NAME	CLASS	INDEX NO.

ST. PATRICK'S SCHOOL
PRELIMINARY EXAMINATION 2022

SUBJECT : Computing
Paper 1 (7155/01)

DATE : 18 AUG 2022

LEVEL : Secondary 4 Express

DURATION : 2 hours

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your Name, Class and Index No. in the spaces at the top of this page.
Write in dark blue or back 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.

For Examiner's Use	
Score	**/80**

This paper contains 14 printed pages including this cover page.

1 Draw lines to match each spreadsheet function to its correct description.

Function		Description
COUNT	•	• Counts the number of cells that are not empty.
COUNTA	•	• Counts the number of characters in a cell.
COUNTIF	•	• Counts the number of cells within a range that meet a specified condition.
		• Counts the number of cells that contain numeric data.

[3]

2 Hendra wants to upgrade his computer by replacing its processor and memory.

(a) Some of the following words need to be used to complete the description of processor and memory.

bi-directional	**memory**	**non-volatile**	**gigahertz**	**volatile**
temporary	**gigabytes**	**storage**	**uni-directional**	**CPU**

Insert **five** words from the list given to complete the following statements.

When the Central Processing Unit (CPU) receives an instruction to write data to the memory, the ……. address bus carries the destination address from ……. to …….. . The data bus carries the data to be written. The speed of a CPU is usually measured in …… .

……. memory refers to Random Access Memory. This memory is ……. , which means all data and instructions stored on it are erased when the computer is switched off. [5]

(b) Information is stored in a computer in units known as bits and bytes.
Describe what is meant by a bit and a byte.

(i) Describe what is meant by a bit and a byte.

……..

……..

…….. [2]

(ii) Convert the following amounts of data in the stated units.

139 MB = ……. KB

2 450 000 000 B = ……. GB [2]

3 Kenny works as an editor in a magazine company and uses his word processer to publish his essay. He wants to protect his data from accidental damage and malicious actions.

The table has three problems that can cause loss or corruption to data.

Complete the table by describing the effect of each problem.

Give one method of keeping data safe from each problem.

Each effect and method must be different for each problem.

Problem	Effect	Method of keeping data safe
Power failure	…… …… …… …… ……	…… …… …… …… ……
Human error	…… …… …… …… ……	…… …… …… …… ……
Computer Virus	…… …… …… …… ……	…… …… …… …… ……

[6]

4 **(a)** State and explain the main function of compilers and interpreters.

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……

…… [2]

(b) Identify two differences between a compiler and an interpreter.

Difference 1: ……

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……

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Difference 2: ……

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…… [4]

5 Identify the input(s), the output(s) and the processes required for the following problem statements:

(a) *To calculate the average number of hours spent travelling to work a day for a period of one month.*

Input(s): ……

Output(s): ……

Processes required: ……

……

…… [3]

(b) *To find the electrical equipment with the highest energy consumption in a month.*

Input(s): ……

Output(s): ……

Processes required: ……

……

…… [3]

6 In a “Rock Scissors Paper” game, the player inputs a choice of rock, scissors or paper. The program then generates a random choice of rock, scissors or paper. The result of the game is either a draw or a win for any one of the players depending on the outcome of the choices:

- The rock wins the scissors but faces defeat against the paper.
- The scissors wins the paper but faces defeat against the rock.
- The paper wins the rock but faces defeat against the scissors.

