COMPUTER STUDIES HIGHER LEVEL   **8324/1**

PAPER 1   3 hours

Marks 100   **2017**

Additional Materials: Answer Book

INSTRUCTIONS AND INFORMATION TO CANDIDATES

- Write your answers in the separate 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 page.

Republic of Namibia

MINISTRY OF EDUCATION, ARTS AND CULTURE

1 Bennie has a stand-alone computer at home and also uses the computers at school. He uses a DVD-RW drive and a CD-ROM drive on his home computer.

State **one** use that Bennie could make of each of the above drives, justifying your choices. [4]

2 Pandu uses a laptop computer that has several utility programs including a disk defragmenter.

(a) State what is meant by the term *utility program*. [1]

(b) Fragmentation of the hard disk decreases the performance of the computer. Explain why the performance decreases. [2]

(c) Name **one** other utility program that could be used on the laptop computer. [1]

3 Terence and Gustav are computer programmers and are discussing different computer languages. Terence writes programs in a low level language and Gustav writes programs in a high level language.

(a) Describe, giving a reason, a situation where a programmer may decide to use a low level programming language. [2]

(b) Give **one** reason why most programmers prefer to use a high level programming language. [1]

4 OchangeSoft is a large organisation with offices throughout the country. It has employed a team of analysts to upgrade the existing paper-based School Management System for Branabas Secondary School. The team has designed and created a new system to replace the existing paper-based system and are planning the changeover to the new system.

Identify and describe in detail **two** different methods of changeover available to the team. Clearly explain **one** advantage and **one** disadvantage of each method. [8]

5 In Object Oriented Programming (OOP), objects, methods and classes are commonly used.

(a) Describe how classes are used in an object-oriented language. [3]

(b) The programmer is developing software that requires the use of several queues. She creates a class called Queue. This Queue requires two variables Queue_Array and Quantity.

State the purpose of two variables **Queue_Array** and **Quantity** required for the implementation of the Queue class. [2]

(c) When programming using a procedural language, a programmer defines how the data is to be stored using a variable and then creates the procedures to operate on these variables.

Describe **two** advantages of programming in an object-oriented language when using several Queues, compared to a procedural language. [4]

6 An array, Cars, stores types of cars typed in by a user.

(a) The array is treated as a stack. The first three cars entered are TOYOTA, VW, FORD in this order.

CARS

7	
6	
5	
4	
3	FORD
2	VW
1	TOYOTA

(i) A car is then removed.

Which car is removed first? [1]

(ii) A new car, RENAULT, is then added.

Into which array element would RENAULT be stored? [1]

(b) The array is treated as a queue. The first four cars entered are JAGUAR, FERRARI, MASERATI, BENTLEY in this order.

CARS

7	
6	
5	
4	BENTLEY
3	MASERATI
2	FERRARI
1	JAGUAR

(i) A car is then removed.

Which car is removed first? [1]

(ii) A new car, LAMBORGHINI, is then added.

Into which array element would LAMBORGHINI be stored? [1]

[Turn over

(c) A linked list is used to store the different games offered at a school.

    (i) Draw a diagram to show how the following games can be stored in the linked list in alphabetic order:

        RUGBY, TENNIS, NETBALL, CRICKET, SOCCER   [5]

    (ii) Describe an algorithm to insert a new game into the correct position in the list.   [5]

7 Describe the purpose of the following registers in a CPU.

    (a) Current instruction register (CIR),   [2]

    (b) Memory address register (MAR),   [2]

    (c) Program counter (PC).   [2]

8 At a private Hospital in Oshakati, an automated Kiosk Machine is used to sell refreshments. The machine advertises 20 refreshment items; each one is given a code from 0 to 19. The prices of all refreshments are in multiples of N$10.00.

The user presses one of the buttons from 0 to 19 on the front of the machine. The machine checks in an array in its memory to find the price of the refreshment selected. This price is displayed on the front of the machine.

The customer then inserts either N$100.00, N$50.00, N$20.00 or N$10.00 note(s). Each time a note is input the machine subtracts the value from the amount still required. The display changes to show the new amount still required or the change to be issued.

When enough note(s) have been inserted the machine will deliver the item and pay out any change necessary.

