



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

PINETOWN DISTRICT

GRADE 12

INFORMATION TECHNOLOGY P2 | THEORY
MID-YEAR EXAMINATIONS 2023

MARK ALLOCATION: 150 marks

TIME ALLOCATION: 3 hours

This Question Paper consists of 19 pages.

INSTRUCTIONS AND INFORMATION

Contents of this paper include the original work by teachers in the Pinetown District and questions modified from NSC examination papers.

- 1) This Question Paper consists of SIX sections:
Section A: Short Questions (20 marks)
Section B: Systems Technology (25 marks)
Section C: Communication and Network Technology (25 marks)
Section D: Data and Information Management (25 marks)
Section E: Solution Development (25 marks)
Section F: Integrated Scenario (30 marks)
- 2) Write your full name and your teacher's surname in the appropriate space on the ANSWER BOOK.
- 3) Read all questions carefully.
- 4) Answer all the questions in the answer book provided.
- 5) You may use a non-programmable calculator.
- 6) Number the answers correctly according to the numbering system used in this question paper.
- 7) Give brief motivations, discussions etc. where required.
- 8) Leave one line between two sub-questions, for example between QUESTION 3.1 and QUESTION 3.2.
- 9) Start each Section on a new page.
- 10) Please write on both sides of the page.
- 11) Write neatly and legibly. Answers that cannot be read by the marker will be marked incorrect.

SECTION A: SHORT QUESTIONS

1.1 Multiple Choice

Select one answer for each question. Write only the question number and the letter representing your answer in your Answer Book. For example: 1.1.1 E.

- 1.1.1 Which one of these is NOT part of the machine cycle? (1)
- A Fetch data
 - B Decode instruction
 - C Encode Data
 - D Execute instruction
- 1.1.2 A combination of more than one field that uniquely identifies each record on a table is called: (1)
- A Primary Key
 - B Foreign Key
 - C Alternative Key
 - D Composite Key
- 1.1.3 The process used to reverse a database transaction and restore the data to a previous state is called: (1)
- A Default state revert
 - B Roll-back
 - C State restore
 - D Revert
- 1.1.4 Refers to several computers that are controlled and work together to perform an attack. (1)
- A zombie
 - B backdoor
 - C Trojan
 - D botnet

- 1.1.5 What will the value of rAnswer be when the following statement is executed? (1)
- rAnswer := 14 + 6 * 9 div 3 – sqrt(64);
- A -7
 - B 24
 - C 52
 - D 9
- 1.1.6 WAP means: (1)
- A Wired Access Point
 - B Wireless Access Print
 - C Wireless Access Protocol
 - D Wireless Arm Point
- 1.1.7 The concept of packaging data and procedures into a single object to prevent access from outside the object is called: (1)
- A An object code
 - B An encapsulation
 - C An object program
 - D A control structure
- 1.1.8 An algorithm is: (1)
- A A set of instructions written in a computer language that will solve a problem
 - B A sequence of logical steps that will solve a problem
 - C The source code of a computer program that will solve a problem
 - D A sequence of plans for the developing and selling of a computer program

- 1.1.9 A device that converts the data or signal from a computer to format that can be transmitted over a communication channel. (1)
- A Router
 - B Modem
 - C Switch
 - D Mouse
- 1.1.10 Which one of the following best describes a blog? (1)
- A A website creator posts short, informal stories or articles on their website
 - B A website where the creator posts informal video stories on their website
 - C A website where the creator posts photos on their website
 - D None of the above

[Subtotal: 10 marks]

- 1.2 Give **ONE** word/term for each of the following descriptions. Write only the word/term next to the question number.
- 1.2.1 Creating a new platform on an existing computer that is using a different operating system. (1)
- 1.2.2 It refers to the process of refining the structure of a database to minimise redundancy and improve the integrity. (1)
- 1.2.3 This refers to computer projects where hundreds, or even thousands, of computers across the world work together to solve a problem. (1)
- 1.2.4 The act of tricking someone into giving information or taking action they usually wouldn't take. (1)
- 1.2.5 The ability to plug in or remove a device from a computer without switching off the computer. (1)
- 1.2.6 A record made to keep track of who made changes to a database and when those changes were made. (1)
- 1.2.7 Initiatives to design, use and dispose of technology in an environmentally friendly way. (1)
- 1.2.8 The total amount of data that can be transferred from one point to another in a given period of time. (1)
- 1.2.9 The protocol that defines how webpages and their content are transferred across the Web. (1)
- 1.2.10 The layout of the physical connection of the computers in a network. (1)

[Subtotal: 10 marks]

SECTION A TOTAL | 20 MARKS

SECTION B: SYSTEMS TECHNOLOGIES

SCENARIO

Your parents are deciding whether to buy a new computer or upgrade their current system and require some advice.

