE benefits of BitTorrent.   (3)

      3.2.3   List THREE risks related to BitTorrent.   (3)

3.3   Remote access is the buzzword used by ICT gurus/specialists nowadays.

      3.3.1   Briefly explain what *remote access* is.   (1)

      3.3.2   List THREE tasks that you can perform using remote access.   (3)

      3.3.3   List and briefly explain TWO groups of remote access technology.   (4)

3.4   On computers, firewalls prevent malicious users and viruses from sending data to and receiving data from your computer. List TWO general types of firewalls.   (2)

3.5   Briefly explain the concept *network topology*.   (1)

TOTAL SECTION C: 22

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

The amount of data and information about individuals that is stored anywhere on the internet increases every day. Photos, financial records, employment history, personal relationship details and purchases are just few of the types of data and information available to others for free or a fee.

4.1 Name TWO characteristics that determine the quality of data. (2)

4.2 Databases need to be protected from several different threats, including incorrect data entry, data corruption, data loss, accidental data deletion, purposeful data deletion and unauthorised access.

    4.2.1 Explain what *data verification* is. (1)

    4.2.2 List and explain TWO main ways of data verification. (2)

    4.2.3 List TWO tasks performed by an audit trail. (2)

4.3 Managing a company's database requires a great deal of coordination. List TWO roles/responsibilities of a DBA. (2)

4.4 Keys are used to establish and identify relationships between tables.

    4.4.1 List FOUR types of key fields that can be used when designing a database. (4)

    4.4.2 Give another name for *attribute* in databases. (1)

4.5   Organised data is the key to effective database design and the normalisation process helps structure data and eliminate redundancy.

tblCustomer
CustNo
CustTitle
CustName
CustSurname
CustSAID
CustPoints
CustCell

tblOrders
OrderNo
CustNo
OrderDate
ProcessedBy
IsDeveloped

tblPrint
PrintNo
OrderFormNo
PicQuality
PicSize
PicFileName
PicFileSize

4.5.1   In the **tblOrders** table, the *IsDeveloped* field is used to identify whether the picture is created or not. Name the data type that can be assigned to the field *isDeveloped*. (1)

4.5.2   Redraw the tables in your ANSWER BOOK and answer the following questions.

(a)   Identify the primary key and foreign key in each table. Write *PK* for the primary key and *FK* for the foreign key next to the appropriate field. (5)

(b)   Map an ERD (entity relationship diagram) by using the appropriate ERD symbol. (4)

TOTAL SECTION D: 24

SECTION E: SOLUTION DEVELOPMENT

QUESTION 5

> A common problem-solving method among programmers is to break a large problem into a series of smaller problems and then to solve each of the smaller problems.

5.1   Programming mistakes crop up quite often, we must learn how to fix them early.

       5.1.1   Briefly explain the concept *debugging*.   (1)

       5.1.2   The process of writing a code to handle errors in a program is known as …   (1)

       5.1.3   Name the statement/clause used to handle errors in a program.   (1)

       5.1.4   What is another name of an error in programming except the word *bug*?   (1)

5.2   UML is a powerful and complex modelling tool used to plan and design classes and objects. The class diagram is divided into THREE sections.

       5.2.1   List the name of each section.   (3)

       5.2.2   Explain the purpose of *ToString* in classes and objects.   (1)

       5.2.3   Write UML in full.   (1)

       5.2.4   Give another name for the following keywords/names in classes and objects.

            (a)   Accessor   (1)

            (b)   Mutator   (1)

            (c)   Auxiliary   (1)

5.3   Write down the result of each of the following functions:

     sString = 'Living in a Digital World';

       5.3.1   iPos := Pos('a', sString);   (1)

       5.3.2   iL := Length(sString);   (1)

       5.3.3   sWord := Copy(sString, 13,13);   (1)

5.4　Study the following code which was written to calculate the Total Amount Due after doing some grocery shopping.

```
Var
Num : Integer;
Price, Cost, Total : real;
Item : string
begin
    1.  Total := 0;
    2.  Item := 'Baked beans';
    3.  Num := 3;
    4.  Price := 3.29;
    5.  Cost := Num * Price;
    6.  Total := Total + Cost;
    7.  Item := 'Kewl Drink';
    8.  Num := 5;
    9.  Price := 1.95;
    10. Cost := Num * Price;
    11. Total := Cost;
    12. redOut.Lines.Add('Total amount to pay: R');
    13. redOut.Lines.Add(IntToStr(Total));
end;
```

5.4.1　Copy the trace table provided below into your ANSWER BOOK and complete to determine output.

Line No	Item	Num	Price	Cost	Total	redOut
1						
2						
3						

(14 ÷ 2)　(7)

5.4.2　The program has a programming error. Name the type of an error you have located/identified.　(1)

5.4.3　Correct the TWO program segments that have errors.　(2)

TOTAL SECTION E:　25

SECTION F: INTEGRATED SCENARIO

QUESTION 6

ICT has revolutionised the way in which people use media to communicate socially. ICT has changed the workplace in terms of employment practices and the physical nature of the space.

6.1 It is not only important to keep informed about the developments and trends in IT, but also keep software updated.

    6.1.1 List THREE reasons of updating the software. (3)

    6.1.2 Distinguish between a *patch* and a *service pack*. (2)

6.2 Computer criminals are ordinary people spending long hours doing tiresome work – often for little reward. They are very scary. Some computer criminals work in cyberspace, so for the average person, they are very hard to identify and seem like an invisible force of evil.

    6.2.1 Explain the concept *computer criminal.* (1)

    6.2.2 List any THREE common computer-related types of theft. (3)

    6.2.3 Differentiate between *backdoor* and *piggybacking*. (2)

    6.2.4 List any THREE measures/safeguards against computer crimes, threats and criminals. (3)

    6.2.5 Name and briefly explain TWO types of hackers. (4)

    6.2.6 Name the attack that makes a website unavailable by using thousands or even millions of computers to request data from the site at the same time. (1)

6.3 The speed and accuracy of computers, their ability to analyse vast quantities of data quickly and to transform, present and communicate data in a variety of formats locally and globally are their main strengths.

    6.3.1 Briefly explain the concept *globalisation*. (1)

    6.3.2 List TWO technologies which have made globalisation possible. (2)

    6.3.3 List any THREE advantages of global communication. (3)

6.4 Online applications are evaluated on the way they look and feel, so website creators spend a lot of time formatting their output.

    6.4.1 Explain what a *data cap* is. (1)

6.4.2 Name and explain the purpose of the icon below.

(2)

6.4.3 Write CSS in full. (1)

6.4.4 Java script programming instructions can either be stored as separate text files with a filename extension …. (1)

6.5 Expert systems are no longer called expert systems but are known as … (1)

6.6 Explain the function of *disk clean-up*. (1)

6.7 To keep pace with the mass adoption of smart home devices and drive business growth without service interruptions, you need the self-improving IoT technology already used by over 500 million to secure their home networks, clouds and endpoints.

6.7.1 Write IoT in full. (1)

6.7.2 Briefly explain the concept IoT. (1)

6.7.3 List TWO technological trends that has made/enabled the IoT possible. (2)

6.8 Social networks grow more powerful with the increase in interactions among people on social platforms. Briefly explain the concept *memes*. (1)

6.9 Computers need sufficient unused space on the hard drive in order to function smoothly. List TWO things that you need to do to free up space on a drive. (2)

TOTAL SECTION F: 39
GRAND TOTAL: 150