

<b>EXAMINATION</b>		<b>NATIONAL SENIOR CERTIFICATE</b>	
<b>GRADE</b>		12	
<b>DATE</b>		JUNE 2024	
<b>SUBJECT</b>		INFORMATION TECHNOLOGY	
<b>PAPER</b>		2	
<b>MARK TOTAL</b>		150	
<b>DURATION (HOURS)</b>		3	
<b>NUMBER OF PAGES</b>		13	



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## INSTRUCTIONS AND INFORMATION

1. This paper consists of 12 pages with the following sections:

<b>SECTION A:</b> Short questions	(20 marks)
<b>SECTION B:</b> System Technologies	(25 marks)
<b>SECTION C:</b> Communications and Network Technologies	(25 marks)
<b>SECTION D:</b> Data and Information Management	(25 marks)
<b>SECTION E:</b> Solution Development	(25 marks)
<b>SECTION F:</b> Integrated Scenario	(30 marks)

2. Answer **ALL** the questions.
3. Answer **ALL** the **SECTIONS** in the answer book.  
Tear off the last page of the question paper (table for question 5.3) and attach it to your script.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Start **EACH** main question on a **NEW PAGE**.
6. Leave a line open between **EACH** of your answers.
7. One mark is allocated per fact; therefore, a question that is 2 marks require 2 facts.
8. Write neatly and legibly.
9. Read **ALL** the questions carefully before answering it.

## SECTION A

### QUESTION 1: SHORT QUESTIONS

- 1.1 Give the best term for each of the descriptions given below:
- 1.1.1 The device used to connect different network protocols to each other. (1)
  - 1.1.2 The location of a document on storage, example *C:\docs\exam.docx*. (1)
  - 1.1.3 Raw, unprocessed values recorded. (1)
  - 1.1.4 Using unique human properties for identification purposes. (1)
  - 1.1.5 Software that tells the operating system how to use devices/components. (1)
  - 1.1.6 Making a copy of files/folders and saving it externally from your device or at another location. (1)
  - 1.1.7 The amount of data transferred between two points in a given time period. (1)
  - 1.1.8 Techniques applied by websites to ensure they rank higher during searches. (1)
  - 1.1.9 Using someone else's profile/details to commit fraudulent activities. (1)
  - 1.1.10 The design of components/devices to reduce health risks associated with repetitive use over long periods of time. (1)

**[10]**

- 1.2 Choose a term/concept from COLUMN B that matches a description in COLUMN A. Write only the letter (A–N) next to the question numbers (1.2.1–1.2.10) in the ANSWER BOOK, e.g. 1.2.11 E.

COLUMN A		COLUMN B
1.2.1	Recording who, what and when changes were made to a database table.	A. VPN
		B. RAID
1.2.2	The program in the language as coded by the programmer.	C. Virtual Memory
1.2.3	Connection and communication of different types of devices through the internet.	D. Downloading
1.2.4	Watching a multimedia file which is not down-loaded to a device.	E. Virtual machine
1.2.5	Area on Hard Drive used as extended RAM.	F. Object code
1.2.6	A peer-to-peer protocol used to download large files from different sources.	G. Internet of Things
1.2.7	Logging into a secure network from a remote location/place.	H. Audit Trail
1.2.8	Additional information/data of a file stored with the file.	I. AI
		J. Virtualisation
1.2.9	Collection of independent disks, used as one, to recover data in case of drive failure.	K. Source code
		L. Torrenting
1.2.10	Running a second operating system on a computer that is already installed with a different operating system.	M. Streaming
		N. Metadata

[10]

**TOTAL SECTION A: [20]**

You want to get involved in Community Service by helping people who have not been exposed to computers, become computer literate. A survey will help you to determine the level of computer literacy in your area. You saw the following advertisement that could help you with recording and evaluating the survey data.

## SECTION B

### QUESTION 2: SYSTEM TECHNOLOGIES



**Samsung Galaxy Tab A8 10.5 (2021)**

- Released 2022, January 17
- 508g, 6.9mm thickness
- <> Android 11, up to Android 13, One UI 5
- 32GB/64GB/128GB storage, microSDXC

