

FORM 4

COMPUTER STUDIES

TIME: 1h 30min

Name: _____

Class: _____

Directions to Candidates:

Answer **ALL** questions in **Section A** and **Section B** on this paper;
The use of flow chart template is permitted;
Calculators are **NOT** allowed;
Good English and orderly presentation are important.

For office use only:

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	Paper Total	Course Work	Final Mark
Max	5	5	5	5	5	5	5	5	5	5	5	15	15	85%	15%	100%
Mark																

Section A – Answer ALL Questions

1. Errors may arise from mistakes during data entry or mistakes in the program itself. **Name** the following errors.
 - a. A data entry error made when two data items are swapped. E.g. Typing 132 instead of 123. _____ [1]
 - b. A data entry error made when a data item is left out. E.g. Typing 'scool' instead of 'school'. _____ [1]
 - c. A program error resulting when a running program meets a situation it was not designed to handle. _____ [1]
 - d. An error in the grammar of the programming language that does not allow the program to run. _____ [1]
 - e. An error in the design of a program that may lead it to hang or give wrong results. _____ [1]
2. Data verification and validation checks are often employed during the entry of data.
 - a. **Name** two types of data validation checks.
 - i. _____ [1]
 - ii. _____ [1]
 - b. Can these checks on the data **ensure** that all data entered is correct? Why?

_____ [1]
 - c. **Explain** briefly one type of data verification.

_____ [1]
3. Computers represent values in binary.
 - a. Why is the above statement **true**?

_____ [2]
 - b. **Convert** the following binary number to decimal: 10001101

Answer _____ [1]
 - c. **Convert** the following binary number to hexadecimal: 10001101

Answer _____ [1]
 - d. **Convert** the following decimal number to hexadecimal: 45

Answer _____ [1]

4. Binary Arithmetic

- a. i. **Represent** the decimal number 20 in an **8-bit register**.

Answer _____ [1]

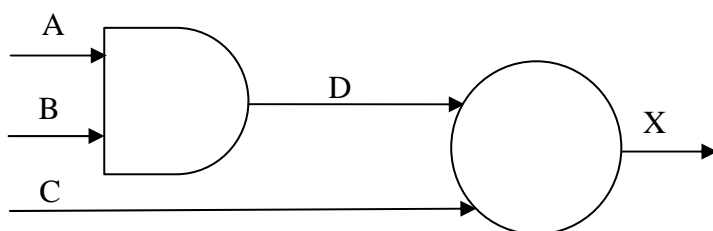
- ii. **Represent** the number 5 in **two's complement** in **8 bits**.

Answer _____ [2]

- b. **Subtract** 5 from 20 using **two's complement arithmetic**.

Answer _____ [2]

5. Consider the following logic circuit and its incomplete truth table below. Note that the circle in the logic circuit is representing an unknown type of gate.



[1]

A	B	C	D	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	1		

[2]

- a. Use the incomplete truth table to help you find the unknown gate. Then **label** the unknown gate in the logic circuit above.
- b. **Complete** the truth table for the above logic circuit.
- c. Give the **Boolean expression** for this circuit.

 _____ [2]

6. Software may be tailor-made or purchased off-the-shelf.
- a. Give three **differences** between tailor-made and off-the shelf packages.

Tailor-made packages	Off-the shelf packages

[1]

[1]

[1]

- b. Mention two **reasons** when a company might decide to go for a tailor-made package and not off-the-shelf.

i. _____ [1]

ii. _____ [1]

7. The System Life Cycle is associated with the computerization of an organization.

- a. **Number** the following seven tasks of the System Life Cycle to put them in the correct order. *The first one has been numbered for you.*

	System maintenance
	Control and Review
	Present system study and analysis
	Programming, Testing and Documentation
1	Problem Definition and Feasibility Study
	Design of new system
	Implementation and changeover methods

[3]

- b. Why is 'Analysis' an important **phase** in the System Life Cycle?

 _____ [2]

8. a. Mention the three types of **documentation** (manuals) that are generally available with software.

 _____ [3]

- b. In which type of documentation of part 'a' above would you expect to find **flowcharts**?

_____ [1]

- c. In which type of documentation of part 'a' above would you expect to find **instructions** on using the software?

_____ [1]

11. The installation and use of software is regulated by its license.

a. Mention two things that happen during software **installation**.

i. _____ [1]

ii. _____ [1]

b. What **type of license** comes with software that can be installed on any number of computers within a single location?

_____ [1]

c. What are the following **types of software** called?

i. Software that is free to use only during a **trial period**.

_____ [1]

ii. Copyrighted software that is given away for **free** by the author.

_____ [1]

Section B – Answer BOTH questions

12. Write a section of **Pascal code** for each of the following tasks.

a. Declare a variable called **name** that can store a maximum of fifteen characters.

_____ [2]

b. Allow the user to enter his/her surname in a variable called **surname** and display the first three characters (leftmost) of his/her surname.

_____ [2]

c. Declare an array called **marks** that can hold up to ten marks. Marks can only be whole numbers.

_____ [2]

d. Allows the user to enter five **values** and then outputs the **largest** value entered. The values must be entered using a loop.

_____ [4]

c. Given an **8-bit register**:

- i. What is the **range** of unsigned binary numbers that can be represented in this register? Give your answer in decimal.

[2]

- ii. What is the **range of two's complement numbers** that can be represented in such a register?

[2]

d. Modern CPUs often have a 32-bit or 64-bit wordlength.

- i. What is the **wordlength** of a computer?

[1]

- ii. How would a 64-bit CPU be **more efficient** than a 32-bit CPU when transferring the word 'computer' between the CPU and Main Memory?

[2]

e. What is the **address space** of a computer?

[1]

f. How is the address space **relevant** to the computer's performance?

[2]