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NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2025

INFORMATION TECHNOLOGY P2

MARKS: 150

TIME: 3 hours

This question paper consists of 12 pages.



SA EXAM PAPERS

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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	(24)
SECTION D: Data and Information Management	(26)
SECTION E: Solution Development	(24)
SECTION F: Integrated Scenario	(36)

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 ONE word/term for each of the following descriptions. Write only the word/term next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK.
- 1.1.1 A device that directs data traffic between different networks and determines the best path for data packets to travel from the source to the destination. (1)
- 1.1.2 The type of memory on a graphics card that temporarily stores image data that is processed by the GPU. (1)
- 1.1.3 A technology that allows the operating system to identify a device that is plugged into the computer and automatically installs the driver for the device. (1)
- 1.1.4 A hardware device that connects computing devices to a central point and directs the data in the network to its correct destination so that communication can occur. (1)
- 1.1.5 A record that is made to keep track of who made changes to a database and when those changes were made. (1)
- 1.1.6 Electronic junk mail you receive via e-communication such as e-mail or SMS. (1)
- 1.1.7 The maximum amount of data that can be transmitted in a network from one point to the other in a certain period of time. (1)
- 1.1.8 Collection of raw, unprocessed and unorganised facts. (1)
- 1.1.9 Utility software that detects and removes malicious software from a computer. (1)
- 1.1.10 An error condition where there are not enough bits available in memory to represent an integer value accurately. (1)

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

1.2.1 Which ONE of the following best describes encapsulation?

- A Encapsulation allows direct access to object attributes.
- B Encapsulation is about restricting access to the methods of an object.
- C Encapsulation requires all data to be public.
- D Encapsulation is about restricting direct access to the fields of an object.

(1)

1.2.2 A diagrammatic/symbolic visual representation of the sequence of steps required to solve a problem.

- A Algorithm
- B Flowchart
- C Pseudocode
- D Programming

(1)

1.2.3 Given the following statement:

$rResult := \text{Floor}(10.4) + 6/2 * 4 / (19 \text{ DIV } 4)$

The value of rResult will be ...

- A 11
- B 14
- C 13
- D 10

(1)

1.2.4 The process of updating the firmware on a device, such as a smartphone or tablet.

- A Jailbreaking
- B Refreshing
- C Flooding
- D Flashing the ROM.

(1)

1.2.5 A condition where a system spends excessive time swapping data between RAM and disk storage instead of executing tasks efficiently, leading to a drastic drop in performance.

- A Thrashing
- B Crashing
- C Downtime
- D Access time

(1)

TOTAL SECTION A: 15

SECTION B: SYSTEMS TECHNOLOGIES**QUESTION 2**

- 2.1 Disk clean-up is a maintenance utility in Windows.
List THREE functions of the disk cleanup utility. (3)
- 2.2 Some specialised equipment, for example medical devices, still use VGA but has mostly been replaced with HDMI.
List TWO advantages of HDMI compared to VGA. (2)
- 2.3 Briefly explain the difference between *POST* and *booting*. (2)
- 2.4 System software is regularly updated with patches and service packs.
2.4.1 Name TWO benefits of software updates. (2)
2.4.2 Distinguish between a *patch* and a *service pack*. (2)
- 2.5 Discuss TWO reasons for compressing files and folders. (2)
- 2.6 Many businesses rely on storage solutions like cloud storage to manage their data more efficiently.
2.6.1 Explain what *cloud storage* is. (2)
2.6.2 State TWO advantages of cloud storage. (2)
- 2.7 High-level languages are translated into machine code using either interpreters or compilers.
2.7.1 Tabulate THREE differences between *compilers* and *interpreters*. (3)
2.7.2 List TWO examples of programming languages which uses interpreters as a language translator. (2)
2.7.3 Describe the role that API's play in high-level programming languages. (1)
2.7.4 State TWO advantages of high level programming languages compared to low-level programming languages. (2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES**QUESTION 3**

