COMMONWEALTH SECONDARY SCHOOL

PRELIMINARY EXAMINATION 2020

COMPUTING
Paper 1 (Theory)

Name: _____ ( ) Class: _____

SECONDARY FOUR EXPRESS/NORMAL ACADEMIC **Wednesday 2nd September 2020**

7155 / 01

0800 – 1000

2 h

READ THESE INSTRUCTIONS FIRST

Candidates answer on the Question Paper.

No Additional Materials are required.

Answer **all** questions.

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.

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.

Name of setter: Mrs Leong Sai Hong

Parent's / Guardian's Signature: _____

For Examiner's Use
/ 80

This paper consists of **12** printed pages including the cover page.

[Turn over]

1 The table below contains statements about types of memory or storage.

Tick (✓) one or more boxes in each row to indicate if the statement is about register, main memory or secondary storage.

Statement	**Register**	**Main Memory**	**Secondary Storage**
Data is lost during power interruption			
Non-volatile memory			
Slowest accessing speed			
Storage space directly used by the arithmetic logic unit and the control unit			
Used to transfer large amounts of data from one device to another			

[5]

2 Match each of the following types of licences to its description.

Licence		**Description**
Free and Open Source	•	• Software that is free for use for a period after which users will need to pay a fee to continue to use it.
Public Domain	•	• Software where unauthorised copying of it is prohibited and its source code is kept secret.
Freeware	•	• Software that is available as “lite” version where users may use at no cost.
Shareware	•	• Software that is available for users to use, copy, study and modify.
Proprietary	•	• For intellectual property that have expired or simply surrendered.

[5]

3 **(a)** Convert the

(i) denary number **89** into a 8-bit binary number.

_____

_____

[1]

(ii) hexadecimal number **9B** into a denary number.

_____

_____

[1]

(iii) binary number **11100101** into a hexadecimal number.

_____

_____

[1]

(b) **(i)** ASCII and Unicode are two applications of the hexadecimal number system.
Explain why Unicode is a preferred choice over the ASCII standard for character encoding.

_____

_____

_____

[1]

(ii) State **two** other examples where hexadecimal is used to represent binary.

_____

_____

[2]

4 Describe two differences between wired and wireless networks.

1. _____

_____

_____

_____

2. _____

_____

_____

_____

[2]

5 **(a)** Technology is widely used in the financial sector.

(i) Describe **two** economic benefits of using technology in the financial sector.

1. _____

_____

_____

[1]

2. _____

_____

_____

[1]

(ii) Describe **two** negative impacts of using technology in the financial sector.

1. _____

_____

_____

[1]

2. _____

_____

_____

[1]

(b) Give **one** type of causes for data corruption and loss and their corresponding preventive measures.

(i) Cause

_____

_____

_____

[1]

(ii) Preventive measure

_____

_____

_____

[1]

6 A teacher wants to find out how many students in the school came from a certain primary school and who they are.

State the inputs, the outputs and the processes.

Inputs _____

_____

_____

Outputs _____

_____

_____

Processes required _____

_____

_____

[6]

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

A	B	X
0	0	1
0	1	0
1	0	0
1	1	0

_____

[1]

(b) Draw a truth table for a NAND gate.

[1]

(c) An alarm in a microwave oven sounds when certain conditions occur.

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

either door is close and temperature < 100ºC and light is on

or door is open and temperature > 100 ºC and light is off

The inputs to the system are:

Input	Binary	Condition
D	0	Door open
	1	Door close
T	0	Temperature < 100ºC
	1	Temperature > 100ºC
L	0	Light off
	1	Light on

Draw a logic circuit for the system.

[6]

8 Study the following algorithm very carefully.

```
1     done = FALSE
2     WHILE num1 < num2
3           OUTPUT “Enter first number”
4           INPUT num1
5           OUTPUT “Enter second number”
6           INPUT num2
7     ENDWHILE
8     IF num1 MOD num2 == 0
9           done = TRUE
10    ELSE
11          done = FALSE
12    ENDIF
13    OUTPUT done
```

(a) num1 and num2 need to be initialised before the above algorithm is run.
State a set of possible values for num1 and num2.

num1 = _____

num2 = _____

[2]

(b) **(i)** Complete the following trace table for the algorithm.
Use the data 1, 10, 20, 5 as input.

num1	num2	OUTPUT

[3]

(ii) State the purpose of the algorithm.

