

6(a)	One mark for each correct term in the correct place. The program counter stores the address of the next instruction to be processed. This address is then sent to the memory address register. This address is the location in RAM where the instruction can be found. The instruction is retrieved from RAM and immediately stored in the memory data register. The instruction is then sent to the current instruction register where it is decoded by the control unit. The instruction is decoded using an instruction set.
6(b)(i)	Hardware (interrupt)
6(b)(ii)	Interrupt handler // Interrupt service routine
6(b)(iii)	Any one from: - 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

9(a)	Any three from: Examples: - To make sure memory is used efficiently - Allocates/deallocates memory to processes - Checks that the processes being actioned have enough memory available - Moves data to and from memory/between memory and storage - Makes sure that two processes do not try and access the same memory location - Creates a memory partition - Creates virtual memory - Transmits pages between RAM and VM
9(b)(i)	Any two from: - Try to find out/guess a password ... by repeatedly entering different combinations/passwords - Could use software to do it automatically
9(b)(ii)	Any three from: Strong passwords // passwords that are long and have a combination of letters, numbers and symbols - Two-step verification // two-factor authentication - Biometric password - Limiting the number of login attempts
9(c)(i)	A currency that only exists electronically/virtually
9(c)(ii)	Blockchain

10(a)	Two from: - System software provides services that the computer requires ... whereas application software provides services that the user requires One from (system software): - Utility software // by example e.g. defragmentation software, antivirus, firewall - Operating system One from (application software): - Any suitable example of an application e.g. word processor, web browser, video-editing software
10(b)	Secondary storage // HDD // SSD

2(a)	No mark for choice. Any four from matching choice. High-level - Easier for programmer to read/write/understand/edit ... therefore, the programmer is less likely to make mistakes // can write in shorter timeframe - Easier to debug // Easier to find/correct errors ...so, the programmer can find and correct errors in less time - Game will be machine independent // Game will be portable (between hardware) ...the game can be used on any computer without a need for understanding of the hardware / compilation for that hardware - Programmer can focus on the problem instead of the manipulation of memory/hardware Low-level - More memory/RAM efficient ... 3D graphics will have high memory consumption anyway - Allows direct manipulation of memory ... allows for more efficient control/response time - Allows for use of specialised hardware
2(b)	Two from for each compiler and interpreter. Compiler - Checks all code before executing any code - Produces error report with all errors found for the whole code (before translating/running any of the code) - Produces executable file Interpreter - Checks/translate one line of code and then executes it before moving on to the next line - Stops when an error is found ... when corrected the program can be run from the same position // allows error correction in real time