The City School

Unified Mid-Year Examinations
2018 - 2019
Class 10

SCHOOL NAME	
INDEX NUMBER	
DATE	

COMPUTER SCIENCE **2210/12**
Paper 1 Theory **1 hour 45 minutes**

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your School name, Index number and Date in the spaces provided.
Write in dark blue or black pen.
You may use a pencil for any diagrams, graphs or rough working.
Do not use paper clips, glue or correction fluid.
Calculators must not be used in this paper.

Answer **all** questions.
No marks will be awarded for using brand names of software packages or hardware.

At the end of examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The maximum number of marks is 75.

Invigilated By: _____ Checked By:_____ Marks Tallied By: _____

This document consists of **12** printed pages.

1 **(a)** In data transmission, there is always the risk that the data has been corrupted or changed in some way. Describe the following error detection methods

(i) Automatic repeat request (ARQ)

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..... [2]

(ii) Echo checking

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..... [2]

(b) HTML isn't a programming language but is simply a mark-up language. Describe the difference between the following.

(i) HTML Structure

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..... [2]

(ii) HTML Presentation

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..... [2]

(c) Column **A** shows **three** types of data transmission. Column **B** shows definitions. Column **C** shows examples.

Draw lines to:

- link up each term in column **A** with its correct definition in column **B**
- link up the **three** definitions in column **B**, with the appropriate example in column **C**

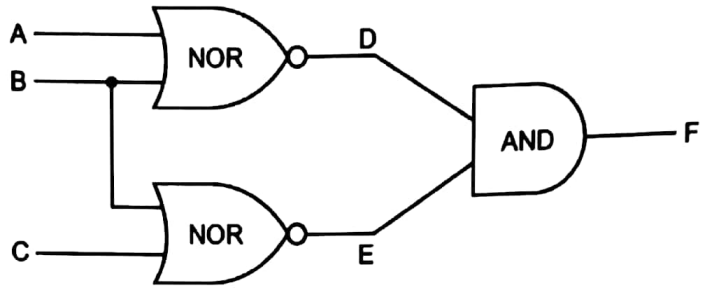
A	B	C
Simplex	Data transmission in both directions at the same time	Telephone conversation
Half duplex	Data transmission in one direction only	Two-way radio communication
Full duplex	Data transmission in both directions, but only in one direction at a time	Global positioning satellite signals

[6]

2 (a) (i) Write boolean algebraic expression for the following circuit

..... [2]

