



**COMMONWEALTH SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2024**

**COMPUTING
Paper 1 (Theory)**

Name: _____ () Class: _____

**SECONDARY FOUR EXPRESS
SECONDARY FIVE NORMAL ACADEMIC
7155/01**

**Wednesday 28 August 2024
1130 – 1330
2 hours**

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on all the work you hand in.

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.

Candidates will answer on the question paper.

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	
Total	80

This paper consists of **13** printed pages including the cover page.

[Turn over

- 1 A company dealing with digital locks uses a standard touch screen keypad for its customers to enter their 4-digit pin codes to unlock the locks.

(a) State **two** reasons why the pin codes can be easily stolen.

1

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2

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[2]

(b) Suggest **two** ways to protect the pin codes from being stolen.

1

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2

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[2]

The company provides an online service for customers who forget their pin codes to log into the system to reset their pin codes.

(c) Describe the difference between authentication and authorisation.

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[2]

(d) Explain why authentication is important for this service and suggest **one** method to enhance the authentication.

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[2]

- 2 During COVID-19, a rural town has to use video-conferencing service for medical consultation. This includes patients who live in nearby mountainous areas.

Describe a positive, negative and ethical impact of introducing this service.

Positive

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Negative

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Ethical

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[3]

- 3 A system checks if a plant is growing healthily by checking the number of days it has grown and its corresponding height.

- (a) Identify **one** input to the system and its data type.

..... [1]

- (b) Identify **one** output to the system and write a program code to produce the output.

Output

Program code

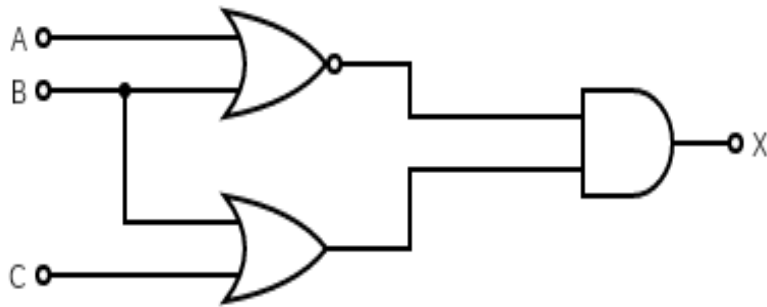
[1]

The system is upgraded to check the health status of any number of plants.

- (c) Identify a problem-solving technique that can be used to modify the program code.

..... [1]

- 4 (a) Complete the truth table for the following logic circuit.



A	B	C	Working Space	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

[3]

- (b) Draw a logic circuit for the expression:

$$X = (A \text{ OR NOT } B) \text{ NAND } (\text{NOT } A \text{ AND } C)$$



[5]

5 A software developer is tasked to develop a computer game for teenagers.

- (a) In the development of his game, he follows a set of stages. Other than the writing of code, state two other stages.

1

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2

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[2]

- (b) The users of the game must have a username and password to log into the game.

The password must contain at least:

- 12 characters
- 1 lower-case letter
- 1 upper-case letter

Write an algorithm, using a **flowchart**, to take the password as input, repeatedly, until it is valid or invalid for three times.

- (c) Complete the table by identifying **two** types of checks used in (b) and suggest a password that will test the error conditions of each check. [6]

Type of check	Password

[2]

6 Rahim is setting up a computer at a computer shop.

- (a) The owner advises him to purchase a multi-core processor as a dual-core processor will run twice as fast while a quad-core processor will run four times faster than a single-core processor.

State whether the owner's statement is true and explain your reason.

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[2]

- (b) Rahim wants to purchase a secondary storage device. State two factors that he should consider while purchasing a secondary storage device.

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[2]

- (c) Rahim decided to purchase a solid state storage device. State two examples of solid state storage devices.

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[2]

- 7 A program is written for a cashier of a mini-mart. The program allows the user to input the price of items bought by a customer, calculates the amount to pay in dollars and to the nearest cents, and outputs the number of items bought and the change. The amount to pay includes an additional Goods and Services Tax (GST) of 9% of the price of each item.

```

01  more_items = "Y"
02  num_items = 0
03  total_price = 0
04  while (more_items = "Y"):
05      price = float(input("Enter the price of the item:
06          $"))
07      total_price = total_price + price
08      num_items = num_items + 1
09      more_items = input("Any more items? 'Y' or 'N': ")
10  total_GST = 1.09 * price
11  print("-----")
12  print("Please pay $" + (round(total_GST, 2)))
13  money_tendered = float(input("Enter cash tendered: $"))
14  while money_tendered > total_GST:
15      print("Cash not enough to pay for items")
16      money_tendered = float(input("Enter cash tendered:
17          $"))
18  print("-----")
19  change = money_tendered - total_GST
20  print("Items bought :", num_items)
21  print("Change : $" + str(round(Change, 2)))

```

- (a) The program has **five** errors.

