Name: _____ (   )   Class: _____

BUKIT VIEW SECONDARY SCHOOL
PRELIMINARY EXAMINATION
Secondary 4 Express

COMPUTING   **7155/01**

2 September 2019

PAPER 1 Written   **2 hours**

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Name, Register Number and Class on the top of this page.
Write in dark blue or black pen.
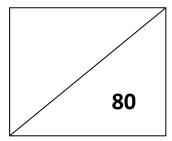You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions.
No marks will be awarded for using brand names of software packages or hardware.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [   ] at the end of each question or part question.
You should show all your working.

80

Setter: Mr Low Chee Wah   **Parent's signature : _____**

This question paper consists of **16** printed pages.

1. A company uses spreadsheet software.

Match each description to the correct spreadsheet function.

Description   **Function**

| Returns number rounded up to an exact multiple of significance. | ● |

● Ceiling

● Counta

| Returns the future value of a loan given the interest rate, number of periods and the present value. | ● |

● Count

● Floor

● FV

| Returns the number of non-empty cells in the given range references. | ● |

● IPMT

● PPMT

| Returns the interest payment in the specified period for a loan of the present value with an interest rate over the number of periods. | ● |

● PV

● Round

[4]

2. **(a)** Convert the binary number **1010 1011** into a denary number. Show your working.

....

....

....[2]

(b) Convert the hexdecimal number **AE3** into a denary number.
Show your working.

....

....

....[2]

(c) Convert the denary number **123587** into a hexadecimal number. Show your working.

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....

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....[2]

(d) List two uses of hexadecimal notation in computer science, other than ASCII.

(i) ....

....

....

(ii) ....

....

.... [2]

3. Fill in the blanks with the correct word(s) from the following list.

address bus	arithmetic logic unit	control unit
central processing unit	data bus	floppy disk
memory	process register	primary storage
RAM	ROM	secondary storage

A(n) ……………………… transfers required memory location from processor to memory. It is uni-directional.

The ……………………… is part of the processor that follows instructions and decides when data should be stored, received or transmitted by different parts of the computer.

……………………… processes data by performing basic mathematical and logical operations.

……………………… is where large amounts of data are stored, such as in a hard disk or hard drive.

……………………… is where data and instructions are stored temporarily so that they can be quickly accessed by the processor when needed.

[5]

4. **(a)** Parity checks are used to detect errors in data transmission.

In the table below, the received bytes were transmitted using **odd** parity.

Tick to show whether each byte has been corrupted or not corrupted during transmission and state the reason.

Received byte	Corrupted	Not corrupted	Reason
10001101			
01101101			

[3]

(b) State **one** way in which the above error(s) can be corrected.

……………………………………………………………………………………

………………………………………………………………………………[1]

5. With the rise of the Internet and the usage of online platforms, cybersecurity is becoming more important. Two-factor authentication is one of the safety measures that online banking, government-linked and e-commerce websites are adopting.

(a) Spyware and Trojan horse are examples of cybersecurity threats. Explain what is meant by each of these terms and how they can be used in cyberattacks.

(i) Spyware: …………………………………………………………………

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(ii) Trojan horse: …………………………………………………………

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(b) Explain what is meant by two-factor authentication and state an example of what is needed in this process.

Two-factor authentication: …………………………………………………..

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………………………………………………………………………………………

Example: …………………………………………………………………………

……………………………………………………………………………….. [2]

6. Programming languages either uses an interpreter or a compiler. Python and Scratch are programming languages that typically use an interpreter, whereas C and Pascal are examples of programming languages that use a compiler.

(a) What is an interpreter?

....

.... [1]

(b) What is a compiler?

....

.... [1]

(c) Johnny is thinking of picking up programming. Describe the advantage of using a programming language that uses either an interpreter or a compiler to help Johnny's decision.

(i) Advantage of using interpreter.

....

....

(ii) Advantage of using compiler.

....

.... [2]

(d) Explain the computing term "Graphical user interface."

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.... [1]

7. A topology describes the physical layout of a network. Understanding the topology is essential to designing a network. Tom needs to build a computer network for his company of 40 staff.

(a) Suggest the type of topology for the computer network that is most suitable for Tom's company.

.... [1]

(b) Describe **two** advantages of this kind of topology.

(i) ....

....

....

(ii) ....

....

.... [2]

(c) Describe **one** disadvantage of this kind of topology.

....

