Practice Examination

Paper 1: Principles of Computer Science

Subject: Computer Science

Paper Code: CSC1WT001A

Time Allowed: 1 Hour 30 Minutes

Total Marks: 80

+ **Instructions:**
  - Answer all questions.
  - Read each question carefully.
  - Write your answers clearly and neatly.

Candidate surname	Other names

+ Computational Thinking Questions *(12 marks)*

(a) Explain the difference between abstraction and decomposition. Provide a real-world example where both are used to solve a problem. [3]

(b) A complex system such as an airport uses multiple subsystems (e.g., flight scheduling, baggage handling, security systems).
Explain how computational thinking principles help in designing such a system. [3]

(c) Given the Boolean expression: ***((A AND B) OR (NOT C AND D)) AND (E OR NOT F)***
Complete the truth table below: [6]

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

+ Data Representation *(12 marks)*

(a) Convert the denary number **156** into:

- 8-bit binary
- Hexadecimal

[3]

Show full working.

(b) A 4-minute audio file is sampled at 44.1kHz with 24-bit depth in stereo.

(i) Calculate the uncompressed file size in MB. [3]

(ii) Explain why using **LOSSLESS COMPRESSION** might still be preferable for music production. [3]

(c) Discuss the impact of increasing colour depth on both image quality and memory/storage requirements. Use an example. [3]

+ Computer Architecture *(20 marks)*

(a) The Control Unit in a CPU is responsible for managing the execution of instructions. Describe the role of the Control Unit during the Fetch-Decode-Execute cycle and how it interacts with other CPU components. [3]
(b) Define the terms 'clock cycle' and 'clock speed'. [2]
(c) Explain the concept of virtual memory. [4]
(d) What is a bus in computer architecture, and what are its types? [4]

(e) Discuss the difference between solid-state and magnetic storage in terms of reliability, speed, and cost.	[4]
(f) A gamer upgrades their CPU and RAM. Explain how these upgrades can improve the performance of a computer when running high-demand games.	[3]

+ Networking and Internet *(15 marks)*

(a) State two advantages of using a network in a school. [2]

(b) What is the role of the DNS (Domain Name System)? [3]

(c) Describe how data is transmitted across the Internet, including reference to protocols. [4]

(d) Explain the purpose and function of the following network components: [3]

- Switch
- Router
- Network Interface Card (NIC)

(e) A student connects to the internet using public Wi-Fi. Explain the risks and how they can stay safe online. [3]

+ Environment and Emerging Technologies *(21 marks)*

(a) State two ways computers have had a positive impact on the environment. [2]
(b) What is meant by 'e-waste'? [1]
(c) What is cloud computing? State one advantage and one disadvantage. [2]
(d) Describe how the manufacturing of computers affects the environment. [2]
(e) Describe two methods of protecting a network from unauthorized access. [2]
(f) Explain how encryption helps to protect data when sending it over the internet. [2]
(g) What is phishing? How can users protect themselves against phishing attacks? [2]

(h) Describe how a Denial of Service (DoS) attack works and its impact on organizations. [2]
(i) A hospital stores sensitive patient records on cloud servers. Discuss both the environmental benefits and the security risks of using cloud storage. [6]