(ii) Complete the truth table for this logic circuit

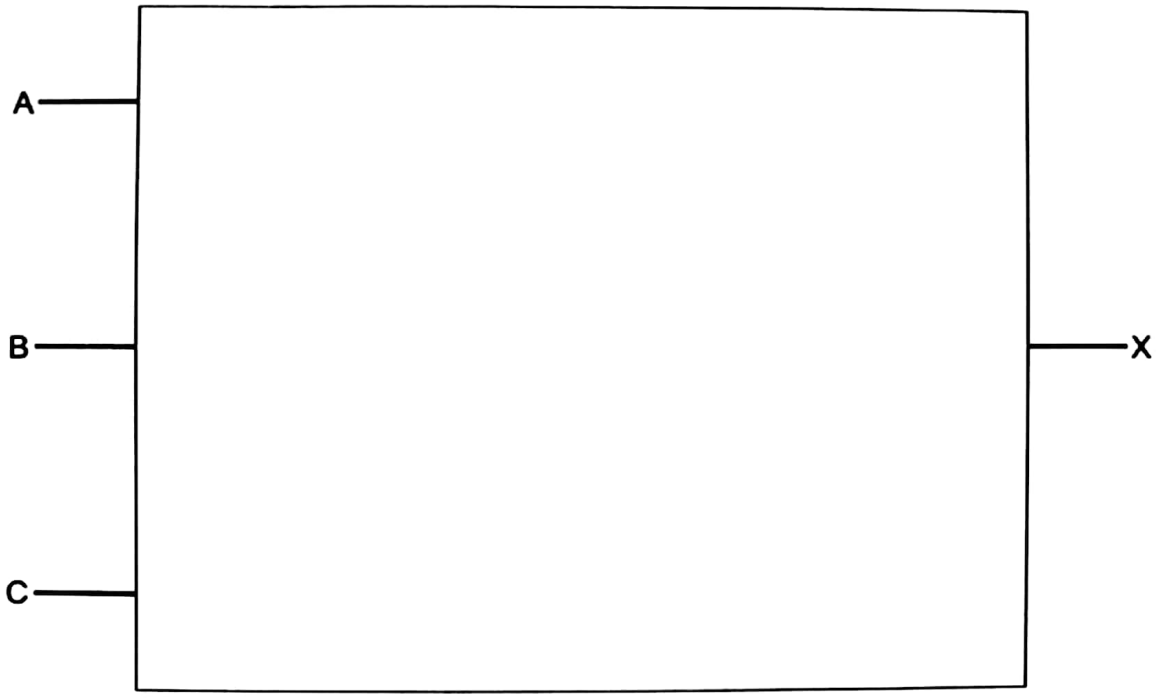


A	B	C	D	E	F
0	0	0			
0	0	1			
0	1	0			
0	1	1			
1	0	0			
1	0	1			
1	1	0			
1	1	1			

[4]

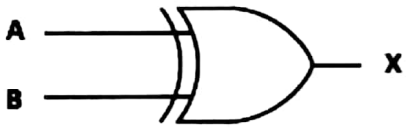
(b) Draw the logic circuit which corresponds to the following logic statement.

X = 1 IF (A is NOT 1 OR B is NOT 1) OR (B is 1 AND C is 1)



[3]

(c) Name this gate .....