The player may try the game repeatedly until 0 is entered to exit.

```
01   move = [“Rock”, “Scissors”, “Paper”]
02   quitGame = TRUE
03   WHILE quitGame == FALSE  #loop until game ends
04       OUTPUT(“Enter 1 for Rock.”)
05       OUTPUT(“Enter 2 for Scissors.”)
06       OUTPUT(“Enter 3 for Paper.”)
07       OUTPUT(“Enter 0 to exit.”)
08       INPUT user
09       IF user != 0
10           IF user < 1 or user < 3:
11               OUTPUT (“ENTER a valid choice!”)
12               CONTINUE     #skips the rest of the code below
                               and repeats at line 03
13           ENDIF
14           computer = RANDINT(1,3)
15           OUTPUT(“You picked ”, move[user - 1])
16           OUTPUT(“Computer played”, move[computer - 1])
17           IF computer != user
18               OUTPUT(“It is a tie!”)
19           ELSEIF computer == 1 and user == 2
20               OUTPUT(“Computer wins!”)
21           ELSEIF computer == 2 and user == 0
22               OUTPUT(“Computer wins!”)
23           ELSEIF computer == 3 and user == 1
24               OUTPUT(“Computer wins!”)
25           ELSE
26               OUTPUT(“You win!”)
27           ENDIF
28       ELSE
29           quitGame = TRUE
30           OUTPUT(“Thank you for playing, goodbye!”)
31   ENDWHILE
```

RANDINT() is a function that generates a random number between the first and second argument provided

(a) There are four logic errors in the pseudo-code.

State the line number of each error and write the correct pseudo-code.

Error 1 ……

Correction ……

Error 2 ……

Correction ……

Error 3 ……

Correction ……

Error 4 ……

Correction …… [8]

(b) Identify and describe two other types of program error.

Error type 1 ……

Description ……

……

……

Error type 2 ……

Description ……

……

…… [4]

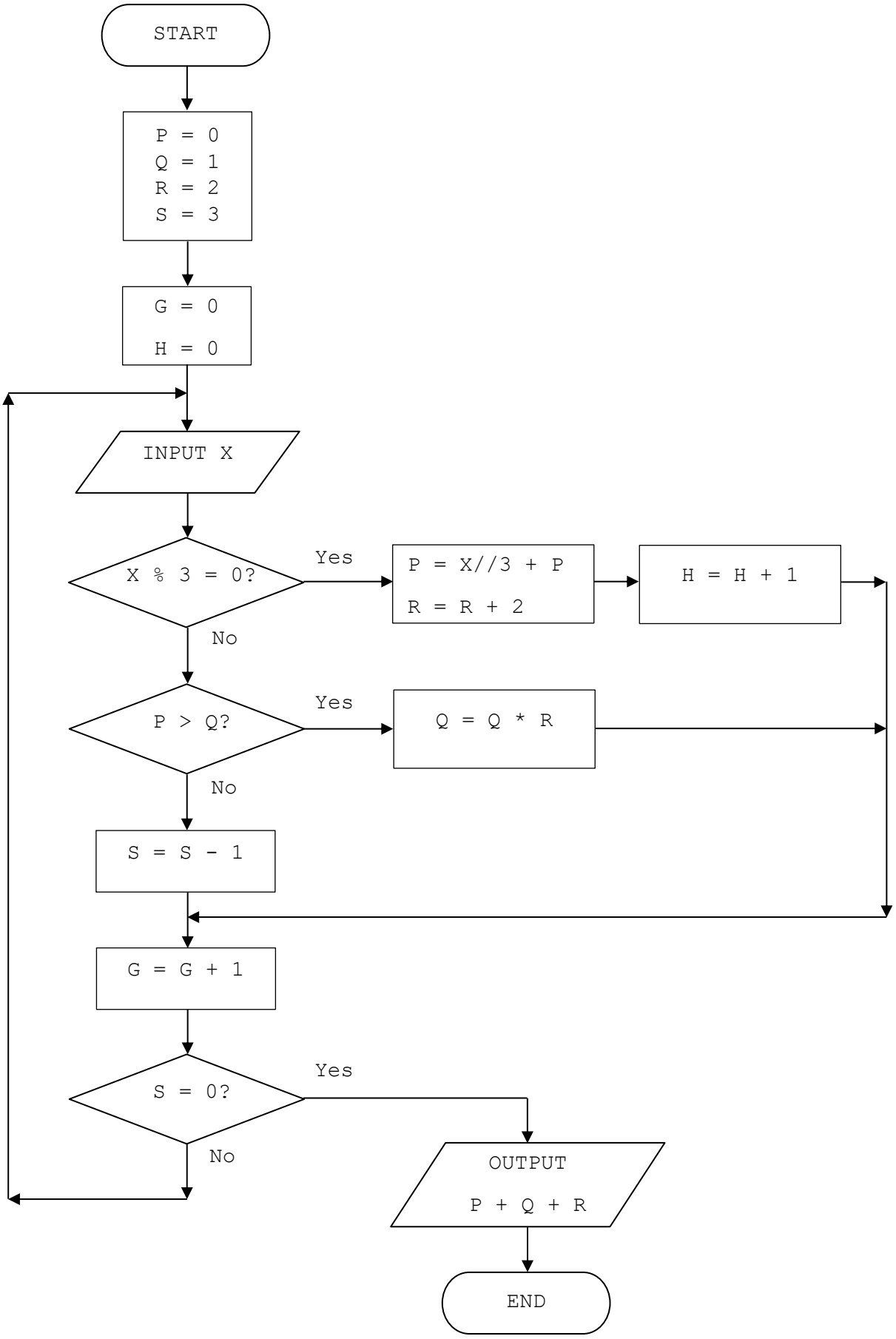
(c) The logic errors in **(a)** have been corrected and the user input is tested with normal and error test case conditions.

