Class/ Index Number /	Centre Number/ 'O' Level Index Number /	Name

新加坡海星中学

MARIS STELLA HIGH SCHOOL
PRELIMINARY EXAMINATIONS
SECONDARY FOUR

COMPUTING **7155**
Paper 1 Written **26 August 2020**
2 hours

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

READ THESE INSTRUCTIONS FIRST

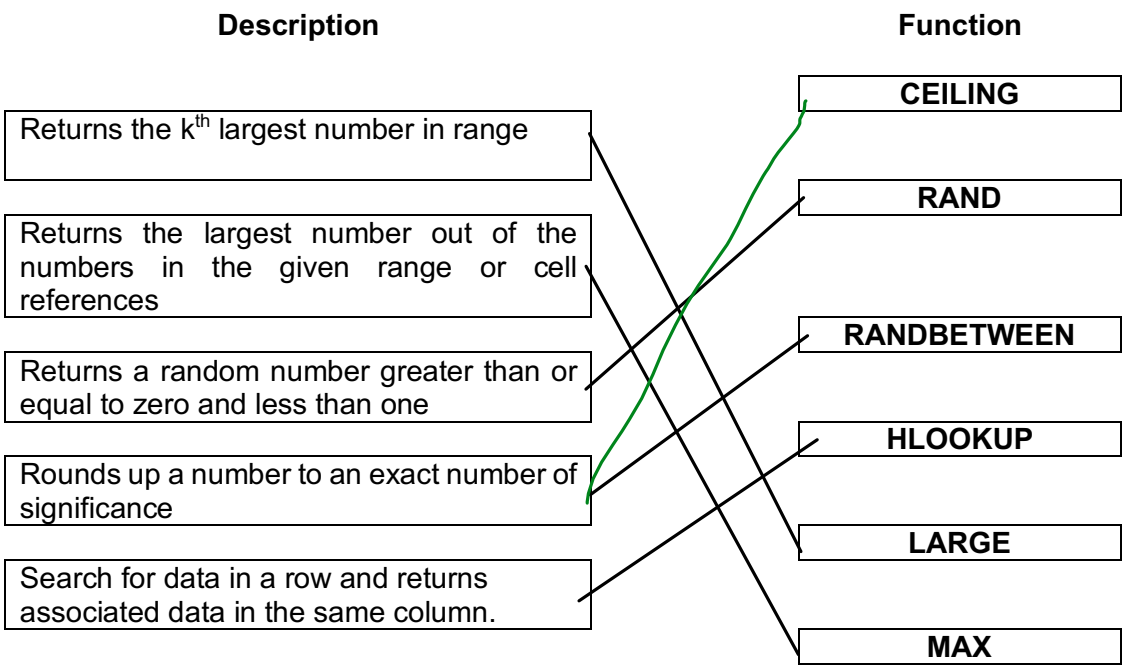
Write your class, index number and name in the spaces at the top of this page.
Write in dark blue or black pen.
You may use a HB pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Approved calculators are allowed.

Answer all the 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
80

1 Draw a line between the description and the correct spreadsheet function.



[5]

2 (a) A sports event company uses a digital camera attached to a drone to video their events from the sky.

The video is stored as it is captured, on a device that is attached to the drone.

Circle the most suitable type of media to store the video.

(i) Optical Magnetic Solid State [1]

(ii) Give **two** reasons to justify your choice.

1 smaller in size and lighter in weight, will not cause the drone to be unbalanced

2 not vulnerable to scratches and drops if the drone accidentally lands too hard on the ground, the data will not be lost

[2]

3 Insert **three** of the following words about different types of software in the correct place in each scenario below.

public domain software | proprietary software | open courseware | shareware | freeware

(a) Ali's company requires productivity software that can be used in his business for emailing customers, creating orders, and tracking of the company's profits and losses. He would also like regular customer support and updates from the software company that owns the source code of the software.

The most suitable category of software for this usage is ~~freeware~~ proprietary software

(b) Mingxuan wants to learn more about Python programming during the school holidays. He wants to enrol for free online lessons provided by a university's website that contains videos and training materials for his learning.

The most suitable category of software for this usage is open courseware

(c) Sharon wants to purchase accounting software for her company's use. She wants to try out a few features of the software before making a decision whether to purchase the full version.

The most suitable category of software for this usage is shareware

[3]

4 Five statements about interpreters and compilers are shown in the table below.
Tick **(✓)** to show whether the statement refers to an interpreter or to a compiler.

Statement	Interpreter	Compiler
Translates the entire program in one go.		
Takes one statement at a time and executes it.		
Program runs at a faster speed because translation was completed earlier.		
Stops the translation process as soon as the first error is encountered.		
Syntax errors are detected before program runs.		

[5]

5 (a) Convert the positive whole denary number **388** into a 12-bit binary number.

