NAMIBIA SENIOR SECONDARY CERTIFICATE

COMPUTER STUDIES HIGHER LEVEL 8324/1

PAPER 1 3 hours

Marks 100 **2020**

Additional Material: Answer Book

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Write your answers in the Answer Book provided.
- Write your Centre Number, Candidate Number and Name in the spaces on the Answer Book provided.
- Write in dark blue or black pen.
- Do not use correction fluid.

- Answer **all** questions.

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The businesses mentioned in this question paper are entirely fictitious.

This document consists of **7** printed pages and **1** blank pages.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

1 Facts are a feature of a declarative language. An example of a fact is shown below.

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sibling (fred, uta).
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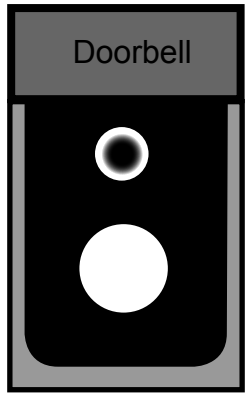
Name and describe one other feature of a declarative language. [2]

2 **(a)** A security company in Windhoek supplies and installs an Internet enabled doorbell for its customers. The doorbell can be accessed using a smartphone. The doorbell has a video camera, which allows the customer to see, hear and speak with anyone arriving at their front door.



The company stores customer videos on a public cloud.

(i) State **two** reasons why the security company chooses to use a public cloud rather than a private cloud to store the videos. [2]

(ii) Customers may have concerns about the security of video being stored on the public cloud.
State **two** precautions used to ensure security of data on public cloud storage. [2]

(b) Neo uses cloud storage to store his photographs on his cellphone.
State **two** advantages of cloud storage instead of his local phone storage. [2]

3 Jordan is the systems administrator for an ISP in Karibib. He uses both a command line interface (CLI) and a graphical user interface (GUI). Describe **two** characteristics of a command line interface (CLI) and **two** characteristics of a graphical user interface (GUI). [4]

4 Gareth coaches a team of ten athletes for a Long Jump event. Gareth uses a program to help analyse each athlete's performance. A sample of the data held about each athlete is shown below.

AthleteData	
firstName	Agnes
Surname	Witbooi
athleteNumber	178
Professional	1
Seasonbest (m)	6.25
Weight (kg)	61.5

Gareth has added a record structure to his program.

RECORD athleteData IS {STRING firstName, STRING Surname, INTEGER athleteNumber, BOOLEAN professional, REAL seasonBest, REAL weight}

(a) Gareth wants to store his ten athletes' data using the record structure shown above. The array name is athletes.
Using pseudocode, declare the variable which can store the data for the eight athletes. [2]

(b) Using pseudocode, or a programming language of your choice, write the code necessary to add the data for the athlete Agnes shown in the table above. Your answer should use the array declared in part (a). [3]

(c) Gareth wants to find the longest season jump measurement of the season.
Using pseudocode, design an algorithm to find the longest season jump. Your answer should use the array declared in part (a). [5]

5 A large agro-processing company in Rundu has four separate departments. The following table describes each department and shows tasks that involve a computer system.

	Department	Tasks
(i)	Data collection centre - The data centre where data from all data logging units is collected	Collect and collate data from sensors around the company units
(ii)	Design Office - Where packaging for products are designed	Produce and present prototypes of new models
(iii)	Marketing	Answer customer queries and produce sales brochures
(iv)	Finance - Wages and salaries department	Produce wage / salary slips each month

Identify, with a reason, a suitable output device which could be used in each of the four departments. Your devices must be different. [8]

6 Jorina, the Management Information System (MIS) manager has just purchased some MIS software for her company.
Explain how MIS Software can be used by Jorina to help the company run more efficiently. [3]

7 A new computer system is to be developed for a factory located in Rehoboth. You have been asked to gather information from the managers, assembly-line workers and clerical staff about the current system. The managers can be available at any time, the assembly-line workers must not be interrupted at any time and do not like taking work home, and the clerical staff are very busy during their working hours and do not like being watched.

Describe, with reasons, the method of fact finding you would use to gather information from each group. The method chosen for each group must be suitable for that group. You must provide reasons why this method was chosen. The methods for each department must be different from each other.