3.1%  
2,370,658 HITS

122  
BECOME A FAN

10.5"  
1200x1920 pixels

8MP  
1080p

2-4GB RAM  
Unisoc Tiger T618

7040mAh  
Li-Po

<b>DISPLAY</b>	Type	TFT LCD
	Size	10.5 inches, 319.7 cm <sup>2</sup> (~80.0% screen-to-body ratio)
	Resolution	1200 x 1920 pixels, 16:10 ratio (~216 ppi density)
<b>PLATFORM</b>	OS	Android 11, upgradable to Android 13, One UI 5
	Chipset	Unisoc Tiger T618 (12 nm)
	CPU	Octa-core (2x2.0 GHz Cortex-A75 & 6x2.0 GHz Cortex-A55)
	GPU	Mali G52 MP2
<b>MEMORY</b>	Card slot	microSDXC (dedicated slot)
	Internal	32GB 2GB RAM, 32GB 3GB RAM, 64GB 4GB RAM, 128GB 3GB RAM, 128GB 4GB RAM
<b>MAIN CAMERA</b>	Single	8 MP, AF
	Video	1080p@30fps
<b>SELFIE CAMERA</b>	Single	5 MP
	Video	1080p@30fps
<b>SOUND</b>	Loudspeaker	Yes, with stereo speakers (4 speakers)
	3.5mm jack	Yes
<b>COMMS</b>	WLAN	Wi-Fi 802.11 a/b/g/n/ac, dual-band, Wi-Fi Direct
	Bluetooth	5.0, A2DP, LE
	Positioning	GPS, GLONASS, BDS, GALILEO, QZSS
	NFC	No
	Radio	No
	USB	USB Type-C 2.0

2.1 This tablet comes with Android 11 preloaded.

2.1.1 Explain what an Operating System (OS) is. (1)

2.1.2 Identify the OS function to which each of the following statements refer:

a. Processing techniques such as Multi-threading.

b. Using device drivers.

c. Setting up and using virtual memory. (3)

- 2.2 The CPU is referred to in the specifications as ‘Octa-Core’.  
Explain what this statement means. (2)
- 2.3 This tablet also has a GPU.  
Explain what a GPU is and what effect it has on the device’s performance. (3)
- 2.4 CPU design supports different processing techniques.  
Which processing technique came about due to the development of multi-core CPU’s? (1)
- 2.5 Explain how multitasking takes place. (2)
- 2.6 This tablet allows you to select from a variety of memory options.  
With reference to computers in general, compare the differences between memory and storage in table format, referring to the purpose and storage duration of each component.

*Redraw the following table in your answer book.*

	Memory	Storage
Purpose		
Duration		

(4)

- 2.7 When a device is fitted with an SSD, the capacity is normally not very large. This makes maintenance an ongoing requirement.  
  
Suggest 3 housekeeping actions that can be applied to clear space on the drive. Exclude any cloud options or transfer of files to external devices as part of your answer. (3)
- 2.8 Explain the purpose of the system clock of computing devices. (2)
- 2.9 The cameras on this tablet both refer to *1080p@30fps*.  
Interpret and explain this specification. (2)
- 2.10 You need to work in the field for long hours. What can you do to extend the duration of the battery use before it can be charged again? (2)

**TOTAL SECTION B: [25]**

## SECTION C

### QUESTION 3: COMMUNICATIONS AND NETWORK TECHNOLOGY

- 3.1 Define the term network. (3)
- 3.2 WLAN is listed as a specification in the advertisement.  
Explain what a WLAN is **and** how Wi-Fi fits in this scenario. (2)
- 3.3 UTP cables are frequently used in local area networks.  
Explain TWO weaknesses associated with transmission using UTP cables. (4)
- 3.4 Explain what Bluetooth is and what it is used for. (2)
- 3.5 Evaluate the importance of each of the following devices in setting up a network by referring to the function/purpose of each.
- 3.5.1 NIC (1)
  - 3.5.2 Server (2)
  - 3.5.3 Switch (2)
- 3.6 Websites use URL's and DNS servers.  
  
Explain the relationship between a URL and a DNS server. (2)
- 3.7 State two reasons why a server-client network is more expensive than a peer-to-peer network. (2)
- 3.8 Internet/network connectivity has changed the traditional work environment.  
Distinguish the differences between:
- 3.8.1 Mobile office (2)
  - 3.8.2 Virtual office (2)
- 3.9 Cloud computing allows people to work online from anywhere using the internet.  
Explain the concept File synchronising. (1)