Identify two different examples of test data for each test case condition.

Test case condition	Test data
Normal	
Error	

[4]

7 Consider the flowchart below.



(a) Complete the following trace table for the flowchart.

Use the data `1, 9, 13, 28, 33, 34, 46` as input.

X	P	Q	R	S	G	H	OUTPUT

[8]

(b) State the purpose of variable H.

…… [1]

8 A buzzer in a chemical plant sounds when certain conditions occur.

The output, Q, of a logic circuit that drives the buzzer must have a value of 1 only if:

either heat detector (A) high and pressure valve (B) low and water level (C) high
or heat detector (A) low and pressure valve (B) high and water level (C) low

The inputs to the system are:

Input	**Binary**	**Condition**
A	0	Heat detector low
	1	Heat detector high
B	0	Pressure valve low
	1	Pressure valve high
C	0	Water level low
	1	Water level high

In the space below, draw a logic circuit for the buzzer system.

[4]

9 Describe how the binary number 1011 1101 is converted into hexadecimal. Give the hexadecimal value in your answer.

Description ……

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Hexadecimal value …… [4]

10 A computer network is often used to enable easy sharing of data and resources.

(a) State what is meant by a computer network.

……

…… [1]

(b) Describe the differences in function between a hub and a switch.

……

……

……

…… [2]

(c) A computer network consisting of 20 computers, 3 printers and a server needs to be set up in an office space to enable the sharing of information, and also for future scalability. Data access needs to be restricted and the network needs to be reasonably resilient

Explain why a star network topology would be most suited for this setup.

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…… [3]

(d) Parity check is an error checking method to ensure that the data received at the destination is the same as the source.

(i) The 7-bit binary value of **0010110** is to be transmitted from one computer to another computer on a network which uses the even parity check with a prepended parity bit. Fill in the boxes below to show the final 8-bit binary value which will transmitted over the network.

[2]

(ii) Describe the limitation of the parity checking method.

……..

……..

…….. [1]

11 In a cooking competition, each contestant is given a score for the dish that he/she prepares. The winner of the competition is the contestant with the highest score. No two contestants are given the same score.

Write an algorithm, using only pseudo-code or a program flowchart, that:

- inputs 20 contestant names and their corresponding scores, and stores this data in a list
- outputs the list index of the contestant with the highest score
- outputs the name and score of the competition winner.

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……... [8]

End of Paper