1 Match each of the following spreadsheet functions to the relevant data type of its output by putting a tick (√) in the box(es).

	Number	Currency	Text	Date
COUNTA				
RAND				
SMALL				
LEN				

[4]

2 A spreadsheet is used to record the Computing Exam results for a class of 16 students.

	A	B	C	D	E
1	**Computing Exam Results**				
2	**Reg No.**	**Name**	**Paper 1 (80 Marks)**	**Paper 2 (50 Marks)**	**Total Score (70% P1, 30% P2)**
3	1	Amanda Aw	37	30	50
4	2	Billy Bao	32	42	53
5	3	Caroline Chung	68	48	88
6	4	Dylan Duo	77	44	94
7	5	Edmund Eng	36	20	44
8	6	Fiona Foo	44	31	57
9	7	Gloria Gan	50	40	68
10	8	Hilbert Ho	37	48	61
11	9	Irene Ivy	79	42	94
12	10	Jessica Jang	69	33	80
13	11	Kenny Kok	37	25	47
14	12	Lisa Lim	41	21	48
15	13	Monica Mann	67	44	85
16	14	Natalie Ng	57	45	77
17	15	Oliver Oh	43	42	63
18	16	Patrick Phua	47	41	66

(a) State what does the second row of the spreadsheet contain and what data type is used.

……..

…… [2]

(b) State a function that allows the result in cell E3 to be calculated as the nearest whole number.

…… [1]

(c) **(i)** Write a formula that calculates the variance of the Total Score for the class.

…… [1]

(ii) State the other function closely related to variance.

…… [1]

(d) State the function that determines the most commonly obtained Total Score.

…… [1]

3 Compare between the spreadsheet functions PMT() and PPMT().

……

……

…….. [2]

4 Name two methods to convert denary numbers to binary numbers.

……

…….. [2]

5 State which number system is used in ASCII codes and briefly describe how they are used.

……

……

…….. [2]

6 In April 2017, the National University of Singapore (NUS) and the Nanyang Technological University (NTU) discovered a cyber-attack on their computer network.

During a routine system check, malware were found hidden in the computer network. These malware had been undetected for a long period of time and it was suspected that they came from infected portable storage drives and email attachments.

Cyber Security Agency (CSA) of Singapore investigated the incident and found that these malware came from overseas with the intention to compromise government and research data.

(a) Briefly describe two examples of how this cyber-attack may impact the universities negatively.

(i) Negative Impact 1 ……

…… [1]

(ii) Negative Impact 2 ……

…… [1]

(b) State two possible measures to prevent this incident from occurring again.

(i) Measure 1 ……

…… [1]

(ii) Measure 2 ……

…… [1]

7 Distinguish between:

(a) phishing and pharming, and

……...

……...

……..

…… [2]

(b) a computer virus and a computer worm.

……...

……...

……...

…… [2]

8 In August 2018, the Personal Data Protection Commission (PDPC) of Singapore has issued an advisory for both organizations and individuals regarding the collection of National Registration Identity Card (NRIC) number under the Personal Data Protection Act (PDPA).

This advisory stated examples of whether NRIC numbers should be given by an individual to an organization:

NRIC numbers **should** be given when you
- join an organization as a new employee, or
- check in to a hotel or clinic, or
- subscribe to a mobile phone line.

NRIC numbers **should not** be given when you
- sign up for a retail membership, or
- participate in a survey or lucky draw, or
- buy movie tickets online.

(a) State how an individual can easily find out whether an organization's policy complies with the PDPA without contacting the organization.

……...

…… [1]

(b) A friend of yours wishes to subscribe to a new mobile phone line service by taking a photo of his National Registration Identity Card (NRIC) using his mobile phone and submitting it online.

(i) Suggest a possible danger of doing so.

……

……

…… [1]

(ii) State one advice you would give to your friend such that he/she can subscribe to the mobile phone line service safely.

……

…… [1]

9 State the function of

(a) a central processing unit, and

……..

…… [1]

(b) a computer bus.

……..

…… [1]

10 There are two main differences between the RAM and the ROM.

One main difference is that one is a volatile memory while the other is not.

(a) State what is meant by volatile memory.

……..

…… [1]

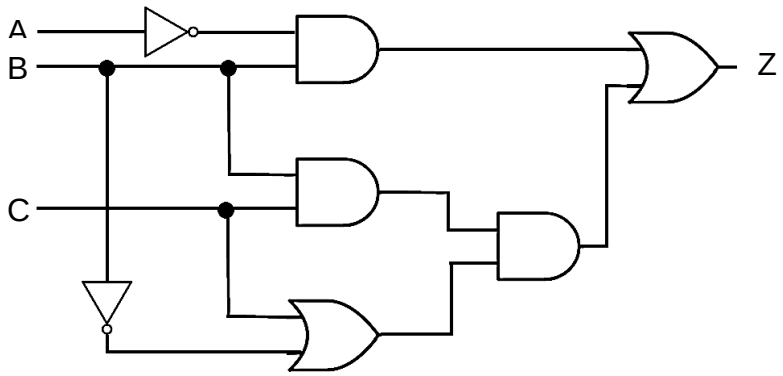
(b) Describe the other main difference between RAM and ROM.

