



DRAYTON MANOR HIGH SCHOOL

**Year 10 End of Year Exam: Student guide**  
**Computer Science**

Duration of paper	1 hour
Total marks for paper	50 marks
Structure of paper	Several multiple-choice questions and few extended answers to assess learning from throughout the year (including since closure).
Skills	<ul style="list-style-type: none"> <li>- System Architecture</li> <li>- Memory and Storage</li> <li>- Computer Networks</li> <li>- Data Representation</li> <li>- Programming Techniques</li> <li>- Data representation</li> </ul>

<b>GCSE Computer Science PLC</b>	<b>R</b>	<b>A</b>	<b>G</b>
<b>1.1 Systems architecture</b>			
I can explain the purpose of the CPU			
I can describe registers of the Von Neumann processor architecture: <input type="radio"/> MAR (Memory Address Register) <input type="radio"/> MDR (Memory Data Register) <input type="radio"/> Program Counter <input type="radio"/> Accumulator			
I can identify the common CPU components and describe their function: <input type="radio"/> ALU (Arithmetic Logic Unit) <input type="radio"/> CU (Control Unit) <input type="radio"/> Cache			
I can describe the functioning of the CPU in the fetch and execute cycle and how this relates to the RAM			
I can explain how common characteristics of CPUs affect their performance: <input type="radio"/> clock speed <input type="radio"/> cache size <input type="radio"/> number of cores			
I can describe the use of embedded systems: <input type="radio"/> purpose of embedded systems <input type="radio"/> examples of embedded systems.			
<b>1.2 Memory</b>			
I can describe the difference between RAM and ROM			
I can describe the purpose of ROM in a computer system			
I can describe the purpose of RAM in a computer system			
I can explain and describe the need for virtual memory			
I can describe flash memory and the advantages of using it.			
<b>1.3 Storage</b>			
I can explain the need for secondary storage			
I can explain the purpose of data capacity and I can calculate data capacity requirements			
I can describe the features of common types of storage: <input type="radio"/> optical <input type="radio"/> magnetic <input type="radio"/> solid state			
I can suggest suitable storage devices and storage media for a given application, and I can explain the advantages and disadvantages of these, using characteristics: <input type="radio"/> capacity <input type="radio"/> speed <input type="radio"/> portability <input type="radio"/> durability <input type="radio"/> reliability <input type="radio"/> cost.			

1.4 Wired and wireless networks			
I can describe different types of networks: <input type="radio"/> LAN (Local Area Network) <input type="radio"/> WAN (Wide Area Network)			
I can explain factors that affect the performance of networks			
I can explain the different roles of computers in a client-server and a peer-to-peer network			
I can identify and describe the hardware needed to connect stand-alone computers into a Local Area Network, including the following: <input type="radio"/> wireless access points <input type="radio"/> routers/switches <input type="radio"/> NIC (Network Interface Controller/Card) <input type="radio"/> transmission media			
I can describe the internet as a worldwide collection of computer networks, including: <input type="radio"/> DNS (Domain Name Server) <input type="radio"/> hosting <input type="radio"/> the cloud			
I can describe the concept of virtual networks.			
1.5 Network topologies, protocols and layers			
I can describe both star and mesh network topologies			
I can describe Wifi features including: <input type="radio"/> frequency and channels <input type="radio"/> encryption			
I can describe an ethernet network connection including the advantages and disadvantages			
I can explain the uses of IP addressing, MAC addressing, and protocols including: <input type="radio"/> TCP/IP (Transmission Control Protocol/Internet Protocol) <input type="radio"/> HTTP (Hyper Text Transfer Protocol) <input type="radio"/> HTTPS (Hyper Text Transfer Protocol Secure) <input type="radio"/> FTP (File Transfer Protocol) <input type="radio"/> POP (Post Office Protocol) <input type="radio"/> IMAP (Internet Message Access Protocol) <input type="radio"/> SMTP (Simple Mail Transfer Protocol)			
I can explain the concept of layers in network layering			
I can describe how packet switching works for transmitting data and the advantages of it			
1.6 System security			
I can describe different forms of cyber attack			
I can explain the reasons for threats posed to networks: <input type="radio"/> malware <input type="radio"/> phishing <input type="radio"/> people as the 'weak point' in secure systems (social engineering) <input type="radio"/> brute force attacks <input type="radio"/> denial of service attacks <input type="radio"/> data interception and theft <input type="radio"/> the concept of SQL injection <input type="radio"/> poor network policy			
I can identify vulnerabilities and put forward prevention methods: <input type="radio"/> penetration testing <input type="radio"/> network forensics <input type="radio"/> network policies <input type="radio"/> anti-malware software <input type="radio"/> firewalls <input type="radio"/> user access levels <input type="radio"/> passwords <input type="radio"/> encryption.			
2.2 Programming techniques			
I can appropriately use variables, constants, operators, inputs, outputs, and assignments			
I can define and make effective use of the three basic programming constructs used to control the flow of a program: <input type="radio"/> sequence <input type="radio"/> selection <input type="radio"/> iteration (count and condition-controlled loops)			
I can appropriately use basic string manipulation			
I can appropriately use records to store data			
I can make use of arrays (or equivalent) when solving problems, including both one and two dimensional arrays			
I can appropriately use sub programs (functions and procedures) to produce structured code			

I can appropriately use and define different data types: <input type="radio"/> integer <input type="radio"/> real <input type="radio"/> Boolean <input type="radio"/> character and string <input type="radio"/> casting			
I can appropriately use common arithmetic operators (+ - / * MOD and DIV)			
I can appropriately use common Boolean operators. Such as AND OR NOT			
<b>2.6 Data representation</b>			
<b>Units</b>			
bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte, petabyte			
how data needs to be converted into a binary format to be processed by a computer.			
<b>Numbers</b>			
how to convert positive denary whole numbers (0–255) into 8-bit binary numbers and vice versa			
how to add two 8-bit binary integers and explain overflow errors which may occur			
binary shifts			
how to convert positive denary whole numbers (0–255) into 2-digit hexadecimal numbers and vice versa			
how to convert from binary to hexadecimal equivalents and vice versa			
<b>Characters</b>			
the use of binary codes to represent characters			
the term ‘character-set’			
the relationship between the number of bits per character in a character set and the number of characters which can be represented (for example ASCII, extended ASCII and Unicode).			
<b>Images</b>			
how an image is represented as a series of pixels represented in binary			
metadata included in the file			
the effect of color depth and resolution on the size of an image file.			
<b>Sound</b>			
how sound can be sampled and stored in digital form			
how sampling intervals and other factors affect the size of a sound file and the quality of its playback: <input type="radio"/> sample size <input type="radio"/> bit rate <input type="radio"/> sampling frequency.			
<b>Compression</b>			
need for compression			
types of compression: <input type="radio"/> lossy <input type="radio"/> lossless.			