- 3.1 Tabulate TWO differences between *fibre-optic* cables and *unshielded twisted pair cables*. (2)
- 3.2 Companies utilise WLANs and extranets to conduct business with their customers.
- 3.2.1 State TWO advantages of a WLAN. (2)
- 3.2.2 State TWO disadvantages of connecting to a network using Wi-Fi. (2)
- 3.2.3 Provide TWO ways in which access to an extranet can be controlled. (2)
- 3.3 When designing a network for an organisation or company, it is important to understand the two network architectures.
- 3.3.1 Differentiate between *thin clients* and *fat clients*. (2)
- 3.3.2 State TWO advantages of thin clients. (2)
- 3.3.3 A server is a computer that provides network resources.
- Name TWO resources shared by a server. (2)
- 3.4 Companies use VoIP to reduce communication costs.
- 3.4.1 Write out the acronym VoIP. (1)
- 3.4.2 Briefly explain what *VoIP* is. (1)
- 3.4.3 State TWO disadvantages of VoIP. (2)
- 3.5 Name TWO advantages of web-based e-mail accounts. (2)
- 3.6 Netiquette can prevent misunderstandings and conflicts.
- 3.6.1 Briefly explain what *netiquette* is. (1)
- 3.6.2 State THREE netiquette rules that users should follow. (3)

TOTAL SECTION C: 24

SECTION D: DATA AND INFORMATION MANAGEMENT**QUESTION 4**

A company that provides catering equipment to businesses need to redesign their business database because the original developer created a poorly designed system that is not working correctly.

The database currently has TWO tables as shown below:

tblClient:

tblClient	
Field Name	Data Type
AccNo	Short Text
CompanyName	Short Text
Address	Short Text
OrderDate	Date/Time
Item1	Short Text
Quantity1	Number
Item2	Short Text
Quantity2	Number
Item3	Short Text
Quantity3	Number

AccNo	CompanyName	Address	OrderDate	Item1	Quantity1	Item2	Quantity2	Item3	Quantity3
21361	The Food Fanfare	4025 Jeremiah Street, East London	2025/06/18 CT411		40	SP001		30	GT012
12781	Gourmet Gallery	622 Roosevelt Drive, Port Elizabeth	2025/07/23 GM011		25	CT411			
11890	Catering Collective	2039 Fermin Road, George	2025/08/06 PL001		60				

tblStock:

tblStock	
Field Name	Data Type
ItemCode	Short Text
Description	Short Text
CostPrice	Currency
SellingPrice	Currency
Profit	Currency
Quantity	Number

ItemCode	Description	CostPrice	SellingPrice	Profit	Quantity
CT411	Cutlery 4 piece	125	175	50	150
GM011	Milkshake Glass	35	65	30	80
GT012	Tumblers	19	28	9	160
PL001	Plate19cm	72	92	20	88
PL002	Plate22cm	89	112	23	123
SP001	Side plates	45	65	20	200

- 4.1 The ItemCode field is the primary key field in the tblStock table. Explain what is meant by the term *primary key*. (2)



- 4.2 Identify the redundant field in tblStock and motivate why it is considered redundant. (2)
- 4.3 The tblClient tables has not been normalised and will lead to anomalies.
- 4.3.1 Explain what is meant by the normalisation of a database. (2)
- 4.3.2 Give THREE reasons why the table is not normalised. (3)
- 4.3.3 Explain what is meant by the term *anomaly*. (1)
- 4.3.4 List and describe TWO anomalies that might occur when using the tblClient table. (4)
- 4.4 The Order Date in the tblClient table will require validation when it is entered. List and explain ONE type of validation technique that needs to be done on this field. (2)
- 4.5 A relational database ensures referential integrity.
- 4.5.1 Define a *relational database*. (2)
- 4.5.2 State ONE function of referential integrity. (1)
- 4.6 The database must be redesigned to prevent anomalies. A third table, tblOrders, needs to be added to the design of this database.

Draw a diagram to show the three tables and how they will be related to each other.

Pay attention to the following:

- Clearly show the name of each table
- Draw the tables showing the field names only
- Base your design on the original tables as shown on the previous page
- Indicate the primary and foreign keys in each table
- Indicate the relationships between the tables (7)

TOTAL SECTION D: 26

SECTION E: SOLUTION DEVELOPMENT**QUESTION 5**

5.1 Name the THREE common types of errors in programming. (3)

5.2 Study the following segment of code to read from a file:

```
AssignFile(sFile, 'staff.txt');
Reset(sFile);
While not eof(sFile) do
Begin
    Readln(sFile, sStaff);
    redOutput.Lines.Add(sStaff);
End;
CloseFile(sFile);
```

