NAME

CLASS

INDEX
NUMBER

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

READ THESE INSTRUCTIONS FIRST

Write your name, class, index number in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
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.

Parent's Signature : _____

Date: _____

Remarks (if any) :

For Examiner's Use	
Marks	/80
Total	**%**

This document consists of **11** printed pages including this page.

1 Draw a line to match the spreadsheet function to the correct description.

Function   **Description**

ROUND

COUNTA

COUNT

VLOOKUP

HLOOKUP

PMT

Looks in the first column of an array and moves across the row to return the value of a cell

Returns the periodic payment for an annuity

Rounds a number to a specified number of digits

Counts how many values are in the list of arguments

[4]

2 A security system records video footage. One minute of video requires 180 MB of storage. The recording system can store several hours of video footage. (Computer Science P1, CIE 2015)

(a) Name and describe a suitable storage device for this recording system.

....

....

.... [2]

(b) Calculate how much storage would be needed for 2 hours of video footage.

Show your working and give the answer in Gigabytes (GB).

....

....

.... [2]

3 A car's Engine Management System receives information from seven different sensors and stores the status of each sensor in an 8-bit register. A value of **1** indicates a fault condition.
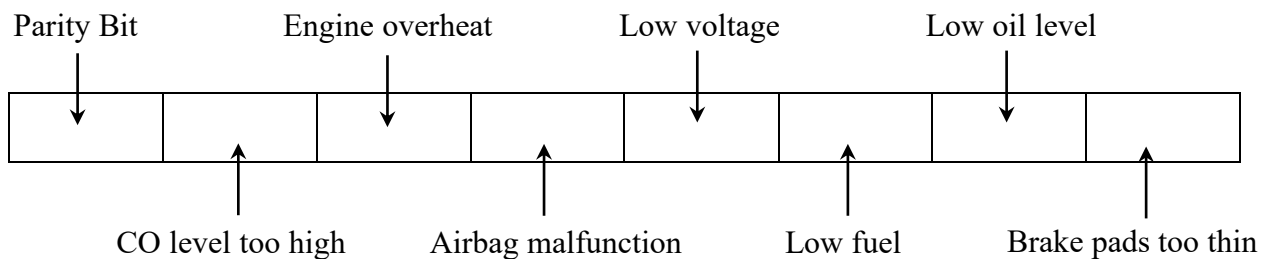
For example, a register showing **10110100** indicates:

● Engine overheating
● Airbag malfunction
● Low fuel

(a) Identify the fault condition(s) that the following register indicates:

1	0	0	0	1	1	0	1

....

....

.... [2]

(b) The system uses **even** parity.

Write the correct parity bit in each of the following registers.

	1	1	1	0	0	1	0

	0	**1**	**0**	**1**	**0**	**1**	**0**

[2]

(c) State the hexadecimal value of the binary number shown in **(a)**.

.... [1]

4 In 2018, many Apple users received the following email notification allegedly from Apple's billing department.

[2]

From: Apple Billing <secured-uppds-auth-en-us-lang-appfgisdgisdgsgdjhjgdfg17@contoloyo.com>
Date: May 14, 2018 at 11:16:42 AM PDT
To: undisclosed-recipients:;
Subject: RE : [Alerts - Recent Activity] Your payment has been Scheduled [CONFIRMATION]

Dear Client,

This email confirms payment for the iCloud storage plan listed below. You will be billed each month unless you cancel. *To cancel, downgrade your storage plan from your iPhone, iPad, iPod touch, Mac, or PC.

Order ID : **TX226SDG594**
Date of Purchase : Monday, May 14, 2018
Payment Method : iTunes

Item : 2 TB Storage

Subtotal : $29.99
Tax : $0
Total : **$29.99**

You may cancel or downgrade from your device at any time. You may contact Apple for a full refund within 7 days of a monthly subscription upgrade or within 15 days after a yearly payment. Partial refunds are available where required by law.

Click For Cancel or Downgrade >

*Please feel free to use support. You can check the details of the product, download the latest software update, share hints and solutions with other users. Also,You can choose the method that is most suitable for you.

The hyperlink, titled "**Click For Cancel or Downgrade >**", leads to a fake website which looked like the company's real website. Several unsuspecting customers did not pay attention to the address of the hyperlink, and tried to login to their iTunes account as usual. As a result, their account was compromised, and personal information was stolen.

(a) Name and explain the type of cyberattack involved.

....

....

.... [3]

(b) Other than the address of the hyperlink, identify **two** tell-tale signs that should have alerted the user to conclude that the email is fraudulent, thus avoid becoming victims to this cyberattack.

Sign 1 ....

Sign 2 ....

.... [2]

5 The following program calculates the lowest common multiple between 2 integers.

One way of calculating the lowest common multiple between 2 integers is to divide the product of the 2 integers by their highest common factor.

```
1  hcf = 0
2  Lcm = None
3  INPUT integer_1, integer_2
4  FOR count = 2 to MIN(integer_1, integer_2)
5      IF (integer_1 % count) == 0 or (integer_2 % count) == 0:
6          hcf = count
7      ENDIF
8  NEXT
9  Lcm = integer_1 * integer_2 % hcf
10 OUTPUT Lcm
```

There are **three** errors in this code. Locate the errors and suggest a correction.

Error 1 ....

Correction ....

....

