	✓ Revse First				! Revise Second		
1.1 – Systems architecture		My Confidence level	OCR 2020	OCR 2021	OCR 2022	OCR 2023	Revise this First
1.1.1 Architecture of the CPU							
The purpose of the CPU: o The fetch-execute cycle	- What actions occur at each stage of the fetch-execute cycle			Q1b(i). 1 Mark			✓
Common CPU components and their function: o ALU (Arithmetic Logic Unit) o CU (Control Unit) o Cache o Registers	- The role/purpose of each component and what it manages, stores, or controls during the fetch-execute cycle - The purpose of each register, what it stores (data or address) - The difference between storing data and an address		Q3. 4 Marks		Q2, 4 Marks		!
Von Neumann architecture: o MAR (Memory Address Register) o MDR (Memory Data Register) o Program Counter o Accumulator				Q1c. 2 Marks			✓
1.1.2 CPU performance							
How common characteristics of CPUs affect their performance: o Clock speed o Cache size o Number of cores	- Understanding of each characteristic as listed - The effects of changing any of the common characteristics on system performance, either individually or in combination			Q1b(ii). 2 Marks			✓
1.1.3 Embedded systems							
The purpose and characteristics of embedded systems	What embedded systems are - Typical characteristics of embedded systems - Familiarity with a range of different embedded systems					Q7. 3 Marks	
Examples of embedded systems			Q5e. 3 Marks				
1.2 – Memory and storage							
1.2.1 Primary storage (Memory)							

The need for primary storage						Q5ai. 2 Marks	
The difference between RAM and ROM	Why computers have primary storage How this usually consists of RAM and ROM			Q1a. 8 Marks	Q7a(i) 1 Mark		
The purpose of ROM in a computer system	Key characteristics of RAM and ROM		Q5d. 2 Marks		Q7a(ii) 2 Marks		
The purpose of RAM in a computer system	Why virtual memory may be needed in a system						
Virtual memory	How virtual memory works - Transfer of data between RAM and HDD when RAM is filled		Q5c. 6 Marks			Q5aiii. 4 Marks	
1.2.2 Secondary storage							
The need for secondary storage	Why computers have secondary storage Recognise a range of secondary storage devices/media			Q6a. 2 Marks		Q5ai. 2 Marks	
Common types of storage: o Optical o Magnetic o Solid state	Differences between each type of storage device/medium Compare advantages/disadvantages for each storage device Be able to apply their knowledge in context within scenarios			Q6b(i). 3 Marks Q6b(ii). 2 Marks			
Suitable storage devices and storage media for a given application					Q7b(i) 2 Marks Q7b(ii) 4 Marks	Q5aii. 2 Marks	

The advantages and disadvantages of different storage devices and storage media relating to these characteristics: o Capacity o Speed o Portability o Durability o Reliability o Cost							
1.2.3 Units							
The units of data storage: o Bit o Nibble (4 bits) o Byte (8 bits) o Kilobyte (1,000 bytes or 1 KB) o Megabyte (1,000 KB) o Gigabyte (1,000 MB) o Terabyte (1,000 GB) o Petabyte (1,000 TB)					Q1a. 4 Marks Q1e. 1 Mark	Q1c. 1 Mark Q1d. 1 Mark	
How data needs to be converted into a binary format to be processed by a computer							
Data capacity and calculation of data capacity requirements			Q5f. 4 Marks	Q5. 6 Marks			
1.2.4 Data storage							
How to convert positive denary whole numbers to binary numbers (up to and including 8 bits) and vice versa	Denary number range 0 – 255 Binary number range 00000000 – 11111111				Q1b. 2 Marks		
How to add two binary integers together (up to and including 8 bits) and explain overflow errors which may occur	Understanding of the terms ‘most significant bit’, and ‘least significant bit’					Q1e. 2 Marks	
How to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice versa	Conversion of any number in these ranges to another number base				Q1c. 2 Marks	Q1b 4	

How to convert binary integers to their hexadecimal equivalents and vice versa	Hexadecimal range 00 – FF				Q1d. 1 Mark	Marks	
Binary shifts	Ability to deal with binary numbers containing between 1 and 8 bits - e.g. 11010 is the same as 00011010 Understand the effect of a binary shift (both left or right) on a number - Carry out a binary shift (both left and right)				Q1f. 1 Mark	Q1f. 2 Marks	
Characters							
The use of binary codes to represent characters						Q1a. 1 Mark	
The term 'character set'						Q3a. 5 Marks	
The relationship between the number of bits per character in a character set, and the number of characters which can be represented, e.g.: o ASCII o Unicode					Q6b(i)1 Mark Q6b(ii) 1 Mark		
Images							
How an image is represented as a series of pixels, represented in binary						Q3bii. 2 Marks	
Metadata					Q6c. 3 Marks	Q3bi. 1 Mark	
The effect of colour depth and resolution on: o The quality of the image o The size of an image file						Q3biii. 1 Mark Q3biv. 2 Marks	
Sound							
How sound can be sampled and stored in digital form					Q6a(i). 3 Marks		