388_10 = 000110000100

388/2=194R0
194/2=97R0
97/2=48R1
48/2=24R0
24/2=12R0
12/2=6R0
6/2=3R0
3/2=1R1
1/2=0R1

[2]

(b) Convert this binary pattern into hexadecimal.

1	0	1	1	0	0	1	0	1	0	0	1	0	1	1	0

1011_2=B_16
0010_2=2_16
1001_2=9_16
0110_2=6_16
1011001010010110_2=B296_16

[2]

(c) RGB codes are one example of where hexadecimal numbers are preferred to binary numbers. Give **two** reasons to explain so.

Hexadecimal has a higher base of 16, more numbers can be stored as RGB codes

hexadecimal numbers are more compact
uses less storage than binary numbers

[2]

(d) State another **two** ways in which hexadecimal numbers are used to represent data.

IPv6 addresses. MAC addresses.

[2]

6 Complete the following paragraphs by filling in the missing words about networks.

A ……local area network…….. is a network of computing devices connected within a small geographical area, typically within the same building, such as in an office. A ……wide area network…….. is a network of computing devices covering across multiple geographical locations, such as those between a main office in a country and branch offices in other countries.

In an office, there would typically be many ……client…….. computers that initiate connections to request for resources and services from a centralised computer to perform operations. This computer which fulfils these requests is known as a ……server…….. as it centrally manages resources and services. This type of network is more ……centralised…….. than a peer-to-peer network as access rights are centrally controlled.

safe

[5]

7 A program asks the user for a string and prints out the string in reverse order.

For example, “Computing” returns a result of “gnitupmoC”.

For **each** test case condition below, write down **one** expected input and **one** expected output.

Test Case 1 for Normal Conditions	
Expected Input	Joe
Expected Output	eoJ

Test Case 2 for Boundary Conditions	
Expected Input	a
Expected Output	a

Test Case 3 for Erroneous Conditions	
Expected Input	2.19
Expected Output	Error!

[6]

Invalid Input! Input should be a string!

8 Personal information needs to be kept safe from unauthorised access.

Explain how the following industries verify personal information.

For each industry, identify the authentication method and explain how it is implemented to verify user identity.

two factor authentication

(a) **Online banking services by banks**

(i) Authentication Method: One-time password ..... [1]

(ii) How it is implemented: After logging in to the online bank account with your passwords, users are sent an OTP to their phones or authentication key to verify if the user logging into the bank account is legitimate.

..... [2]

(b) **Passport checking by Immigrations Department**

(i) Authentication Method: Biometrics ..... [1]

(ii) How it is implemented: Through fingerprint and face recognition scanners, they verify if the person is the same as the one on the passport

as the characteristic is unique

..... [2]

(c) Explain **two** ways in which a user can protect against unauthorised access of personal information when using social networking websites.

Set their accounts to private

Only send or accept invites to people know well

..... [2]

9 A computer has both an IP address as well as a MAC address.

(a) Explain what an IP address is and its function.

identify device and computer

internet protocol

An IP address is used to identify a network interface controller to allow packets to be sent to the device.

..... [2]

(b) Explain what a MAC address is and its function.

A MAc address is Media Access Control and is used to direct data between devices in a local area network

identify network interface controller

..... [2]

10 The spreadsheet below contains information about students who registered at a running club. The ID field is a text that consists of the gender (first character), year of birth (second to fifth character) and member number (last three characters). Columns C and D are displayed using data in column B.

	A	B	C	D
1	**Student Name**	**ID**	**Gender**	**Year of Birth**
2	Johnny Tan	M2004101	M	2004
3	Kathleen Koh	F2000102	F	2000
4	Muhammad Imran	M2002103	M	2002
5	Joy Tang	F2005106	F	2005
6	Ravi Veloo	M2004110	M	2004
7	Tan Ming Huat	M2006108	M	2006
8				
9	**Number of Students**	**6**		
10	**Number of Female Students**	**2**		
11				

(a) Identify the most appropriate data type for the following cell references.

A2 Text

B9 Number

[2]

(b) Cells **D2** to **D7** need to display Year of Birth information using data from column B.

Identify the most appropriate function that will need to be entered in cell **D2** using cell **B2**.

=MID($B2, 2, 4) [1]

(c) Cell **B9** needs to display the count of students using the cell range B2:B7.

Identify the most appropriate function that will need to be entered in cell **B9**.

=COUNTA(B2:B7)

[1]

(d) Complete the function used in cell **B10** to display the number of female students.