Error 2 ....

Correction ....

....

Error 3 ....

Correction ....

.... [6]

7

6 A perfect number is an integer that is equal to the sum of its proper divisors. The following program will accept a sequence of integers and output the perfect numbers.

```
1   FOR counter = 1 to 3
2       total = 1
3       INPUT number
4       FOR divisor = 2 to INT(number**0.5):
5           IF number % divisor == 0:
6               total = total + divisor + (number / divisor)
7           ENDIF
8       NEXT
9       IF total == number:
10          OUTPUT number
11      ENDIF
12  NEXT
```

Complete the trace table for the following set of data, entered in sequence.

number = 6, 10, 28, 30

Trace table

counter	total	number	divisor	OUTPUT
1	1			
		6		
			2	
	6			
				6
2	1			
		10		
			2	
	8			
			3	
3	1			
		28		
			2	
	17			
			3	
			4	
	28			
			5	
				28

[5]

7   In most cars, the car alarm system, **A**, would sound when
    ● the user presses the alarm on the remote control (**R** = **1**), or
    ● the car is locked (**L** = **1**) and the shock sensors detect a strong impact (**S** = **1**), or
    ● the car is locked (**L** = **1**) and the voltage sensors detect a decrease in voltage (**V** = **0**).

    (a)   Write down the Boolean statement for the car alarm system.

    .... [1]

    (b)   Draw the logic circuit diagram for the car alarm system.

    R ——

    L ——

    S ——   —— A

    V ——
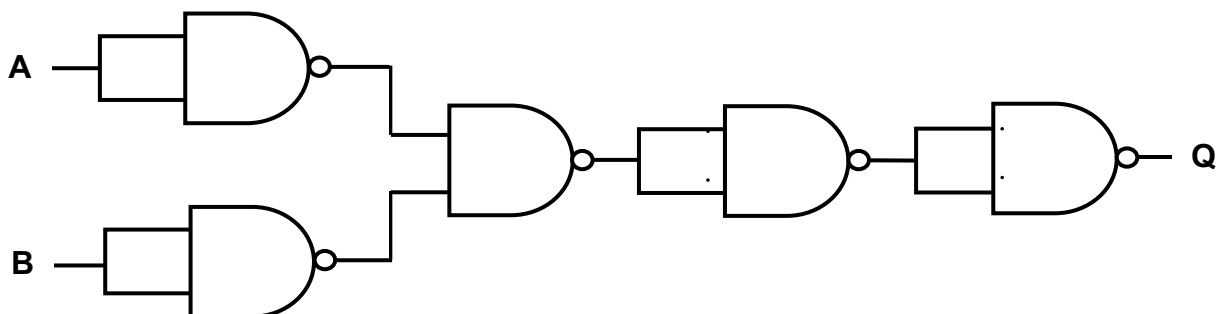
                                                                                                        [4]

8   The following logic circuit diagram is only made up of NAND gates.

    A ——

                                                                                                        Q

    B ——

(a) Complete the following truth table for the above logic circuit diagram.

A	B	Q
0	0	
0	1	
1	0	
1	1	

[4]

(b) Name a single logic gate that has the same function as the above logic circuit.

.... [1]

9 A processor or central processing unit (CPU) executes instructions.

(a) Describe what is meant by a 1 MHz (megahertz) processor.

....

....

.... [2]

(b) Describe what is meant by multi-core processors.

....

....

.... [2]

10 Computers in a network are generally classified as either clients or servers. These devices can be organized in either a client-server or peer-to-peer (P2P) network.

(a) Describe **two** differences between a client-server network and P2P network in terms of their functions.

....

....

....

....

.... [4]

(b) What kind of network would you suggest for businesses with a large number of users? Explain your answer.

....

....

.... [2]

11 Your friend has 2 laptops, 2 desktops, 1 wireless printer and 1 tablet computer at home. He wishes to connect these devices as a single home network. Draw for him a possible network diagram for his home in the space provided. You should label your network devices clearly.

[5]

12 Perform the following number system conversions. Show your working clearly.

(a) Hexadecimal 7A to Denary

....

....

.... [2]

(b) Denary 765 to Hexadecimal

....

....

.... [2]

(c) Binary 10101111 to Hexadecimal

....

....

.... [2]

13 Data stored on a computer needs to be kept safe and secure. Malicious software or viruses can cause data corruption and loss.

(a) State **two** other ways data can become corrupted.

....

....

....

.... [2]

(b) Explain **one** difference between viruses and worms.

....

....

.... [1]

(c) Apart from data corruption, data must be kept safe from unauthorized access. State **three** reasons how unauthorized access can occur.

1 ....

2 ....

3 .... [3]

14 A client wants you to write a program to calculate the cash income of a mini store over a day. Upon running the program, it should ask the user for the amount of cash received from each transaction. Then, the program outputs the total amount of cash income over the day, and the average amount of cash income per transaction.

Input ....

....

Output ....

....

Process ....

.... [6]

15 Write a pseudocode or flowchart to inverse the letters of a string. Inverse means to swap the letter to the opposite letter in the English alphabet. For example, if "a" is present, change it to "z"; if "b" is present, change it to "y". The program should then print the result. You may assume that the input string only contains lower case alphabet characters. So the inverse of input string "abefg" is "zyvut".

....

....

....

....

.... [8]

End of Paper