- 2.1 Instead of buying a new computer, you suggest that upgrading would be a better and more feasible option.
- 2.1.1 Name TWO necessary factors that need to be considered when upgrades are to be employed. (2)
- 2.1.2 What is the term is used to describe the design of computers that allow for upgrading and replacing of hardware components instead of buying a new computer? (1)
- 2.2 Your family has heard of SSD technology.
- 2.2.1 Explain TWO differences between SSD and HDD. (2)
- 2.2.2 Explain how you would configure the PC if you have both an SSD and HDD drive. (2)
- 2.3 Your father decides that to save cost he will only purchase application software like Microsoft Office 2019. He does not wish to buy any system software, as he is only going to use application software.
- 2.3.1 What is the general function of system software? (2)
- 2.3.2 Explain to your father why he will be using system software even though he thinks he may not have bought any system software. (2)
- 2.3.2 You recommend to your father to go the SaaS route instead of him purchasing Microsoft Office 2019.
- 2.3.2.1 Name the SaaS version of Microsoft Office. (1)
- 2.3.2.2 Give 2 advantages of using the SaaS version of Microsoft Office. (2)

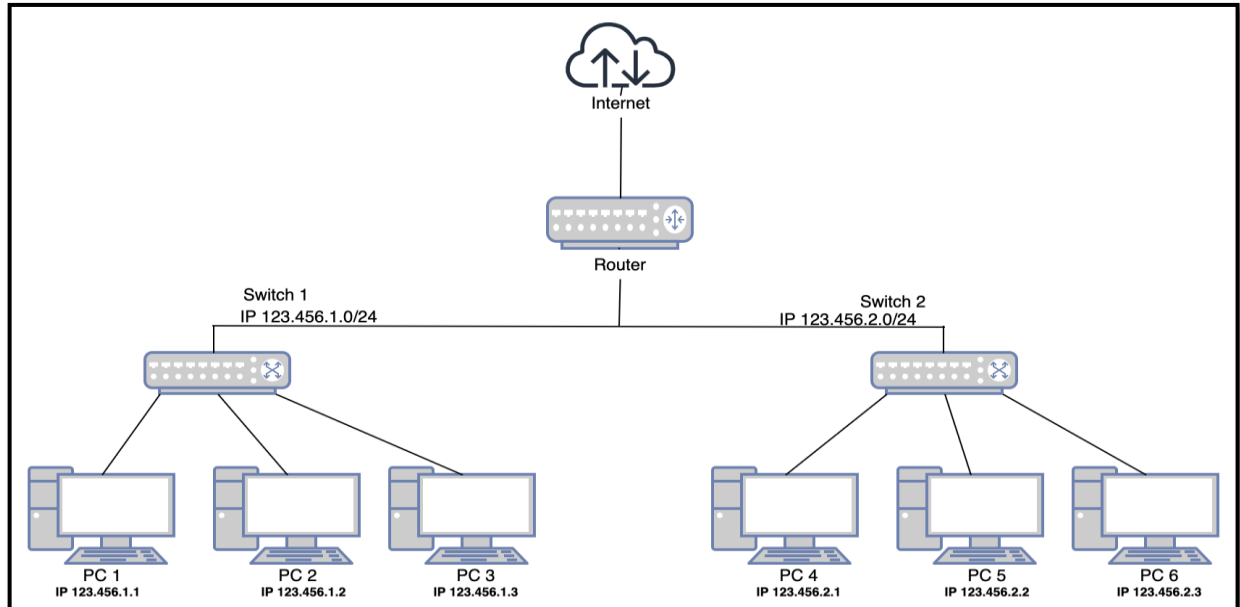
- 2.4 Your mother saw an advert for Windows 10 and Windows 11 Server. She thought that Windows 11 Server would be a better choice, as it is newer. Comment critically on her choice by outlining the broad difference between these types of operating systems. (2)
- 2.5 You realise that with the upgraded PC and operating system, you will require updated drivers for the old printer.
- 2.5.1 Explain to your father what a device driver is. (1)
- 2.5.2 Where would you try and locate drivers for the old printer? (1)
- 2.6 Connecting additional hardware like new printers to your PC has been made much easier, as most hardware connects to USB ports. In addition, USB technology supports plug-and-play technology.
Explain what is meant by the term, plug-and-play. (1)
- 2.7 You advise your parents to archive photo albums before the upgrade. Explain to them difference between backups and archives. (2)
- 2.8 You suggest the purchase of a GPU with the upgrade.
- 2.8.1 Explain to your parents what a GPU is and what it is used for. (2)
- 2.8.2 Give TWO benefits which a separate video card provides, **besides** producing better quality images (output) that are displayed on your monitor. (2)