(a) Managers [3]

(b) Assembly-line workers [3]

(c) Clerical staff [3]

8 High-level languages can be translated using a compiler or an interpreter.

(a) Describe the features of a compiler. [3]

(b) Describe the features of an interpreter. [3]

9 **(a)** A communication line uses Automatic Repeat reQuests (ARQ).
Explain what is meant by Automatic Repeat reQuests (ARQ). [3]

(b) A computer system uses even parity. The leftmost position of each byte is the parity bit.

(i) What bit will be needed to complete the byte below? [1]

?	1	0	1	0	0	0	1

(ii) The parity bit is used to perform a parity check when a byte is transmitted from computer A to computer B.
Explain how computer B will establish whether or not the byte has been transmitted correctly. [2]

(c) In addition to a parity bit check on a byte, a parity block check is also carried out. Computer A transmits four bytes followed by a parity byte. The following sequence of bytes has just been received by computer B.

10110111

01111000

00011010

01110001

10101100 ← Parity byte

One of the four bytes has an error in one of the bits.

(i) On your answer script, identify and write out the byte where the error has occurred. Underline the bit that is the error. [2]

(ii) Write down the corrected byte. [1]

(iii) Explain what the computer system needs to do if more than 1 bit has been transmitted wrongly. [2]

10 A safety system uses three digital sensors X, Y and Z. The outputs from these sensors feed into a logic circuit. The output from the logic circuit is A.

A has the value 1, if:

either output from sensor X is 1 and output from sensor Y is 1

or output from sensor Y is 0 and output from sensor Z is 0

or output from sensor X is 0 and output from sensor Z is 1

(a) Draw a logic circuit to represent the above safety system. [6]

(b) Draw a truth table for the safety system. [4]

(c) The output from the logic circuit is sampled every ten seconds. The output for eight consecutive samples are stored in an 8-bit register.

(i) The register contains :

0	1	0	1	1	1	0	1

Calculate the equivalent denary value. [1]

(ii) Show the contents of the register if the denary equivalent is 66. [1]

(iii) A fault condition occurs if five consecutive values of 1 are sampled.
Give a binary value that shows a fault condition. [1]

(iv) Give the minimum denary value that shows a fault condition. [1]

11 A random access file is used to store member records. The key field, MemberID, is in the range 1000 to 9999.

A hashing algorithm has been designed to calculate each record's address using:

$$\text{Address} \leftarrow \text{MemberID MOD } 100$$

$x \text{ MOD } 100$ returns a value which is the remainder when x is divided by 100.

The record with this key is then stored at the calculated address.

(a) Records with the following key fields are to be added to the file:

2003

3097

4007

6098

7008

Write the address where these records would be stored. [2]

(b) (i) An additional record with key field 5097 is to be stored.
State what will happen to the existing contents of the file. [1]

(ii) Describe how the file handling software could prevent the outcome stated in part **(b)(i)**. [2]

12 A biomedical company is testing sunscreen products that use nanoparticles to reflect cancer-causing ultraviolet light from human skin in all the regions of Namibia.

(a) Define the term nanotechnology. [2]

(b) Sunscreen products that use nanoparticles promise to be more effective in protecting humans from cancer-causing ultraviolet light as compared to the sunscreen products that do not use nanotechnology. Explain why this is the case. [2]

(c) There is growing use of nanotechnology in the field of nanotechnology in medicines. Describe **two** other applications of nanotechnology in the field of medicine. [2]

(d) Identify **one** drawback of nanotechnology. [1]

13 Define the following terms in peripheral device control:

(a) Polling [2]

(b) Handshaking [2]

14 The use of mobile technologies has affected education in both positive and negative ways.

(a) Compare 4G and GPRS mobile telecommunications technologies. [4]

(b) Identify one mobile application in education, that is supported better by 4G and not GPRS. Justify your choice. [2]

(c) State **one** benefit of mobile apps in education. [1]

15 Olavi is a victim of both cyberstalking and cyber-bullying.

Describe the following ethical issues to do with computer systems and for each provide one strategy to deal with it:

(a) Cyberstalking [2]

(b) Cyber-bullying [2]

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