Write an algorithm to control the process of buying a refreshment item.   [9]

9 A home loan official for a large commercial bank in Erongo region issues home loans to clients based on a logic network made up of AND, OR and NOT gates only. A loan application will be approved if the outcome signal (i.e. O = 1) is received depending on the following input bits:

INPUT	BINARY VALUE	CONDITION
P	1	Price ≤ Client's Qualifying amount
	0	Price > Client's Qualifying amount
D	1	Distance from CBD ≤ 10km
	0	Distance from CBD > 10km
A	1	Area of ERF ≥ 200 m^2
	0	Area of ERF < 200 m^2

A loan application is approved (O = 1) occurs when:

Either
Price, P ≤ Client's qualifying amount and Distance from CBD, D ≤ 10km
OR
Price, P ≤ Client's qualifying amount and Area of ERF, A ≥ 200 m^2
OR
Distance from CBD, D > 10km and Area of ERF, A ≥ 200 m^2

Draw a logic network and truth table to show all possible situations when the stop signal could be received. [8]

10 A marine research center has three stations in Walvis Bay, Swakopmund and Divundu.

- The Walvis Bay station has a Local Area Network (LAN) consisting of five computers.

- A file server on this network (Server A) contains all the administration and research data for all three stations.

- A second file server (Server B) authenticates all logons.

- The Swakopmund and Divundu stations each have a single computer, which connect to the network of the Walvis Bay station.

- The stations are connected over a Wide Area Network (WAN) using a star topology.

(a) With the use of examples, describe how communication links can be established by using the following protocols:

(i) TCP/IP [3]

(ii) Packet switching [3]

(iii) Circuit switching [3]

(b) Some messages, which are transferred on a network, are confidential. Encryption could be used as one of the many security measures for these stations.

State the meaning of the term *encryption* and explain how it is used to maintain confidentiality of messages. [3]

[Turn over

11 Mr. Gawaseb is a CEO of AB2 Stationers, a leading stationery and office furniture supplier in Windhoek. He is considering implementing a computerised Management Information System (MIS) for his organisation.

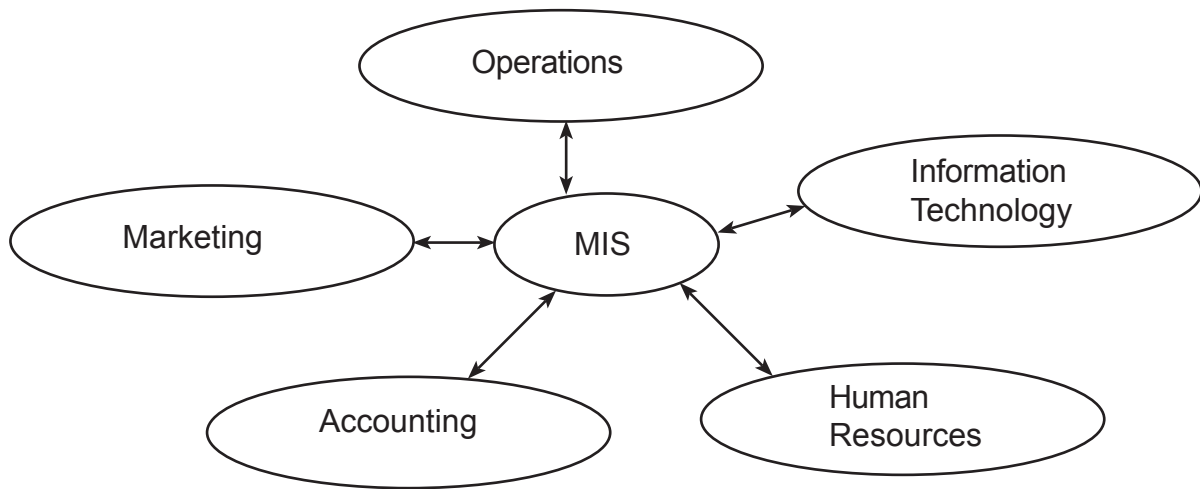Fig 1 below shows the possible interactions of an MIS with various departments of AB2 Stationers.

Fig. 1

(a) Name **one** feature of an MIS that AB2 Stationers can benefit from and with the use of examples explain how these possible benefits can be realized. [3]

(b) Using examples, briefly describe the following types of Information systems:

(i) Passive Information System. [2]

(ii) Interactive system. [2]

12 A systems analyst must decide on whether to use a General application software or a Custom-designed software.

(a) What is meant by the following terms?

(i) *General application software* [1]

(ii) *Custom-designed software* [1]

(b) Give **two** advantages and **two** disadvantages of each type of software mentioned above. [4]

13 Moira has a new mobile application that stores details of members of a social club on a member file.

(a) Members' names are stored as strings of characters using ASCII character set.

    (i) State what is meant by a *character set*. [1]

    (ii) Describe how the ASCII character set is represented. [3]

(b) The number of log-ins made by a member during the year is stored as an integer in a single byte. Hangula has logged in 105 times. Convert the denary value 105 into the binary representation for the computer to store. [2]

(c) Moira used hexadecimal to encode the background color for one of the HTML pages for her application.

The colour code is:

Red		Green		Blue	
F	E	A	6	1	2

What are the denary representations of the following colours? Show all working.

    (i) Red [2]

    (ii) Green [2]

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