Data transmission – 2020 IGCSE 0478

1. Nov/2020/Paper_11/No.9

Victoria is entering data into a computer system. The data will be transmitted to cloud storage.

(a) An even parity check is used to check for errors in the binary values after transmission.

For each of the **7-bit binary values**, write the **Parity bit** that makes sure **even** parity is met.

7-bit binary value	**Parity bit**
1100010	.....
1001011	.....
0100010	.....
0010111	.....

[4]

2. Nov/2020/Paper_12/No.2

Four 7-bit binary values are transmitted from one computer to another. A parity bit was added to each binary value creating 8-bit binary values. All the binary values have been transmitted correctly.

(a) Tick (✓) to show whether an **Even** or an **Odd** parity check has been used for each binary value.

8-bit binary value	Even (✓)	Odd (✓)
11111111		
01100110		
01111011		
10000000		

[4]

(b) The data will also be checked using a checksum.

Describe how a checksum can be used to check that the data has been transmitted correctly.

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..... [5]

3. Nov/2020/Paper_13/No.3a

(a) **Four** denary to 8-bit binary conversions are given.

Tick (✓) to show if each denary to 8-bit binary conversion is **Correct** or **Incorrect**.

Denary	Binary Conversion	Correct (✓)	Incorrect (✓)
145	10010001		
179	10110101		
11	00010011		
100	01100010		

[4]

(b) Convert the **12-bit** binary number into hexadecimal.

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

..... [3]

4. Nov/2020/Paper_13/No.5

Arjun uses a scanner to create digital versions of some printed documents.

The scanner is attached to his computer using a USB connection.

(a) Tick (✓) to show if the USB connection uses **Parallel** or **Serial** data transmission.

Describe your chosen method of data transmission.

Parallel ☐

Serial ☐

Description

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[3]

(b) Give **three** benefits of a USB connection.

Benefit 1 .....

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Benefit 2 .....

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Benefit 3 .....

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[3]

(c) Arjun uses the Internet to send the digital documents to his friend. He wants to make sure the documents are sent securely.

Identify **two** protocols that can be used to transfer data securely.

Protocol 1 .....

Protocol 2 .....

[2]

5. Nov/2020/Paper_13/No.7

Four 7-bit binary values are transmitted from one computer to another. A parity bit was added to each binary value creating 8-bit binary values. All the binary values have been transmitted correctly.

(a) Tick (✓) to show whether an **Even** or an **Odd** parity check has been used for each binary value.

8-bit binary value	Even (✓)	Odd (✓)
10000001		
10000010		
00101001		
00101000		

[4]

(b) A parity check may not always detect errors that have occurred in data transmission.

State why a parity check may not detect data transmission errors.

..... [1]

(c) Give **one** other error checking method that could be used to check for errors in data transmission.

..... [1]

6. Mar/2020/Paper_12/No.2

A school network is used to transmit and store data about students.

(a) Different types and methods of transmission can be used to send data across the network.

Three descriptions about data transmission are given.

Tick (✓) **one Method** and tick (✓) **one Type** for each description.

Description	Method		Type		
	Serial (✓)	**Parallel (✓)**	**Simplex (✓)**	**Half-duplex (✓)**	**Duplex (✓)**
Data is sent down a single wire in a single direction only.					
Data is sent down multiple wires in both directions, at the same time.					
Data is sent down a single wire in both directions, but never at the same time.					

[3]

(b) Parity bits are used to help detect errors in data transmission. A parity bit is added to each binary value before transmission.

Three binary values are to be transmitted using **even** parity.

(i) Complete the parity bit that would be added to each binary value for even parity.

Binary value							Parity bit
1	1	0	0	1	1	1	
1	0	1	0	1	0	1	
0	1	1	0	1	0	0	

[3]

(ii) A number of errors occurred during data transmission.

State why a parity check may **not** detect transmission errors.

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..... [1]

(c) Data is encrypted using 128-bit symmetric encryption before it is transmitted.

(i) Explain what is meant by encryption.

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..... [2]

(ii) State how the strength of the encryption can be improved.

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..... [1]

(d) Describe how the school could prevent the loss of stored data.

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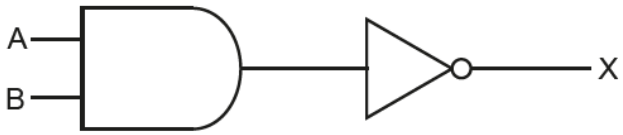
..... [6]

7. June/2020/Paper_12/No.4

(a) Identify the name **and** draw the **single** logic gate that can replace the given logic circuits.

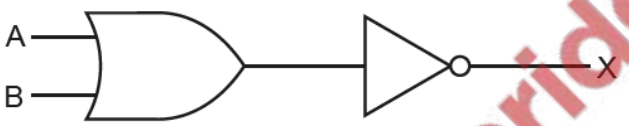
(i)



Name of gate: ..... Drawing of gate:

[2]

(ii)



Name of gate: ..... Drawing of gate:

[2]

(b) Complete the truth table for the given logic statement:

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

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		

[4]

8. June/2020/Paper_13/No.9

Four 7-bit binary values are being transmitted from one computer to another. An odd parity check is being used to check for errors in the binary values.

Write the correct **Parity bit** for each **7-bit binary value** to make sure it meets **odd** parity.

Parity bit	**7-bit binary value**
.....	0000011
.....	1000000
.....	0111111
.....	1010101

[4]