01		**4 marks for AO1 (understanding)** 1 mark for each correct point that explains how a Hard Disk Drive operates, up to a maximum of 4 marks. **Examples Include**: • A HDD can contain multiple platters (disks); • A disk/disks that move/spin • Each platter is divided into sectors; • The disks are spun at a very high speed (approximately 7,200 rpm to 10,000 + rpm); • Read\write heads (move across the disk to) read and write data; • There is one read\write head for each side of a platter ie two heads per platter; • Data is written to\read from the disk by magnetising\polarising\sensing microscopic regions on the disk; • Data is organised in concentric rings called tracks; • There is a small circuit board on the drive that controls the reading and writing of data; • Data is transferred from and to the disk via a cable/electrical current being passed; • The intersection of sectors and tracks are called blocks; • Data is read 1 block at a time; **NE** Storing binary, or 1s and 0s without reference to magnetising	4

02	3	**2 marks for AO1 (understanding)** AO1 understanding – **1 mark** for each identified error **maximum of 2** marks. Hardware is a physical device or component // (and therefore) it cannot be downloaded or installed from a disk; Software are programs (that get installed onto a computer); **A.** the student has said “the student has explained software and hardware back to front\the wrong way around” – **max 1 mark** if this is the only response.	2

03

4 marks for AO1 (understanding) 8 marks for AO2 (apply)

12

Level	Description	Mark range
4	Evidence of a **clear understanding** is shown through **discussion** of the devices' properties. Comparisons are well supported by valid technical explanations for the advantages **and** disadvantages. Explanations are clear and accurate, using correct and detailed technical language **throughout**.	10–12
3	Evidence of a **more developed understanding** is shown through **comparisons** of the devices' properties. Comparisons are supported by explanations that give valid technical reasons for the advantages **and/or** disadvantages. Technical language is used accurately in **most** cases.	7–9
2	Evidence of **some understanding** is shown by making **brief comparisons** of the devices' properties. Comparisons are supported by simple descriptions of the advantages **and/or** disadvantages. There is **some** use of technical language although its use is sometimes inaccurate.	4–6
1	Evidence is shown of **limited understanding** through a **simple identification** of which device's properties are better or worse than the other. **Limited** supporting statements are provided. There is **no** use of technical language, or if there is it is used inaccurately.	1–3
No creditworthy material		0

Guidance:

There are 5 different properties that can be compared between the devices: cores; clock speed; cache; RAM; HDD/SSD.

Possible comparisons	Device A	Device B
Core	Quad (4) core • More cores than B. • Can process more commands in same time than dual core.	Dual (2) core • Less cores than A. • Can process fewer commands in same time than quad core.
Clock Speed	1.6 GHz CPU • Lower clock speed than B. • Would process fewer instructions per second than B **if it had the same number of cores.** • Combined with the quad core processor this equates to raw power of 6.4 billion instruction per sec – theoretically worse than B. • Slower processor so more energy efficient.	3.9 GHz CPU • Higher clock speed than A. • Would process more instructions per second than A **if it had the same number of cores.** • Combined with the dual core processor this equates to raw power of 7.8 billion instructions per sec – so theoretically better than A. • Faster speed means more power consumption/less efficient. • So may run hotter.
Cache	8 MB cache • More cache than B. • Theoretically CPU A will have to wait less time to get instructions. • Despite less raw speed this may mean A is overall faster than B.	2 MB cache • Less cache than A. • Because it has less cache than A there might be bottlenecks. This might negate B's overall better raw speed than A.
RAM	16 GB RAM • More RAM than B. • Potential boost to A as more programs and data will be held in memory, reducing time to read from secondary storage.	4 GB RAM • Less RAM than A. • More likely to require use of virtual memory. • Increased access of secondary storage may be balanced by use of faster SSD.
Secondary Storage	2 TB Hard Disk Drive (HDD) • More storage than B. • Slower access than SSD. • Less resilient, as mechanical. • May be more suitable for large media files.	250 GB Solid State Drive (SSD) • Much less storage than A. • SSDs more resilient. • SSDs faster. • because uses flash memory. • Less useful for storing large files, eg media. • More energy efficient as no motor.
Overall comparison	Overall, not much difference in processing speeds but A more suitable for non-mobile device processing lots of media and B fairly powerful mobile computer but with limited storage space.	

Qu	Part	Marking guidance	Total marks
04	1	**2 marks for AO1 (understanding)** Maximum of **two** marks from: • enables user to access their data from more places/devices; • enables user to more easily share data with others (can make parts of their cloud storage publicly available) // To allow sharing of files; • increases the amount of potential storage available; • reduced cost of computing devices for users as no need for as much built-in secondary storage // Can potentially purchase a cheaper (lower spec) computer; • to allow concurrent access/collaboration; • cloud storage is automatically backed up by the host; **R.** Relative cost, unless statement is qualified.	2

Qu	Part	Marking guidance	Total marks
04	2	**2 marks for AO2 (apply)** Maximum of **two marks** from: SSDs are (relatively) expensive // have higher cost per (giga)byte; SSDs (typically) have lower capacity (than magnetic hard drives); **2 marks** if a valid point is made along with a suitable valid expansion **A.** magnetic hard drives (usually) have higher write/erase cycles (which can make them more suitable for hard disk recording, eg music, video) **A.** SSDs have limited write/erase cycles // SSDs degrade over time	2

Qu	Part	Marking guidance	Total marks
05	1	**Mark is for AO1 (recall)** Physical / electrical / electronic Component(s) / part(s) / element (of a computer system);	1

Qu	Part	Marking guidance	Total marks
06	1	**Mark is for AO1 (recall)** program / code / instructions (executed by / controls the operation of the hardware);	1