

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

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

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

3(a)	One mark each: <table border="1"> <thead> <tr> <th>Function name</th><th>Description</th></tr> </thead> <tbody> <tr> <td>managing memory</td><td> Examples: - allocates memory to processes - prevents two processes accessing the same memory </td></tr> <tr> <td>platform for running applications</td><td>allows application software to run on the computer</td></tr> <tr> <td>managing peripherals</td><td> Examples: - allocates data to buffers - transmits data to hardware - receives data from hardware </td></tr> </tbody> </table>	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
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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								

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)
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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

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