SECTION B TOTAL | 25 MARKS

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

SCENARIO

Marvel Enterprises is a small business. The diagram below indicates the network they have incorporated into their business.



- 3.1 The computers in the cabled network are used by all staff members and a WLAN has been made available for use by clients.
- 3.1.1 Give ONE reason why a wireless network is more suitable for the clients. (1)
- 3.1.2 Give ONE reason why all devices must have a unique IP address. (1)
- 3.1.3 Give TWO possible reasons why clients using the WLAN could experience slow connection speed at times. (2)

- 3.2 The LAN in the administration office uses a client-server model and provides internet access.
- 3.2.1 Name TWO services that can be provided by an ISP besides the connection to the internet. (2)
- 3.2.2 State TWO benefits of using an ADSL connection. (2)
- 3.2.3 Explain the function of the switch as part of the LAN. (2)
- 3.3 Rolling blackouts (load shedding) take place across the country; as a result loss of data is becoming increasingly problematic and impacts on the business negatively.
- The use of a UPS had been recommended. How would the UPS assist the business? (1)
- 3.4 A client-server network is used in the main office.
- 3.4.1 Motivate the choice for having a client-server network rather than a peer-to-peer network. (1)
- 3.4.2 The desktop computers in the network are all fat clients.
State TWO differences between a fat client and a thin client. (2)
- 3.5 The manager must decide whether to use cloud services or a VPN to access information for the business.
- 3.5.1 State TWO disadvantages of using cloud storage. (2)
- 3.5.2 Suggest ONE cloud service that can be used to share files. (1)
- 3.5.3 Explain the benefit of using a VPN to share information. (2)

- 3.6 An Acceptable Use Policy (AUP) is in place for the business to outline the rights and responsibilities of the staff in the network environment.
- 3.6.1 BitTorrent application installations may be viewed as inappropriate in a work environment. What is BitTorrent? (1)
- 3.6.2 Explain why an organization such as this business should include restriction details on the installation of BitTorrent applications in their AUP. (1)
- 3.6.3 State the condition that should be adhered to, to ensure that the use of BitTorrent is legal. (1)
- 3.7 Networks may be vulnerable to many forms of malware.
- 3.7.1 State TWO ways in which the business could protect itself from being infected with malware. (2)
- 3.7.2 How would a firewall protect the network from malware attacks? (1)

SECTION C TOTAL | 25 MARKS

SECTION D: DATA AND INFORMATION MANAGEMENT

SCENARIO

A local shop is doing their part to protect our planet by going 'Green'. Their shop only sells environmentally friendly / energy-efficient / eco-friendly products. They have found several reliable Suppliers that provide them with a wide variety of these products.

- 4.1 A database table has been set up containing information about all the suppliers and the products the shop offers. The table design for **tblInformation** is as follows:

Field Name	Data Type
SupplierID	Short Text
SupplierName	Short Text
Address	Short Text
SupplierContactNo	4.1.1.1
ProductCode	Short Text
ProductName	Short Text
Price	4.1.1.3
QuantityOnHand	Number

- 4.1.1 No data type and has been indicated for certain fields.
- 4.1.1.1 Give a suitable data type and field size for **SupplierContactNo**. (2)
- 4.1.1.2 Give a reason for your choice of data type above. (1)
- 4.1.1.3 Suggest a suitable data type for **Price**. (1)
- 4.1.2 It is clear that the above table is not normalised.
Name and explain TWO anomalies that can occur in the above example. (4)
- 4.1.3 Distinguish between 1NF and 2NF (2)

- 4.1.4 Re-organise the data above in such a way that anomalies will not occur. Use a basic ERD to illustrate the following:
- Split the table into two tables.
 - Give the tables suitable names.
 - All original fields must be used.
 - Clearly indicate the primary key for each table.
 - Indicate a foreign key in one table.
 - Clearly indicate the relationship between the tables. (5)

4.2 Access control is an essential part of protecting data; we should ensure that no unauthorised people have access to our data.
List TWO methods of access control. (2)

4.3 'Parallel data set' is a term associated with databases.