**TOTAL SECTION C: [25]**

## SECTION D

### QUESTION 4: DATA AND INFORMATION MANAGEMENT

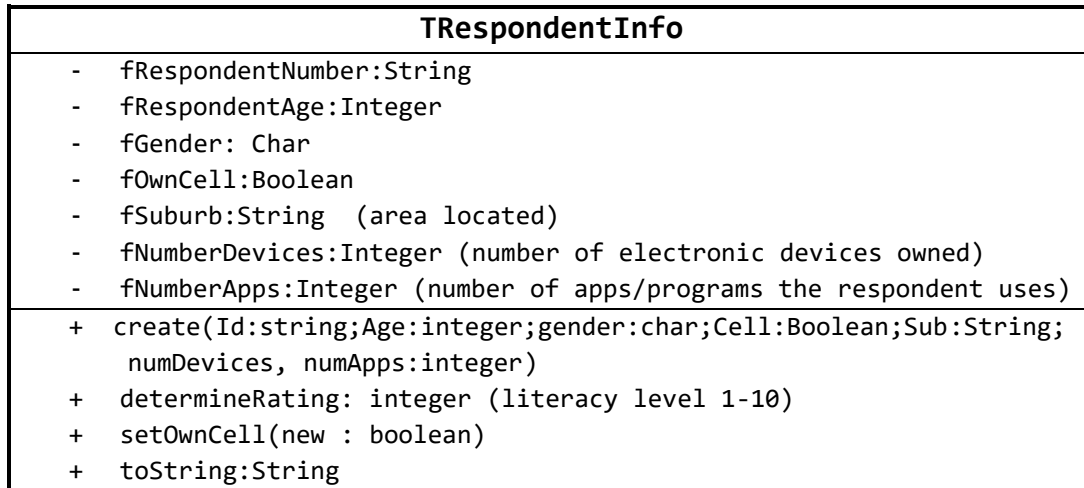
- 4.1 Database tables are mostly used to store data.  
Define the following terminology:
- 4.1.1 Primary key (2)
  - 4.1.2 Alternative key (2)
  - 4.1.3 Record Lock (2)
- 4.2 When tables of a database are in a relationship, a one-to-many relation with referential integrity is mostly used.  
Explain what referential integrity is. (2)
- 4.3 Most Point-of-Sales systems use database management systems.  
Give an advantage of using a database management system. (1)
- 4.4 During database design, normalisation of the tables is very important.
- 4.4.1 Explain what normalisation is. (2)
  - 4.4.2 Give TWO pointers to look for that will indicate that the table is not in a normalised state. (2)
- 4.5 Programs should be designed in a way to best prevent any possible errors in input or when the received data is processed.  
Clearly explain the difference between data validation and verification. To support your explanation, provide an example of how each can be applied in a program. (4)
- 4.6 Data saved should also be *relevant* and *current*.  
Distinguish between these two concepts. (2)
- 4.7 Explain what a runtime error is with reference to coding. (1)
- 4.8 When Graphical User Interfaces are designed, some pointers regarding user-friendliness should be considered.
- 4.8.1 Explain the concept: '*user-friendliness*'. (2)
  - 4.8.2 List THREE different strategies/guidelines to use when designing a user-friendly GUI. (3)

**TOTAL SECTION D: [25]**

## SECTION E

### QUESTION 5: SOLUTION DEVELOPMENT

5.1 Study the following UML class diagram that was developed to record information regarding the computer literacy of respondents.



- 5.1.1 Why do you think the cell phone number was not saved as an attribute of this class? (1)
- 5.1.2 Is the method *determineRating*, that uses the number of devices and applications to derive a literacy level, an accessor, a mutator or an auxiliary method? Motivate your answer. (2)
- 5.1.3 The method *setOwnCell* is an example of a mutator. Explain what a mutator is. (2)
- 5.1.4 What is the purpose of the *toString* method? (2)
- 5.1.5 A constructor is used to instantiate the object. Explain what happens during instantiation. (2)
- 5.1.6 Explain the concept of encapsulation of attributes and methods. (2)
- 5.2 The use of classes is an example of modular programming design.
- 5.2.1 Give THREE benefits of modular programming design. (3)
- 5.2.2 Explain the concept of outsourcing with reference to program design and development. (2)

5.3 You are coding a game where words entered are scored. The score is calculated by adding the positional value from the alphabet of the character in the word. (A=1 to Z=26).

You have designed the following algorithm and need to test it using a trace table.

The algorithm:

1	sAlpha ← 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
2	iScore ← 0
3	sWord ← input in upper case (Use 'PAT' as test data)
4	iLong ← length(sWord)
5	for i ← 1 to iLong
	begin
6	iPos ← POS(sWord[i],sAlpha)
7	iScore ← iScore + iPos
8	End // for
9	Display iScore

Use the table on the last page of this paper to complete the trace table: (5)

Line	iScore	sWord	iLong	i	If i<= ilong	iPos	display	sAlpha
1								ABCDEFGHIJKLMNOPQRSTUVWXYZ VWXYZ
2	0							
3		PAT						

5.4 You have decided to use the length of the word as a difficulty criterion when calculating the score.

- If the word is longer than 9 characters, each character counts double the positional value.
- If the word is 5 characters or less, the positional value is halved.