= COUNTIF (C2:C7, '='F')

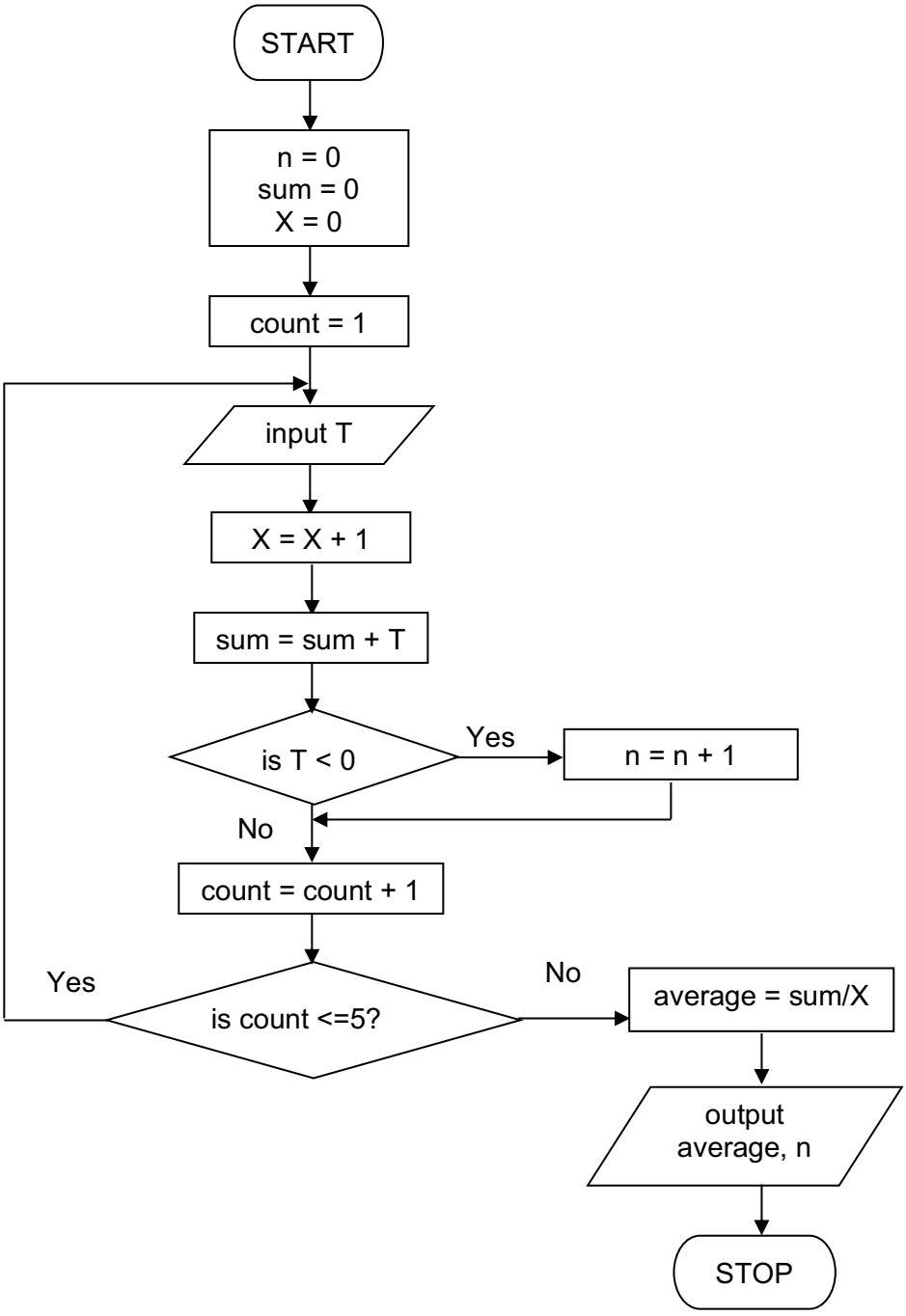
[2]

(e) Cells **C2 to C7** need to have a red background if the cell value has a value of F. Otherwise, it will have a blue background. State how the cells can be set to automatically change colour depending on the values inside them.

Use Conditional Formatting on cells C2 to C7 if the cell value has F, change to red, otherwise change to blue

[1]

11 The following flowchart shows an algorithm that inputs five temperatures and outputs the average temperature and the number of temperatures which were negative.



Complete the trace table for this flowchart using the following test data:

18, 7, 23, –2 , 0

n	sum	X	count	T	OUTPUT

[6]

12 (a) Consider the following Boolean statement.

X = NOT (**A** OR **B**) OR (NOT (**C** AND **A**))

Complete the truth table for the Boolean statement.

A	**B**	**C**	**Working Space** A OR B	NOT(A OR B)	C AND A	not(C AND A)	**X**
0	0	0	0	1	0	1	1
0	0	1	0	1	0	1	1
0	1	0	1	0	0	1	1
0	1	1	1	0	0	1	1
1	0	0	1	0	0	1	1
1	0	1	1	0	1	0	1
1	1	0	1	0	0	1	1
1	1	1	1	0	1	0	0

[4]

(b) Two-way switches allow a single light to be switched on or off from two different locations easily. In the diagram below, Light R is at the centre of a long corridor, which is controlled by Switches P and Q at both ends of the corridor.

