

NGEE ANN SECONDARY SCHOOL

PRELIMINARY EXAMINATION

COMPUTING

Paper 1 Written

23 August 2019

7155/01

2 hours

Candidates answer on the Question Paper. No Additional Materials are required.

Instructions to Candidates

Write your name, register number and class at the top of this page. Write in dark blue or black pen. You may use an HB pencil for any diagrams, graphs or rough working. Do not use staples, paper clips, glue or correction fluid.

Approved calculators are allowed.

Answer **all** questions.

The number of marks is given in brackets [] at the end of each question or part question. You should show all your working. The total number of marks for this paper is 80.

For Examiner's Use

Marks /80

Checked by student:	Dat	e:
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This document consists of <u>16</u> printed pages and 0 blank pages.

- (a) Convert the binary number 11001011 into a denary number. Show your working.
 [2]
 (b) Convert the denary number 173 into a hexadecimal number. Show your working.
 [2]
 (c) The MAC address of a device is shown below. Fill in the blanks below to indicate what the two groups of numbers represent.

[2]

(d) An IT manager is trying to trace if the device in (c) had gained unauthorized access to the company's network. Based on the log files of the network, the last 4 bits of the unauthorized device's MAC address in binary form were identified to be **0111**.

Check and state if the above device was the unauthorized device.

1

2 (a) Information is stored in a computer in units known as bits and bytes. Describe what is meant by a bit and a byte.

- (b) Convert the following amounts of data in the stated units.
 - (i) 2 450 000 000 B = _____ GB

[2]

- (ii) 2 KiB = _____ B
- (c) Jason wants to set up a simple network at home to connect his laptop and smartphone to his wireless printer. He has a wireless router and a modem to provide Internet connectivity to all the devices.
 In the space below, draw a simple diagram, with labels and connecting lines, to show how all the above-mentioned devices can be connected in his home [2] network.

(d) A topology describes the physical layout of a network.

Draw a line between the description and the correct topology.

Topology	Description
Ring topology	A formation in which a common cable or backbone connects all devices, allowing the transmission of data to all the devices connected.
	A formation in which each computer is paired with a network device such as a hub or switch and connected to one another, allowing data transmission between the network devices.
Bus topology	A formation in which a network device such as a hub or switch is at the centre of the network with connections to all the other computers.
	A formation in which each computer is connected to two other computers and data is passed around in the same direction.
Star topology	A formation in which every computer is connected to one another and data can be transmitted from different computers simultaneously.

- 3 Kamil is setting up a new computer system to record television programmes. He wants to be able to record, view and then erase programmes that he does not want to keep.
 - (a) He has chosen to use a magnetic hard disk as an optical storage medium.

Explain to Kamil an advantage and a disadvantage of using a magnetic hard disk compared to a solid-state memory card.

(b) State another type of external storage.

(c) The different parts of the computer system work together so that data can travel via different paths through the computer, which is known as data flow.

In the text below, insert **five** of the following words in the correct place about the following data flow when using input and output devices.

memory	input device	processor reg	ister	data bus
output de	vice ALU	address bus	contr	rol unit
Data is entered the computer ca a	using the an understand. Th	and control and control and control and control and the second	nverted i arily sto	into a form that red in
Instructions from processor's be processed b	m the running app y the processor's	Dication are interpreted	by the may requ	uest the data to
The control unit	t may then redired	ct the processed data to splay in a form that use) rs can u	nderstand.

[5]

4 Benjamin logged into his game and discovered his account has been hacked and all the items on his character had gone missing. He went to search for help online.

Ac	cou	nt Hacked	
Update	ed: 3 mo	onths ago Article ID: 9852	
Keleva	sîÇ √	♪ 😤 ₩ℤ ₩ 🔅 ⑤ Ø Ø 🦉 🏆 SC 📕 Φ 🕅 ⊷	
Сог	nmon F	Problems	
• /	Account	compromised	
• /	All items Password	s missing rd changed	
lf you f prever 1. 5 2. (think yo ht future Secure yo Once you	our Blizzard account has been hacked, follow the steps below to regain access to your account and a compromises. Your computer to avoid being hacked again after you've regained access. u've secured your computer, submit a ticket to recover your account.	
3. V r	Vhile Cu nethods	istomer Support reviews your case and restores access to your account, review the following common s hackers use to steal your account.	
(sour	ce: <u>htt</u>	tps://us.battle.net/support/en/article/9852)	
(a)	Benja	amin uses the password for his game account: <u>benjamintay</u> .	
	(i)	Explain to Benjamin why this is a poor password for securing his account.	
			[1]
	(ii)	Describe how to create hard-to-guess passwords.	

.....

[1]

(b) Benjamin has successfully regained control of his account.