……..

……..

…… [1]

11 Write a Boolean statement for the figure below:



…….. [4]

12 An alarm sounds when certain conditions occur in an artificial lake.

The output X of a logic circuit that drives the alarm has a value of 1 only if:
either water level (W) low and input valve (Y) off and output valve (Z) on
or water level (W) high and input valve (Y) on and output valve (Z) off

The inputs to the system are:

Input	**Binary**	**Condition**
W	0	Water level low
	1	Water level high
Y	0	Input valve off
	1	Input valve on
Z	0	Output valve off
	1	Output valve on

In the space below, draw a logic circuit for the system. [4]

13 State the function of

(a) a modem, and

……

…… [1]

(b) a network interface card.

……

…… [1]

14 Compare between wired and wireless networks in terms of each of the following. Also state the reasons for their differences.

(a) Bandwidth

……

……

……

…… [2]

(b) Scalability, i.e. increasing the number of connected devices.

……

……

……

…… [2]

15 Compare between the function and organization of the peer-to-peer network strategy versus the client-server network strategy.

……

……

……

……

…….. [2]

16 Draw a line between the correct network topology and its description.

Network Topology	Description
	All data is passed around in both directions. Only the intended recipient will accept and process the data.
Star Topology	
	All data is passed around in the same direction. Only the intended recipient will accept and process the data.
Ring Topology	
	All devices in the network act as both a client and a server and communicates directly with one another.
Bus Topology	
	All devices send data to a central device which forwards the data to the intended recipient.

[3]

17 In data transmission, packets are checked for errors using two different methods. One method is the parity check.

(a) The data shown below uses an even parity system where the first digit is the parity bit.

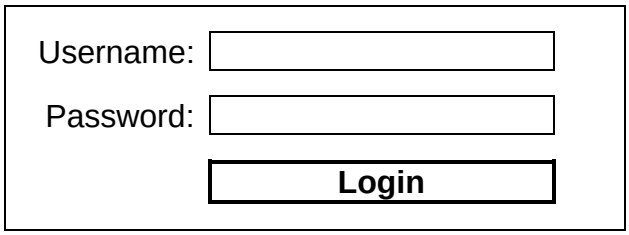
Fill in the missing bit. [1]

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

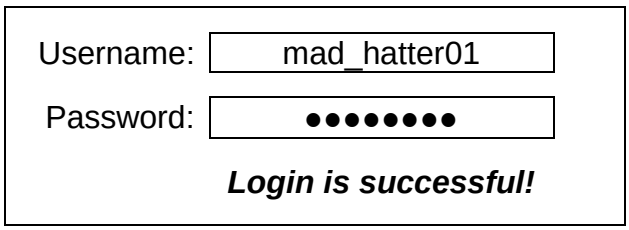
(b) State the other method for checking errors in data transmission.

…… [1]

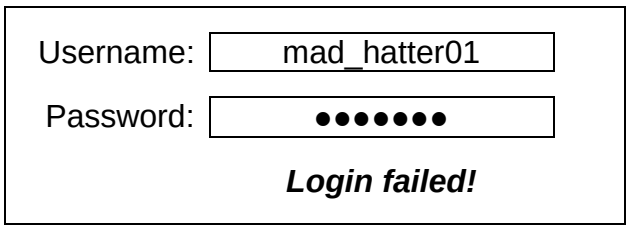
18 You have been asked to write a program for the login page of a website:



Upon login, users should see either



Or



(a) Write down the required input(s) and output(s) of this program.

Input(s)	Output(s)
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

[3]

[Turn over

(b) State the process(es) required by this program.

……

……

……

……

……

……

……

…… [3]

19 **(a)** State what is meant by **decomposition** in program development.

……

…… [1]

(b) You are required to reduce a fraction into its simplest form.

For example: $\frac{6}{4} \rightarrow \frac{3}{2}$

Decompose this problem.

……

……

……

……

……

…… [2]

20 Consider the following algorithm:

```
1   count = 0
2   REPEAT
3       INPUT a
4       INPUT b
5       CASE a
6       > b:
7           OUTPUT 'Win'
8       = b:
9           OUTPUT 'Draw'
10      OTHERWISE
11          OUTPUT 'Lose'
12      ENDCASE
13      count = count + 1
14  UNTIL count = 3
```

(a) Using the following data as input, complete the trace table for the algorithm above.

```
7,2,4,4,8,9,7,5
```

Trace table:

[4]

(b) Draw a flowchart for this algorithm. [5]

21 Order the five stages of program development by writing numbers 1 to 5. [2]

Order	Stages of Program Development
	Gather requirements
	Implement code
	Plan solutions
	Test and refine code
	Write code

22 Name two programming constructs and write 2 to 4 lines of python code to illustrate each construct. [3]

Programming Construct	Python Code
	…… …… …… ……
	…… …… …… ……

23 **(a)** State what is meant by a run-time error.

……..

…….. [1]

(b) Briefly explain how each of the following may occur in programming:

(i) syntax error, and

……

…… [1]

(ii) logic error.

……

…… [1]

24 **(a)** State the purpose of a translator in programming.

……..

…….. [1]

(b) Name the two types of translators in programming.

……..

…….. [1]

END OF PAPER

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