5(a)	Hardware (interrupt)
5(b)	Any **four** from: • Checks the **priority** of the **interrupt** • If priority is higher, it **halts** the current process • … stores it on a stack • … fetches the interrupt • … checks the source of the interrupt • … calls the interrupt service routine (ISR) / interrupt handler to process the interrupt • If priority is not higher, it continues with current process
5(c)(i)	• It is sent one bit at a time • It is sent down a single wire
5(c)(ii)	Any **two** from: • The mouse can be powered by the device • It is a universal connection • It is backward compatible • Less chance of skewing // Less chance of errors • Supports different data transmission speeds • Adequate transmission speeds • The cable cannot be inserted incorrectly • The device is **automatically detected** // **Driver** is **automatically installed** when device is connected
5(c)(iii)	Any **one** from: • Slower transmission than a **parallel** connection • Wire may get in the way // wire may limit movement of mouse

4(a)	Any **two** from: • It assigns a priority to an interrupt. • It uses an interrupt handler / interrupt service routine to process the interrupt. • Maintains/organises the interrupt queue
4(b)	Any **two** from: Examples: • managing files • providing an interface • managing peripherals and drivers • managing memory • managing multitasking • providing a platform for running applications • providing system security • managing user accounts
4(c)(i)	Any **one** from: Examples: • key press on a keyboard • button clicks on a mouse • printer out of ink
4(c)(ii)	Any **one** from: Examples: • division by zero • two processes trying to access the same memory location

7(a)(i)	D
7(a)(ii)	**One** mark for identifying a function. **One** mark for a matching description. For example: • Memory management • … managing what gets allocated where in memory • Managing peripherals and drivers • … managing the communication between any input and output devices that are connected to the computer • Multitasking • … managing the process of **switching** between tasks that are being carrying out • Platform for running applications • … allowing communication between the applications software and the hardware • System security • … proving features such as username and password • User accounts • … allowing multiple user accounts to be created on a computer
7(b)	Any **one** from: • Firmware • Bootloader • BIOS • Bootstrap

1(a)	**Instructions/program** that is used to operate a computer/hardware
1(b)	B
1(c)	Operating system // system software

6(a)	Any **one** from: • **Permanently** store instructions (in ROM) • Stores instructions to **boot up/start up** the computer • Provides the **operating system** with a platform to run on • Controls/manages/allows **communication** with hardware • **Store** instructions **securely** (to stop them being easily corrupted)
6(b)	Any **one** from: Example: • Bootstrap • Bootloader • BIOS • Operating system (in embedded system) • Programs (in embedded systems)
6(c)	Any **two** from: • Operating system • Utility software NOTE: Two examples of utility software can be awarded

IGCSE Computer Science: **s24 12**

4(a)	Any **one** from: • Operating system • Utility software // by example
4(b)	Any **two** from.: Example: • Word processor • Spreadsheet • Database • Web browser • Image/photo-editor • Video-editor • Email client • Game • Social media app
4(c)	Any **two** from: • System software **manages/maintains** the **hardware/software** • Applications software allows the **user** to perform tasks

IGCSE Computer Science: **s24 13**

9(a)	**One** mark for each correct term in the correct place. • printer • computer • priority level • fetch–decode–execute cycle • interrupt queue • higher • interrupt service routine (ISR)
9(b)	Example: • Memory management • Multitasking

IGCSE Computer Science: **m24 12**

3(a)	**One** mark each: **Function name** / **Description** managing memory: Examples: • allocates memory to processes • prevents two processes accessing the same memory platform for running applications: allows application software to run on the computer managing peripherals: Examples: • allocates data to buffers • transmits data to hardware • receives data from hardware
3(b)(i)	To indicate that something requires the attention of the **processor/OS/CPU**
3(b)(ii)	**One** mark for input device **and** matching interrupt: e.g. • Keyboard Key pressed • Mouse Mouse moved//button clicked

IGCSE Computer Science: **m24 12**

3(b)(iii)	Any **five** from: • Interrupt is given priority • …and placed in interrupt queue • Processor finishes current **FE cycle** for program • Processor checks interrupt priority queue // processor checks for higher priority interrupt than program/process • If lower priority processor runs next FDE cycle for program/process // if lower priority processor continues with program/process • (if higher priority) processor **stores** current process/registers on stack • Checks source of interrupt • … and calls the appropriate ISR • ISR handles/resolves interrupt • If there is another higher priority interrupt (than process) then repeat • … (otherwise) processor retrieves content of stack/registers/previous process (to continue with process from program)

IGCSE Computer Science: **w23 11**

9(a)	Any **one** from: – Operating system // Interrupt handler
9(b)	Any **five** from: e.g. – Key press generates the interrupt – Interrupt given a priority – Interrupt is sent to CPU – Interrupt is placed in a queue – CPU stops current task to check the queue/service the interrupt … – … using an interrupt service routine – If key press is highest priority the interrupt is processed
9(c)(i)	Any **two** suitable hardware example e.g.: – Moving the mouse – Clicking a mouse button – Plugging in a device – Paper jam in printer – Printer out of paper
9(c)(ii)	Any **two** suitable software examples e.g.: – Division by zero – Two processes accessing the same memory location – Null value

IGCSE Computer Science: **s23 11**

4	**One** mark for each correct term in the correct place: • System • Application • Operating • Hardware