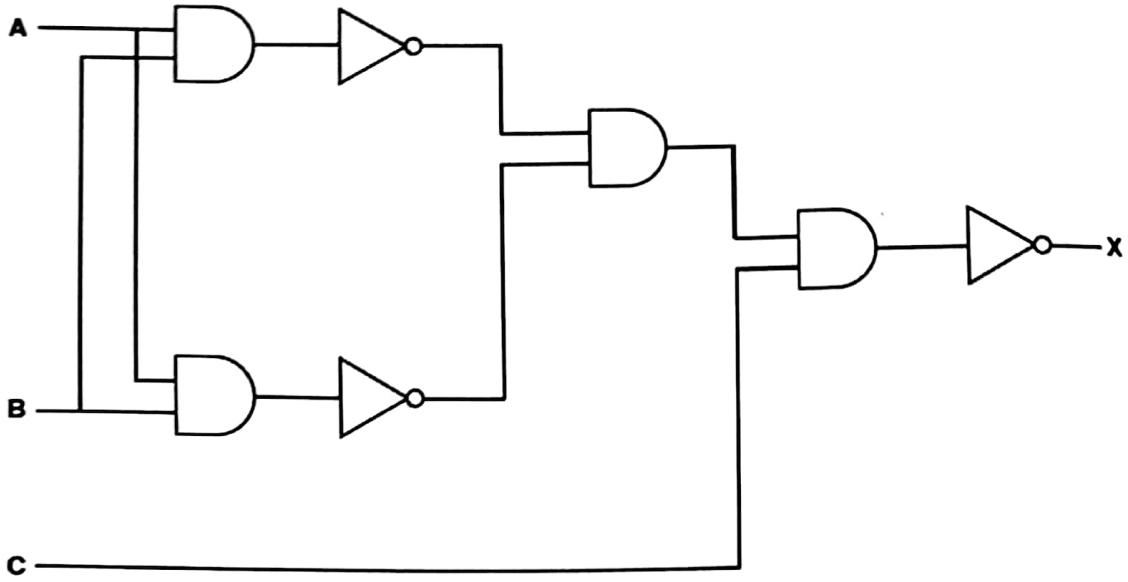


Complete the truth table for this gate

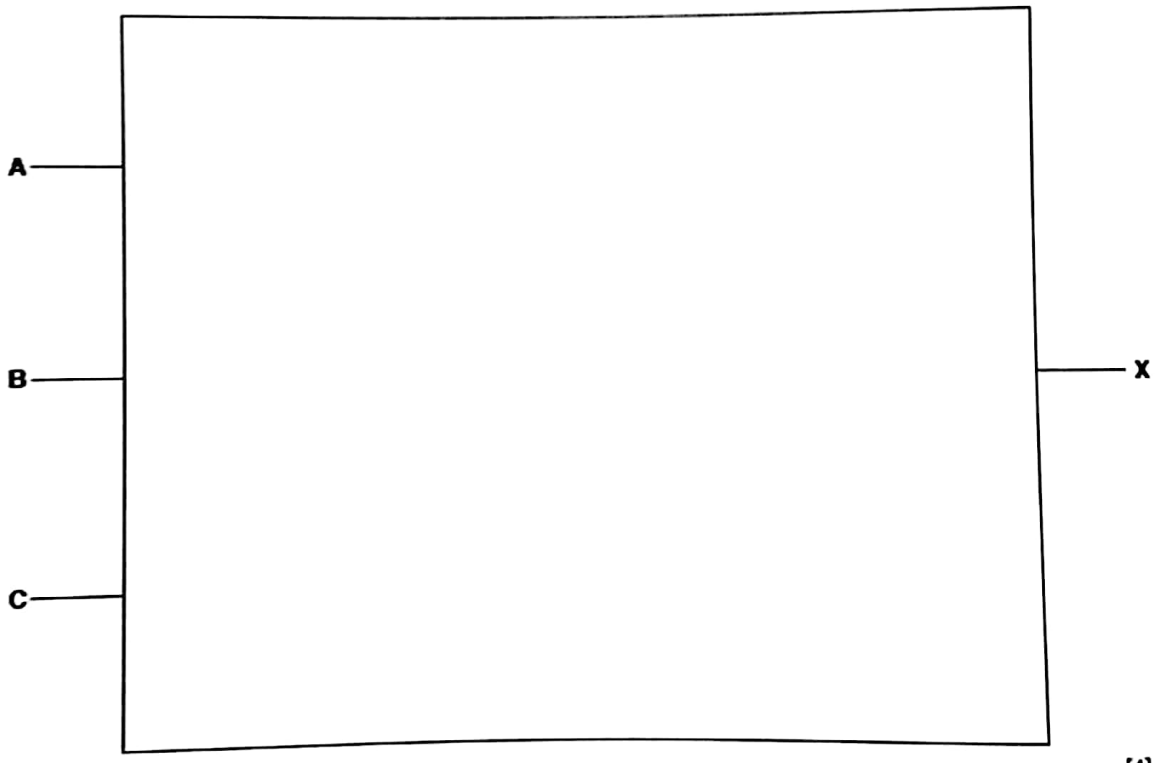
Input		Output
A	B	X
0	0	
0	1	
1	0	
1	1	

[5]

(d) Re-draw the following logic circuit using NAND gates only.



Logic circuit re-drawn:



[4]

3 **(a)** Five statements about serial data transmission and parallel data transmission are shown in the table below. Study each statement. Tick (✓) to show whether the statement refers to serial data transmission or parallel data transmission.

Statement	Serial	Parallel
Bits of each character are sent one after the other		
Works well over long distances		
Each bit in a byte is transmitted along individual channel simultaneously.		
Over longer distances the bits can get skewed.		
Works well over a short distance		

[5]

(b) State what is meant by the term USB.

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..... [1]

(c) Describe **two** benefits of using USB connections between a computer and a device.

1. .....

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2. .....

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..... [2]

4 Parity checks are often used to check for errors that may occur during data transmission.

(a) A system uses **even parity**.

Tick (✓) to show whether the following three bytes have been transmitted correctly or incorrectly.

Received byte	Byte transmitted correctly	Byte transmitted incorrectly
11001000		
01111100		
01101001		

[3]

(b) A parity byte is used to identify which bit has been transmitted incorrectly in a block of data.

The word "F L O W C H A R T" was transmitted using nine bytes of data (one byte per character). A tenth byte, the parity byte, was also transmitted.

The following block of data shows all ten bytes received after transmission. The system uses **even parity** and column 1 is the parity bit.

	letter	column 1	column 2	column 3	column 4	column 5	column 6	column 7	column 8
byte 1	F	1	0	1	0	0	1	1	0
byte 2	L	1	0	1	0	1	1	0	0
byte 3	O	1	0	1	0	1	1	1	1
byte 4	W	1	0	1	1	0	1	1	1
byte 5	C	1	0	1	0	0	0	1	1
byte 6	H	0	0	1	0	1	0	0	0
byte 7	A	0	0	1	0	0	1	0	1
byte 8	R	1	0	1	1	0	0	1	0
byte 9	T	1	0	1	1	0	1	0	0
parity byte		1	0	1	1	1	1	1	0

(i) **One** of the bits has been transmitted incorrectly.

