1 Jennifer has loaned \$200,000 from the bank to buy a house. She has set up a spreadsheet to tabulate the instalments to be paid each month. In the spreadsheet shown below, rows 12 to 244 are **hidden**.

	А	В	С
1	Loan Amount:	\$200,000	
	Annual Interest Rate:		
2	(Compounded Monthly)	2.00%	
3	Period:	20	
4	Monthly Instalment:	-\$1,011.77	
5			
6		Instalment I	Breakdown
7	Month	Principal Paid	Interest Paid
8	1	-\$678.43	-\$333.33
9	2	-\$679.56	-\$332.20
10	3	-\$680.70	-\$331.07
11	4	-\$681.83	-\$329.94
245	238	-\$1,006.72	-\$5.04
246	239	-\$1,008.40	-\$3.36
247	240	-\$1,010.08	-\$1.68

(a) State the data formats used in cell **B1** and cell **B2**.

......[2]

(b) Identify the function used in cell B4 to determine the monthly instalment to be paid.

.....[1]

(c) Identify the function used in cell **C8** to determine the amount of interest to be paid for that month.

......[1]

(d) Evaluate the following spreadsheet formulas:

=ROUND(B4,0)	 [1]
=CEILING(B8,-10)	 [1]
=SUM(B8:B247)	 [1]
=LARGE(C8:C247,2)	 [1]

(e) Jennifer wants to calculate the number of months where the interest paid is above \$100.

Write a spreadsheet formula to perform this calculation.

......[2]

(f) Jennifer wants to calculate the amount she will owe the bank after 20 years assuming that she did not pay for any instalments at all.

Suggest a spreadsheet function that will help her in this calculation.

......[1]

2 (a) Convert the binary number **1100 1001** into a positive whole denary number. Show your working clearly.

 	 •••	 	•••	•••	•••	 	 		 • • •	• • •	•••	• • •	 	• • •	 • • •			 •••	 	•••	••	
 	 	 	•••			 •••	 		 •••	•••			 •••	• • •	 •••	• • •	•••	 •••	 		••	
 	 	 				 	 	•••	 • • •	• • •			 		 			 	 			[2]

(b) Convert the denary number **148** into an 8-bit binary number. Show your working clearly.

[2]

(C) Convert the hexadecimal number AE into an 8-bit binary number.[1] (d) In representing RGB codes, hexadecimal numbers are used rather than binary numbers. State two reasons to explain why.[2] The size of computer data are commonly represented as bytes. (e) (i) Describe what is meant by a byte and how it is related to a bit.[1] Convert 32 KB into bits. (ii)[1] (iii) Convert 4 GiB into bytes.[1]

3 Amidst the COVID-19 pandemic, people are discouraged from visiting the bank in person and are advised to use online banking services to access their accounts and perform transactions.

However, online banking services bring about greater risks of cyberattacks and it is important for a bank to keep its customers' data safe and secure. Unauthorised access to customers' data can occur due to weak authentication methods, poor access controls and issues with its privacy policy.

For each cause of unauthorised access stated above, state an example of how it can occur, and a measure that can be taken by the bank.

(a) Weak authentication methods:

	Example:	
	Measure:	
		[2]
(b)	Poor access controls:	
	Example:	•
	Measure:	
		[2]
(c)	Issues with privacy policy:	
	Example:	•
		•
	Measure:	
		נסו
		[2]

- 4 COVID-19 restrictions in many countries has led to an increase in e-commerce transactions and usage of online services such as internet banking. Cybercriminals have taken advantage of this situation by setting up more phishing and pharming attacks.
 - (a) State one similarity and one difference between a phishing and a pharming attack.

(b) One way to avoid being pharmed is to ensure that public key encryption is being used by the webpage when submitting credit card or other sensitive information via the Internet.

State how you can identify whether public key encryption is being used by a webpage.

(c) Suggest another way to avoid being pharmed or phished.

.....[1]

- **5** Technology brings about social and economic impact on various aspects of our lives, as well as certain ethical issues.
 - (a) State one **positive** and one **negative** social impact of technology in communication.

- (b) State two positive economic impacts of technology in transportation.

 1:
 [1]

 2:
 [1]

 2:
 [1]

 (c) Describe two ethical issues related to the impact of technology in Healthcare.

 1:
 [1]

 2:
 [1]

 2:
 [1]

 2:
 [1]

 2:
 [1]
- 6 Insert **three** of the following words about computer architecture in the correct place in the text below.

processor data bus co	ntrol unit address bus	arithmetic logic unit
-----------------------	------------------------	-----------------------

The follows instructions and decides when data should be stored, received or transmitted by different parts of the computer.

The is a uni-directional because information can be sent in one direction only, that is, from processor to memory.

The processes data and follows instructions.

[3]





(b) Complete the truth table for (a).

Input			Working space				
Α	в	С		Х			
0	0	0					
0	0	1					
0	1	0					
0	1	1					
1	0	0					
1	0	1					
1	1	0					
1	1	1					
	•			[4]			

- 8 A computer network connects two or more computers together for the exchange of data.
 - (a) Compare between a LAN and a WAN.

(b) Draw a line from each network device to its best description:

Network device	Description
Router	Device that forwards packets between separate networks.
Drider	Device that constructs a single network by connecting multiple similar networks together
Bridge	Device that performs modulation and demodulation.
Network Interface Card	Device that transmits received packets to all connected devices.
Modem	Device that connects exactly two networks together
Modern	Device that enables the transfer of data between a device and a network.
	[4]

9 The flowchart below represents an algorithm that accepts integers as inputs and outputs two lists.



[This question is continued on the next page.]

list_a	list_b	X	count	check	OUTPUT

(a) Complete the trace table below by performing a dry run using the test data: 1, 2, 3, 4, 5, 6, 0

[6]

(b) Describe the purpose of the algorithm in terms of its inputs and outputs.

 10 Below is a program written in Python programming language. This program accepts 100 positive integers between 0 to 1000 and outputs the sum of the integers which are a multiple of 5.

```
total = 0
for i in range (100)
    number = input("Enter a number:")
    if number[-1]=="0" and number[-1]=="5":
        total = total + number
print(total)
```

There are **three** errors in this python code.

For each error, write down the line containing the error, identify the type of error and then write the correct code for that line.

Error 1	
Type of error	
Correction	
Error 2	
Type of error	
Correction	[3]
Error 3	
Type of error	
Correction	[3]

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

Using pseudo-code or a flowchart, write an algorithm that:

- inputs the name of a contestant and his/her score. This input is repeated 20 times and the names and scores are stored in two arrays.
- determines which contestant has the highest score **after** all inputs have been entered.
- outputs the name and score of the winning contestant.

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