The intruder tries another method to gain access to Benjamin's account again by using a phishing email.

State what is meant by phishing. (i) [1] (ii) Describe a tell-tale sign to identify phishing emails. [1] (c) The gaming website recently adopted a two-factor authentication for users to access their online accounts more securely. Explain what two-factor authentication is, and how it allows secure access to online accounts. [2] Describe the social issues arising from the use of technology in the area of (d) entertainment. [2]

5 (a) Identify the logic gate represented by the following truth table.

Α	В	Χ
0	0	1
0	1	0
1	0	0
1	1	0

.....

[1]

[4]

(b) Complete the truth table for the Boolean statement:

A	в	С	Working space	х
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

X = ((A NOR B) OR (A AND C)) NAND C

(c) A concrete mixer homogenously combines cement and related components continually to give workers ample time to use the concrete before it hardens.

The alarm of a concrete mixer sounds when certain conditions occur in the mixer.

The output, X, of a logic circuit that drives the alarm must have a value of 1 only if:

either	viscosity level (V) high and motor speed (M) low
or	viscosity level (V) low and motor speed (M) high

The inputs to the system are:

Input	Binary	Condition
V	0	Viscosity high
	1	Viscosity low
М	0	Motor speed is low
	1	Motor speed is high

Draw a logic circuit for the system.

6 (a) A bank sets up a home loan calculator application that will allow clients to find out the different amounts of monthly repayment to make depending on the different interest rates charged by the bank. Clients need to decide on the loan amount required and the period of repayment. The loan amount should be between \$10 000 to \$1 000 000 while the period of repayment should be between 5 to 35 years inclusive.

State the inputs, the outputs and the processes required to find the monthly repayment amounts and the corresponding simple interest rates.

Test ease condition	Test data	
For each condition, give an example	of test data that can be used.	
Identify two other test conditions that	t could be used to test the application.	
I he home loan calculator application and error conditions	needs to be tested with data for normal	
to validate the input.	eck that should be added in the process	
Name and describe and validation of	ack that abould be added in the process	

Test case condition	Test data

[4]

(b)

(c)

7 Sandy wants to borrow a loan of \$20,000. She searches for loans offered by three different banks with their respective annual interest rates and minimum loan length.

	А	В	С	D
1		ABC	GHI	XYZ
2	Loan Amount	\$20,000.00	\$20,000.00	\$20,000.00
3	Loan Length (months)	36	20	40
4	Interest Rate	9.75%	10%	9.55%
5	Monthly Payment	-\$643.00	-\$1,089.80	-\$585.77
6	Total Amount Payable	-\$23,147.96	-\$21,795.97	-\$23,430.76
7				
8				
9	Total Interest Payable	-\$3,147.96	-\$1,795.97	-\$3,430.76
10	Bank	ABC	GHI	XYZ
11				
12	Lowest Interest	-\$1,795.97		
13	Best Bank Loan	GHI		

Sandy has a spreadsheet to decide which bank she should take a loan from.

(a) State the type of data that is held in each of the following cells.

	B2		
	B4		[2]
(b)	(i)	The cells B5 – D5 show the monthly payment amount for each bank. Identify the most appropriate function to use in cell B5.	
			[1]
	(ii)	The cells B6 – D6 show the total loan amount payable for each bank. Identify the most appropriate formula to use in cell B6.	
			[1]

(iii) The cells B9 – D9 show the total interest payable for each bank. Identify the most appropriate formula to use in cell B9.

.....[1]

(c) Identify the most appropriate function to search in rows 9 and 10 for the same amount as the lowest interest payable provided by cell B12, and use it to complete cell B13.

An algorithm is required to remove all non-digits from a credit card information and output the credit card number.
 Study the following pseudo-code.

```
Idnum = "834-2332-8442"
NewId = ""
Counter = 0
WHILE Counter <= len(Idnum)
    IF Idnum[Counter] != "-"
        NewID += Idnum
    ENDIF
    Counter = Counter + 1
ENDWHILE
OUTPUT "Credit card no: NewID"
```

There are **three** errors in this pseudo-code. Locate the errors and state the correct pseudo-code.

Error 1	
Correction	
Error 2	
Correction	
Error 3	
Correction	
	[6]





Complete the trace table for the following set of data.

10, 11, 27, 21, 36, 0, 2, 17, 72, 80

Trace table

Х	count	sum	digit_sum	OUTPUT

(b) State the purpose of the algorithm.

.....[1]

- 10 Write an algorithm, using pseudo-code or a flowchart, that
 - reads a string containing 7 bits
 - computes the parity bit using odd parity
 - outputs the final 8 bits in a string with the appended parity bit.

*** End of Paper ***

[8]