4.3.1 Explain what a parallel data set is and what it is used for. (2)

4.3.2 Explain the main disadvantage of implementing parallel data sets. (2)

4.4 Data independence is another term commonly associated with database management systems. Explain the term, data independence. (2)

4.5 What is a distributed database? Would this be appropriate to implement in this scenario? (2)

SECTION D TOTAL | 25 MARKS

SECTION E: SOLUTION DEVELOPMENT

- 5.1 The application below is used to capture personal information of Students who are registering for the year 2024.

The screenshot shows a Windows application window titled "Form1" with a standard Windows title bar (minimize, maximize, close buttons). The main content area has a light blue background with a dotted grid pattern. At the top center, there is a large white rectangular box containing the text "Registration 2024" in a bold, black, sans-serif font. Below this, the form is organized into several sections:

- Enter Name:** A text input field with the placeholder text "edtName".
- Enter Surname:** A text input field with the placeholder text "edtSurname".
- Enter ID Number:** A text input field with the placeholder text "edtIDNumber".
- Select Gender:** A section containing two radio button options: "Male" and "Female".
- Select Grade:** A dropdown menu with the placeholder text "cmbGrade" and a downward arrow.
- Select Application Date:** A date picker dropdown menu showing the date "2023/06/06" and a downward arrow.

At the bottom center of the form, there is a rectangular button labeled "Submit".

- 5.1.1 There are THREE parts of the program that use selection components to capture data.
Motivate why the application developer would use selection components rather than entry fields to capture students' data. (1)
- 5.1.2 The data is then stored in a database that is connected to the application.
Why would the data be store in a database rather than a text file or an array? (1)
- 5.1.3 Data validation is very important when it comes to programming.
How can we validate whether a gender was selected or not? (1)
- 5.1.4 Write pseudocode to validate that the ID number has the correct number of digits. (3)

5.2 Below is a snippet of code that is used to determine whether a number entered by the user is either an even number or an odd number:

```
1 Procedure TForm1.btnDetermineClick(Sender: TObject);
2 var
3     iNum: Integer;
4 begin
5     iNum := edtNum.Text;
6     if iNum div 2 <> 0 then
7         begin
8             ShowMessage('Number is odd');
9         end;
10    else
11        begin
12            ShowMessage('Number is even');
13        end;
14    end;
```

There are many errors in this snippet of code.

Provide the line number where each of the following errors occurs and the corrected code:

- 5.2.1 Syntax Error (2)
- 5.2.2 Logic Error (2)
- 5.2.3 Runtime Error (2)

5.3 Loops allow us to execute the same thing over and over again.

Provide an example for the following:

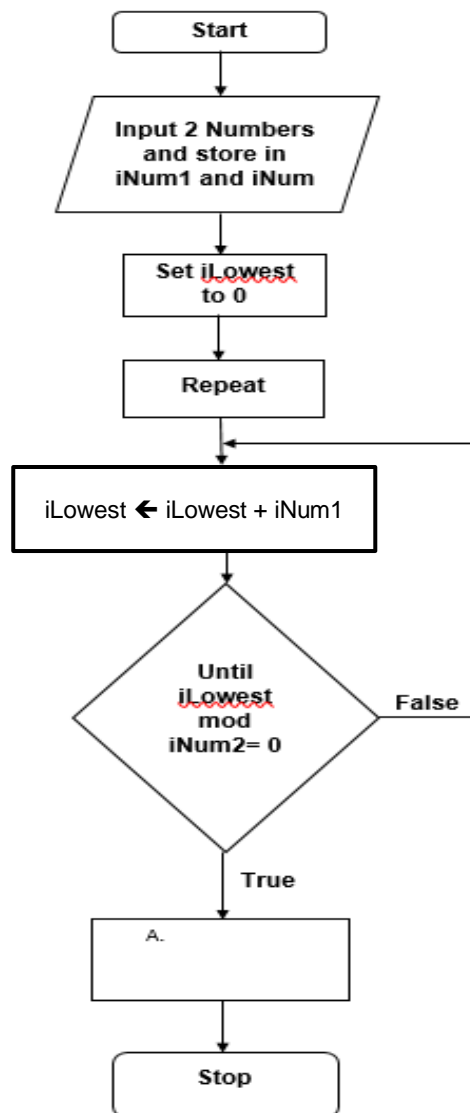
- 5.3.1 Conditional Loop (1)
- 5.3.2 Post-Conditional Loop (1)