Each switch has two states: 0 for “off” and 1 for “on”. Light R also has two states: 0 for “off” and 1 for “on”. Light R will be on only when both Switches P and Q are off or on concurrently. However, if only one switch is on and the other is off, Light R will be off.

The truth table for the two-way switches is given as below.

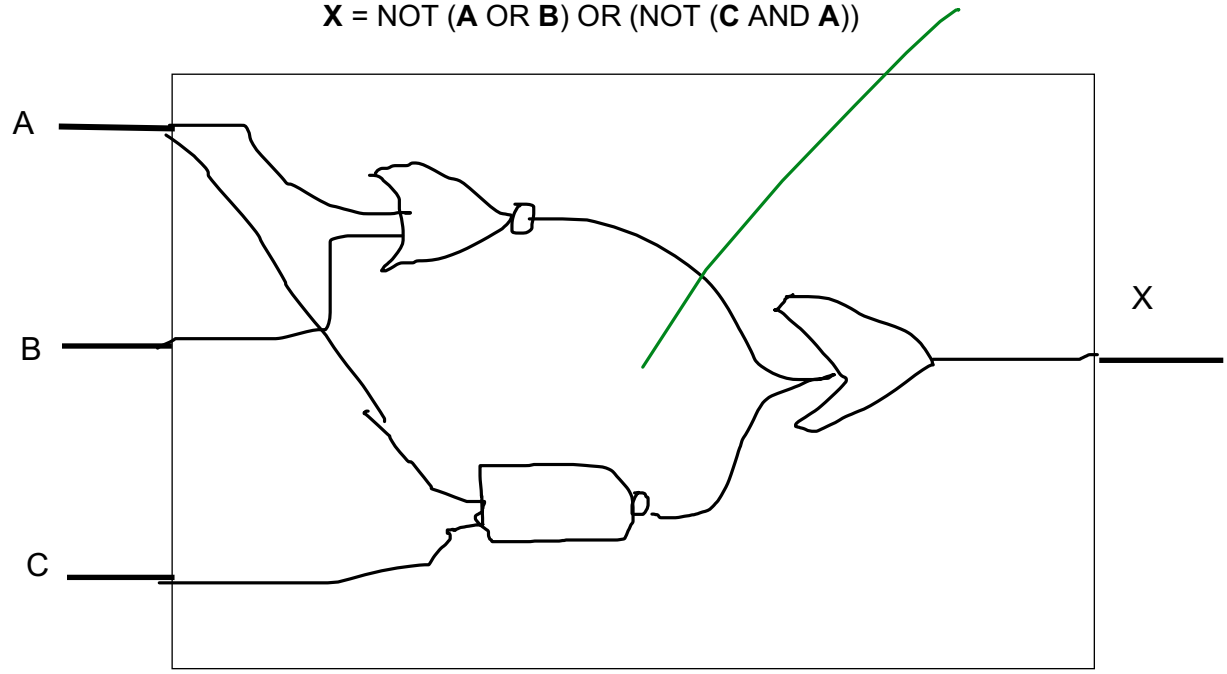
P	**Q**	**R**
0	0	1
0	1	0
1	0	0
1	1	1

Write down the Boolean statement for the two-way switch.

R = (P AND Q) OR (NOT(P) AND NOT(Q)) [2]

(c) Draw a logic circuit to represent the following Boolean statement. Do **not** simplify the statement.

X = NOT (**A** OR **B**) OR (NOT (**C** AND **A**))



[5]

13 The Elections Department is using a computer program to read in the ages of 100 citizens and then outputs the results based on the conditions below. Each age is a whole number greater than 0. You **must** validate this input.

Write an algorithm, using only pseudo-code or a program flowchart that takes the ages of 100 citizens as input and then

- outputs the count of eligible voters who are aged 21 or above.
- outputs the count of non-eligible voters.
- outputs the average age of an eligible voter.

```
citizens = []
eligiblevoters=0
sumofage=0
a=0
WHILE a < 100
  INPUT citizenage
  IF citizenage > 0:
    add citizenage in citizens
    a = a + 1
    IF citizenage>20:
      eligiblevoters=eligiblevoters+1
      sumofage = sumofage+citizenage
    ENDIF
  ELSE
    OUTPUT "Citizen is aged 0 or less! Invalid input!"
  ENDIF
ENDWHILE
OUTPUT "Eligible voters: " + eligiblevoters
OUTPUT "Non-eligible voters: " + (100-eligiblevoters)
OUTPUT "Average age of an eligible voter: " + (sumofage/eligiblevoters)
```

……..

……..

……..

……..

[9]

-End of Paper-