The effect of sample rate, duration and bit depth on: o The playback quality o The size of a sound file					Q6a(ii) 3 Marks		
1.2.5 Compression							
The need for compression					Q6d(i) 2 Marks		
Types of compression: o Lossy o Lossless					Q6d(ii) 2 Marks	Q3c. 6 Marks	
1.3 – Computer networks, connections and protocols							
1.3.1 Networks and topologies							
Types of network: o LAN (Local Area Network) o WAN (Wide Area Network)			Q2a. 3 Marks	Q7a. 2 Marks Q7f. 2 Marks (Virtual Network)		Q2bi. 1 Mark Q2bii. 4 Marks Q2biii. 2 Marks	
Factors that affect the performance of networks			Q2c(i). 2 Marks Q2c(ii). 2 Marks	Q7c(i) 4 Marks Q7c(ii) 1 Mark	Q3a(i). 3 Marks Q3a(ii) 1 Mark		
The different roles of computers in a client-server and a peer-to-peer network			Q2d. 3 Marks			Q5c. 6 Marks	
The hardware needed to connect stand-alone computers into a Local Area Network: o Wireless access points o Routers o Switches o NIC (Network Interface Controller/Card) o Transmission media			Q1b(i). 1 Mark		Q3d. 3 Marks (Router)		
The Internet as a worldwide collection of computer networks: o DNS (Domain Name Server) o Hosting o The Cloud o Web servers and clients			Q2e. 6 Marks	Q7c(iii) 4 Marks (Packet Switching)	Q3b. 7 Marks		

Star and Mesh network topologies			Q6a. 2 Marks	Q7b. 2 Marks			✓
1.3.2 Wired and wireless networks, protocols and layers							
Modes of connection: o Wired • Ethernet o Wireless • Wi-Fi • Bluetooth			Q6b. 4 Marks		Q3c. 2 Marks		✓
Encryption					Q3e. 2 Marks		✓
IP addressing and MAC addressing			Q6c(i). 3 Marks				✓
Standards							✓
Common protocols including: o TCP/IP (Transmission Control Protocol/Internet Protocol) o HTTP (Hyper Text Transfer Protocol) o HTTPS (Hyper Text Transfer Protocol Secure) o FTP (File Transfer Protocol) o POP (Post Office Protocol) o IMAP (Internet Message Access Protocol) o SMTP (Simple Mail Transfer Protocol)			Q6c(ii) 3 Marks (Packet Header)	Q7e. 4 Marks	Q3f. 2 Marks	Q2ai. 4 Marks	
The concept of layers						Q2aii. 2 Marks	
1.4 – Network security							
1.4.1 Threats to computer systems and networks							

Forms of attack: o Malware o Social engineering, e.g. phishing, people as the 'weak point' o Brute-force attacks o Denial of service attacks o Data interception and theft o The concept of SQL injection			1b 4 Marks	Q7d(i) 3 Marks Q7d(ii) 3 Marks (Brute Force)		Q4a. 4 Marks 4b. 3 Marks	✓
1.4.2 Identifying and preventing vulnerabilities							
Common prevention methods: o Penetration testing o Anti-malware software o Firewalls o User access levels o Passwords o Encryption o Physical security			Q1a. 4 Marks Q1b. 4 Marks	Q7d(i) 3 Marks	Q5a. 2 Marks (Physical) Q5b. 6 Marks		✓
1.5 – Systems software							
1.5.1 Operating systems							
The purpose and functionality of operating systems: o User interface o Memory management and multitasking o Peripheral management and drivers o User management o File management			Q5a. 8 Marks	Q2a. 6 Marks			✓
1.5.2 Utility software							
The purpose and functionality of utility software			Q5b(iii) 3 Marks	Q2b(i). 1 Mark		Q5b. 1 Mark	
Utility system software: o Encryption software o Defragmentation o Data compression			Q5b(i). 3 Marks Q5b(ii). 2 Marks	Q2b(ii). 3 Marks			✓
1.6 – Ethical, legal, cultural and environmental impacts of digital technology							
1.6.1 Ethical, legal, cultural and environmental impact							

Impacts of digital technology on wider society including: o Ethical issues o Legal issues o Cultural issues o Environmental issues o Privacy issues			Q4. 8 Marks (AI Medicine)	Q3a. 2 Marks Q3b. 2 Marks Q4. 8 Marks (BYOD)	Q4. 8 Marks (AI Social Networks)	Q6. 8 Marks	
Legislation relevant to Computer Science: o The Data Protection Act 2018 o Computer Misuse Act 1990 o Copyright Designs and Patents Act 1988 o Software licences (i.e. open source and proprietary)				Q2c. 2 Marks Q8. 5 Marks	Q5c. 5 Marks	Q5d. 6 Marks