_____

_____

[1]

(c) The algorithm has only one type of validation check.
Name **and** describe another **one** validation check that could be added to validate the input(s).

_____

_____

_____

_____

[2]

(d) Once complete, the algorithm is tested with data for boundary conditions.
Identify **two other** test case conditions that could be used to test the algorithm.
For **each** condition, give an example of test data this algorithm.

Test case condition	Test data

[4]

9 A source code will need to be translated into machine code before it can be run on the computer.

(a) Write down **one** advantage and **one** disadvantage of using a compiler over an interpreter to do the translation.
Advantage: _____

_____

_____

_____

Disadvantage: _____

_____

_____

_____

[2]

(b) State **one** example of a programming language that uses an interpreter.

_____

[1]

10 Anna has taken a $10000 study loan. The loan is to be repaid over 5 years. The interest rate is 5% per year. She has used a spreadsheet to keep track of the repayments and the amount she owes.

	A	B	C	D	E	F
1	**Initial Loan:**	$10,000.00				
2	**Interest Rate (per Year):**	5.00%				
3	**Loan Length (years)**	5				
4	**Yearly Payment**	$2,309.75				
5	**Total Amount Paid:**	$11,548.74				
6						
7	**Year**	1	2	3	4	5
8	**Principal Payment**	$1,809.75	$1,900.24	$1,995.25	$2,095.01	$2,199.76
9	**Interest Payment**	$500.00	$409.51	$314.50	$214.74	$109.99
10	**Total Interest Paid**	$500.00	$909.51	$1,224.01	$1,438.75	$1,548.74
11						

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

A5 _____

B2 _____

E9 _____

[3]

(b) **(i)** The cell **B8** shows the principal payment for the first year.
Identify the most appropriate function to use in cell B8.

_____

[1]

(ii) A formula is entered into cell **B10** to calculate the total interest paid in the first year. This formula is then copied and pasted onto cell range **C10:F10** so that the accumulated interest paid for the respective year can be calculated.

(a) Identify the most appropriate function to use in cell **F10**.

_____

[1]

(b) Write down the absolute cell address that has been used in the formula in cell **F10**.

_____

[1]

11 Write an algorithm, using only pseudo-code, that:

- Inputs test scores of twenty students and stores these numbers in an array (E.g. [80, 45, 63, 95, …, 35])
  Assume that each score ranges from 0 to 100.
- Outputs the average score of all students
- Outputs the array index of the highest score

You must validate all inputs.

[6]

12 A pseudo-code algorithm:

- Allows a user to input 10 words and store them in a list.
- Allows the user to input a word to search for
- Outputs a message to show if the word is in the list
- Outputs the number of times the word appears in the list

```
1    times = 1
2    FOR x = 1 TO 10
3         OUTPUT “Enter a word: ”
4         INPUT words[times]
5    NEXT
6    OUTPUT “Enter the word to search for: ”
7    INPUT search
8    FOR x = 1 TO 10
9         IF words[x] == search
10             times = times - 1
11        ENDIF
12   NEXT
13   IF times >= 0
14        OUTPUT “Found”
15        OUTPUT times
16   ELSE
17        OUTPUT “Not Found”
18   ENDIF
```

There are **four** errors in this pseudo-code. Locate the errors and state the correction.

Error 1: _____

Correction: _____

Error 2: _____

Correction: _____

Error 3: _____

Correction: _____

Error 4: _____

Correction: _____

[8]

13 Write an algorithm, using only a program flowchart, that:

- ask the user to enter a string of characters
- ask the user to enter a character to remove from the first string
- remove the character from the string of characters whenever it occurs in the first string to form a new string
- outputs the new string

You do not need to validate any data entered.

[7]

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ *End of Paper* ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
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