5.4 Object Orientated Programming (OOP) allows a programmer to automate repetitive tasks and create reusable code.

5.4.1 Explain the purpose of making an attribute of the object class private and not public. (1)

5.4.2 In order to access the attributes, we make use of methods.
Name the TWO types of methods used to access the attributes. (2)

5.5 Study the flow chart below and answer the questions that follow on the next page:



- 5.5 5.5.1 What is this flowchart trying to determine? (1)
- 5.5.2 Write down the missing step for Block A. (1)
- 5.5.3 Why would a Repeat loop be used in this instance as opposed to a For loop? (1)

5.6 Redraw the trace table below and complete all the steps using the input provided. Do not forget to fill in a heading for the last column according to your answer in **5.5.2**.

Line	iNum1	iNum2	iLowest	iLowest mod iNum2 = 0?	A.
1	5				
2		7			

(5)

SECTION E TOTAL | 25 MARKS

SECTION F: INTEGRATED SCENARIO

SCENARIO

The Durban Youth Wellness Centre is home to eight (8) practitioners (including Speech and Occupational Therapists, a Paediatrician and Play Therapists), a Receptionist and an Accounts Manager. Currently, each employee maintains their own stand-alone PC workstation on which they keep their personal data files, including client contact information and confidential reports. All devices on-site are able to access the internet through a shared Wi-Fi router connected to a Fibre line; however, the devices themselves are currently not networked.

It must be noted that patients can see multiple practitioners at the organisation and cross-referrals are frequent; however, each practitioner still maintains the original file and sends a photocopy to his/her colleague. The Accounts Manager must collate the information sent to her by the practitioners at the end of each day so that she can submit claims to the Medical Aid Schemes online.

As a Network Administration consultant, you have been tasked with creating a cohesive ICT system for the organisation.

- 6.1 One of the practitioner's workstations is obsolete and he would like you to investigate the use of a tablet for his client notes and other information.
- 6.1.1 What advantages are there for the practitioner using a mobile device? (2)
- 6.1.2 What are the risks involved when using a tablet? (2)
- 6.1.3 How would you protect against the risks mentioned in 6.1.2? (2)
- 6.2 Currently, each practitioner, the Receptionist and the Accounts Manager maintain their own flat-file database of client information, including contact information, billing information and medical history.
- 6.2.1 Differentiate between flat file and relational databases (2)
- 6.2.2 State 2 problems that could be encountered in the setup above. (2)
- 6.2.3 Give 2 reasons for the implementation of a relational database for client contact, medical and account information. (2)

- 6.3 One of your tasks is to create a Maintenance Plan for the practice's ICT system.
- 6.3.1 Explain the purpose of the following maintenance tasks: (2)
- 6.3.1.1 Software Updates (2)
 - 6.3.1.2 Disk clean-up (2)
 - 6.3.1.3 Defragmentation (2)
- 6.3.2 How frequently would you perform each of the tasks listed above? (3)
- 6.4 One of the Speech Therapists has been researching Virtual, Augmented and Mixed reality technologies.
- 6.4.1 Differentiate between augmented and virtual reality (2)
- 6.4.2 Examine the use of Augmented Reality as it applies to healthcare and education, as practiced at The Durban Youth Wellness Centre. (2)
- 6.5 The privacy of both Employees and Clients are protected by the POPI Act in South Africa.
- 6.5.1 What does the acronym POPI stand for? (1)
- 6.5.2 Why is online privacy becoming more difficult to achieve? (2)
- 6.6 AI (Artificial Intelligence) refers to technology that simulates human intelligence.
One example is the use of chatbots online, by companies and institutions.
- 6.6.1 Discuss the benefits of using a chatbot on the website of the Durban Youth Wellness Centre. (2)

SECTION F TOTAL | 30 MARKS

PAPER TOTAL | 150 MARKS