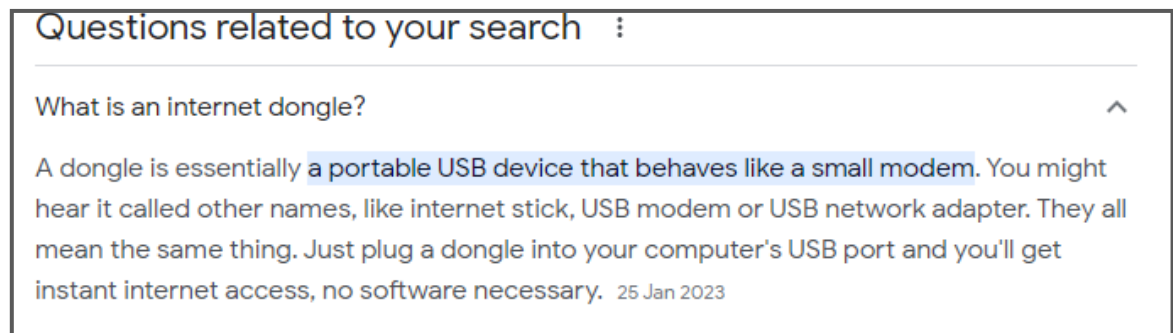
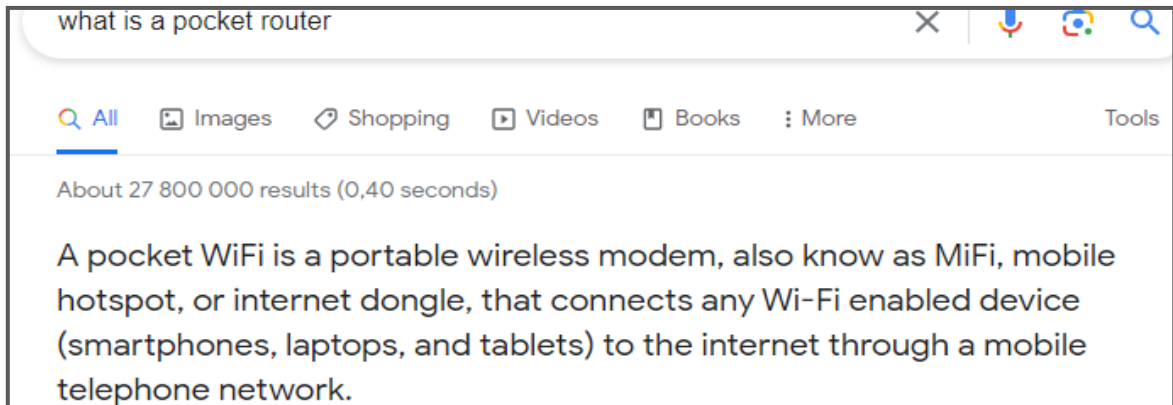
Refer back to the algorithm in question 5.3 and add pseudocode to lines 10 and further and use a **new variable** to calculate the final score for the word taking the length of the word into consideration. (4)

**TOTAL SECTION E: [25]**

## SECTION F

### QUESTION 6: INTEGRATED SCENARIO

You are not sure if the tablet can use a Sim Card for internet access and researched *Dongles*. During your research you read about a pocket Router and found the following results:



- 6.1 Both these search results refer to the term *modem*. Explain the purpose of a modem. (2)
- 6.2 We do not all get the same results when entering similar search phrases.
- 6.2.1 Explain why the Web 3.0 technology can have an influence on our search results. (2)
- 6.2.2 Explain the term: Big Data. (2)
- 6.2.3 Why is Big Data important to companies? (1)
- 6.3 When using the internet or social networks we might expose ourselves to various security risks. Different prevention methods are available for possible protection.
- 6.3.1 Explain the term encryption. (2)
- 6.3.2 Internet banking sites make use of SSL. Explain what SSL is and how it works. (3)
- 6.3.3 Why do companies set up firewalls as preventative measure. (2)



- 6.4 *DDoS*- and *Ransomware* attacks have featured more frequently.  
Explain what each of these entails, also point out the difference between them. (4)
- 6.5 As good digital citizens, we need to be aware of the impact of our carbon footprint.
- 6.5.1 Define the term: green computing. (2)
- 6.5.2 Suggest TWO actions, contributing to green computing, we can do to assist. (2)
- 6.6 Good netiquette includes the sending of compressed attachments to save downloading time and the size of the email attachments.  
Distinguish between lossy and lossless compression. (3)
- 6.7 Webinars are reliant on using VoIP.  
Explain this statement. (2)
- 6.8 In general slow internet connections are a frustration to most South Africans.  
Internet Service Providers (ISP) sometimes apply shaping which can slow down the connection even more. (3)  
Explain what shaping is and give TWO reasons why a provider can apply it.

**TOTAL SECTION F: [30]**

**GRAND TOTAL: [150]**