5.2.1 Explain the purpose of the AssignFile statement. (2)

5.2.2 Write the Delphi code to declare the variable, sFile. (1)

5.2.3 Motivate why the conditional loop can NOT be replaced with an unconditional loop. (1)

5.2.4 Describe the effect of replacing Reset(sFile) with Append(sFile) in the provided code. (1)

5.2.5 Why will no output be displayed if Reset(sFile) in the given code is replaced with Rewrite(sFile)? (1)

5.3 You have been asked to write an algorithm to display a randomly generated odd number in the range 45 to 75 (both inclusive):

5.3.1 Define an *algorithm*. (1)

5.3.2 Name ONE tool/diagram that can be used to represent an algorithm. (1)

5.3.3 Complete the following statement to generate a random number in the range 45 to 75 (both inclusive):

iRandom := (1)

5.3.4 Write an If statement to test whether the variable, iRandom, is an odd number. (1)

5.4 Study the UML class diagram below and answer the following questions.

TInspection
- fFarmName : String + fInspectionDate : String - fFarmSize : Real - fLocustStage : Boolean
+ Constructor Create (sFarmName, sLocustStage, sInspection: String; rFarmSize:Real) + GetFarmName : String + SetDate (sInspection : String) + DetermineDuration : Real + TreatmentRequired (rInfectedSize:Real) : String + toString : String

5.4.1 Differentiate between an *accessor method* and a *mutator method*. (2)

5.4.2 What does the positive sign (+) and the negative sign (-) refer to in the UML diagram? (2)

5.4.3 Critically analyse the following declaration in the class diagram:
+ fInspectionDate : String (1)

5.4.4 Identify TWO auxiliary methods in the class diagram provided. (2)

5.4.5 Provide an example of an accessor method from the class diagram. (1)

5.4.6 Give an example of a function with parameters from the methods listed in the class diagram. (1)

5.5 You have been tasked with developing software that will enable people to reserve seats for a movie. The cinema has 26 rows, each containing 40 seats.

5.5.1 Suggest a suitable data structure in which to store the seating reservations. (1)

5.5.2 Suggest a suitable GUI component to display the seating reservations in the Delphi program. (1)

TOTAL SECTION D: 24

SECTION F: INTEGRATED SCENARIO**QUESTION 6**

The rapid advancement of Artificial Intelligence and office automation is transforming the gig economy, while also contributing to the digital divide. As businesses rely on cryptocurrencies for transactions, concerns about digital footprints and GIGO grow.

- 6.1 The digital divide impacts digital citizenship.
- 6.1.1 Differentiate between *digital divide* and *digital citizen*. (2)
- 6.1.2 Explain how the digital divide impacts digital citizenship. (2)
- 6.2 A significant number of global companies report using Artificial Intelligence tools in their business.
- 6.2.1 Define *Artificial Intelligence*. (1)
- 6.2.2 State TWO disadvantages of using *ChatGPT*. (2)
- 6.3 Briefly explain the concept *digital footprint*. (1)
- 6.4 The company has a policy which encourages decentralisation of labour.
- State THREE disadvantages of decentralisation of labour. (3)
- 6.5 The office automation industry is growing at an alarming rate.
- 6.5.1 Briefly explain what *office automation* is. (1)
- 6.5.2 Name TWO examples of office automation. (2)
- 6.5.3 State THREE advantages of *robots* in workplaces. (3)
- 6.6 Information and Communication Technology contributed to the growth of the gig economy.
- 6.6.1 Define the *gig economy*. (1)
- 6.6.2 Name TWO disadvantages of the gig economy. (2)
- 6.7 Some companies use cryptocurrencies to facilitate payments.
- 6.7.1 List ONE popular cryptocurrency that companies use. (1)
- 6.7.2 Name ONE benefit of cryptocurrencies. (1)
- 6.7.3 Discuss ONE drawback of cryptocurrencies. (1)

- 6.8 Some employees experiences slow internet due to network throttling and network shaping.
- 6.8.1 Differentiate between *network throttling* and *network shaping*. (2)
- 6.8.2 Mention TWO key benefits of network shaping in a large network. (2)
- 6.8.3 The employees use email for internal communication.
- Briefly explain the role of SMTP and POP3 in this context. (2)
- 6.9 Errors made by employees contribute to GIGO and can cause data loss and damage to a company's reputation.
- 6.9.1 Expand the acronym, GIGO. (1)
- 6.9.2 Discuss THREE common human errors that employees can make that can lead to data loss. (3)
- 6.9.3 State THREE measures that can be followed to prevent GIGO. (3)

TOTAL SECTION F: 36
GRAND TOTAL: 150