.... [1]

(d) Which network topology is the least reliable in the event of a breakdown of a computer in the network? Explain your choice.

....

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.... [2]

8. Decomposition, pattern recognition and generalisation are problem-solving techniques used by software programmers. Describe these techniques.

Decomposition: ...…………………….…………………………………………

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Pattern recognition: …..…………………………..………………………………….

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Generalisation: ..…………………………….………………………………….

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9. The algorithm below takes in 3 integers from 0 to 20 (inclusive).
It then calculates and outputs some values.

```
1  num = [0]*3
2  print("Enter 3 integers from 0 to 20")
3
4  for i in range(3):
5      num[i] = int(input("Enter a number: "))
6      while num[i] < 0 or num[i] >20:
7          print("Error, please enter again")
8          num[i] = int(input("Enter a number: "))
9
10 print(min(num),sum(num) - min(num)- max(num),max(num))
11
12
```

(a) Complete the trace table for this pseudocode using the following test
data: 4, 34, 6, 7

i	num[0]	num[1]	num[2]	OUTPUT

[5]

(b) Name the type of validation check that was implemented in the above algorithm.

……………………………………………………………..…………. [1]

(c) Name another type of check or validation that programmers can implement.

…………………………………………………………..…………. [1]

(d) Describe the purpose of the algorithm.

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10. (a) The following pseudocode algorithm should:

- input the temperature of a computer room daily for a period of 30 days, starting from day 1 of the month
- output the average room temperature for 30 days
- output the day of the month with the highest temperature
- output the highest temperature

```
1    max = 100
2    sum = 0
3    for i = 1 to 30:
4        i = i + 1
5        input temp[i]
6        if temp[i] > max:
7            temp[i] = max
8            day = i
9        endif
10       sum = sum + temp[i]
11   next i
12   print(sum, day, max)
```

There are **four** errors in this pseudocode. Locate the errors including its line number and state the correct pseudocode.

Error 1: …………………………………………………………………………

Correction: ………………………………………………………………………

Error 2: …………………………………………………………………………

Correction: ………………………………………………………………………

Error 3: …………………………………………………………………………

Correction: ………………………………………………………………………

Error 4: …………………………………………………………………………

Correction: ………………………………………………………………………

[8]

(b) The temperature in day 4 and day 28 of the month are the same and they are the hottest days in the month. What will the program output for the day of the month with the highest temperature? Explain your answer.

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11. A chemical factory has a safety circuit made up of logic gates. The emergency alarm will trigger in response to certain conditions.
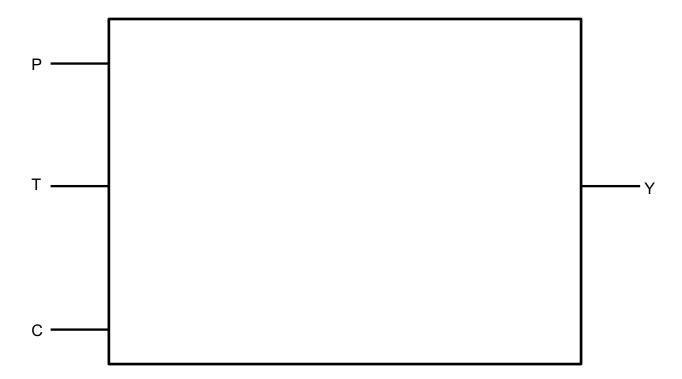
The output, Y, of the logic circuit that activates the alarm will have a value of 1 only if:

either   the process pressure is normal and the temperature is too low
or   the temperature is normal and the chemical pump is faulty

The inputs to the system are:

Input	Description	Binary Value	Conditions
P	Process pressure	1	Oil pressure is normal.
		0	Oil pressure is too high.
T	Temperature	1	Temperature is normal.
		0	Temperature is too low.
C	Chemical pump	1	Chemical pump is working.
		0	Chemical pump is faulty.

(a) Draw the logic circuit for the above system.

P

T   Y

C

[5]

(b) Complete the truth table for the above system.

P	T	C	Working Space	Y
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[4]

(c) Write the Boolean statement for the above logic circuit.

.... [1]

12. John has a list of English words. He is interested in analysing words containing vowels (AEIOU).

Write an algorithm, using pseudocode which:

- keeps requesting user for words input until the word "exit" is entered
- allows the user to enter words in either upper-case or lower-case
- outputs the total number of words entered
- outputs the percentage of words containing vowels
- outputs the longest word containing at least one vowel

[7]

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