Give the line number of each error and write the correct line for each.

Line number

Correction

Line number

Correction

Line number

Correction

Line number

Correction

Line number

Correction

- (b) State **two** reasons for using constants in a program.

1

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2

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[2]

- (c) The program uses a `WHILE ... ENDWHILE` loop.

State **one other** type of loop and explain when it is used over a `WHILE ... ENDWHILE` loop.

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[3]

- (d) Explain **one** difference between a compiler and an interpreter.

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[2]

- 8 Mr Lee uses a spreadsheet software to keep track of the money he has deposited in a local bank and the interest received for the number of years he deposited in the bank.

	A	B	C	D	E	F
1	LEE'S SAVINGS					
2						
3	Transaction Number	Amount deposited	Year of Transaction	Number of Years Deposited	Interest Rate	Interest Receivable
4	2017DP0702	\$1,700.00	2017	7	4%	\$476.00
5	2018DP0903	\$1,600.00	2018	6	4%	\$384.00
6	2019SP0104	\$1,200.00	2019	5	3%	\$180.00
7	2020DP1905	\$1,800.00	2020	4	3%	\$216.00
8	2020DP0706	\$1,200.00	2020	4	3%	\$144.00
9	2022SP0909	\$660.00	2022	2	2%	\$26.00
10	2023DP0908	\$660.00	2023	1	1%	\$7.00
11						
12	Total	\$8,820.00				
13	Number of deposits	7				
14	Range deposited	\$1,140.00				
15						
16	Rates					
17	Number of Years Deposited	Description	Interest Rate per Year			
18	1	One year	1%			
19	2	Two or three years	2%			
20	4	Four or five years	3%			
21	6	Six years and over	4%			
22						

- (a) Identify the functions used in the following cells:

C4

E4

B13

[3]

- (b) The cells **D4:D10** is calculated by subtracting the Year of Transaction from the current year.

State the formula in **D4** that will do this.

.....

[2]

- (c) The cell **B14** is calculated by subtracting the lowest Amount deposited from the highest Amount deposited.

State the formula that will do this.

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- (d) The background colour of cells **F4:F10** changes to red if the interest receivable is less than \$200.

Identify the spreadsheet feature used to change the colour of the cells depending on their value.

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- 9 (a)** Convert the following denary integer into hexadecimal.
2846

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- (b)** Describe, using an example, how to convert a binary number into denary.

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[3]

- (c) There are many types of encodings used to represent characters.

Describe **one** type of encoding.

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[3]

- 10 (a) Determine the parity bit of the following data strings if an odd parity system is used.

1100110

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[1]

- (b) Write down the checksum for the block of data with the following byte sums.

1455

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[1]

- (c) Computers in a network can be organised in either a client-server or peer-to-peer network.

Complete the comparisons of these two networks by writing the missing terms.

The client-server network has a control of data and resources, unlike the peer-to-peer network.

It is easier to schedule of all shared files at regular intervals as compared to a peer-to-peer network which requires more effort.

..... may be enhanced with the use of specialised software or operating system features designed for servers whereas for a peer-to-peer network, it is only as strong as the individual computers.

The is typically high but limited to the capability of the server while the peer-to-peer network varies depending on how data needs to be transmitted.

Storage-wise, it is centralised and carried out only at the while a peer-to-peer network allow individual users to carry out at each computer.

The setup and administrative are high as maintenance of servers and clients are needed.

[6]

11 A n -narcissistic number is a n -digit number that is the sum of the n th powers of its digits.

For example, 153 is a narcissistic number because $153 = 1^3 + 5^3 + 3^3$, but 1635 is not a narcissistic number because 1635 is not equal to $1^4 + 6^4 + 3^4 + 5^4$.

Write a pseudo code or program code that does the following:

- accepts a positive integer of 4 digits
- calculates the sum of the 4th powers of its digits
- checks if the sum is the same as the integer
- outputs if the number is a narcissistic number.

.....[8]