Write the byte number and column number of this bit:

Byte number .....

Column number ..... [2]

(II) Explain how you arrived at your answer for **part (b)(i)**.

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..... [2]

(c) A parity check may not identify that a bit has been transmitted incorrectly.

Describe **one** situation in which this could occur.

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..... [1]

5 Describe the following

IP Addresses

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..... [2]

MAC Addresses

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..... [2]

6 An alarm, Y, sends a signal (Y = 1) when certain fault conditions in a chemical process are detected. The inputs are:

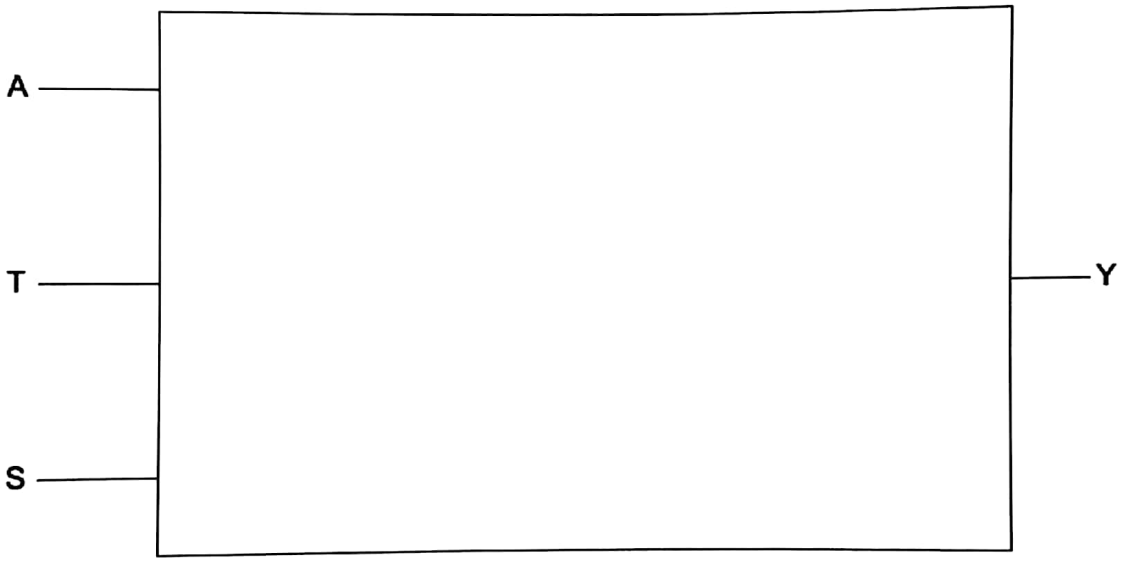
Input	Binary Value	Condition
A	1	acidity > 5
	0	acidity <= 5
T	1	temperature >= 120UC
	0	temperature < 120UC
S	1	stirrer bar ON
	0	stirrer bar OFF

The alarm, Y, returns a value of 1 if:

either temperature >= 120UC AND stirrer bar is OFF

or acidity > 5 AND temperature < 120UC

(a) Draw the logic circuit for the above system



[5]

(b) Complete the truth table for this alarm system.

A	T	S	Working	Y
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		

[4]

7 **(a)** Five statements about interpreters and compilers are shown in the table below.

Study each statement. Tick (✓) to show whether the statement refers to an interpreter or to a compiler.

Statement	Interpreter	Compiler
Creates an executable file that runs directly on the computer.		
More likely to crash the computer since the machine code produced runs directly on the processor.		
Easier to debug since each line of code is analysed and checked before being executed.		
Slow speed of execution of program loops.		
It is more difficult to modify the executable code, since it is in machine code format.		

[5]

(b) Give **one** application of writing a program in a low-level language.

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..... [1]

(c) Give **one** drawback of writing a program in a low-level language.

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..... [1]

(d) Give **one** drawback of writing a program in a high-level language.

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..... [1]

(e) Describe Syntax Errors. Give any 2 examples.

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..... [3]

(f) Describe Logical Errors. Give any 2 examples.

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..... [3]