MODULE B MEMORY AND STORAGE · B2

Virtual memory: mark scheme

Mark scheme · ~25 minutes · 20 marks · Cambridge 0478 syllabus 3.3.4

How to use. Mark positively. "Any N from" means award one mark per point up to N. **//** separates alternative answers for the same mark. Words in (brackets) are not needed for the mark. Credit any other valid answer that shows the same understanding.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) 0478 3.3.4	Any **two** from: (Part of) secondary storage // HDD // SSD used as (if it were) (extra) RAM used when RAM is full (to) temporarily hold pages / data moved from RAM	**2**	max 2. Do not credit "extra RAM chips" or "part of the CPU".
1(b) 0478 3.3.4	Any **two** from: The operating system creates it by allocating / partitioning / setting aside an area of secondary storage // HDD // SSD when RAM is (nearly) full	**2**	max 2.
2 0478 3.3.4	full secondary storage pages needed RAM	**5**	1 mark per correct term, in order.
3 0478 3.3.4	Any **three** from: RAM has a limited size // 16 GiB may not be enough (several large) programs / data / films may fill RAM virtual memory gives extra space when RAM is full so more programs / data can be open at once // a new program can still be loaded prevents the computer crashing / failing to load a program when RAM is full	**3**	max 3. Do not credit "to store files" / "for backups".
4 0478 3.3.4	Created on a ROM chip: False CPU can only process data once it is in RAM: True Store files permanently: False Pages transferred from RAM to virtual memory: True	**4**	1 mark per correct row. Two ticks in a row: no mark for that row.

QUESTION	ANSWER	MARKS	GUIDANCE
5(a) 0478 3.3.4	Any **two** from: Secondary storage is slower to access than RAM Pages must be transferred back into RAM before the CPU can use them Many pages are transferred back and forth // disk thrashing, which takes time	**2**	max 2. "Virtual memory is slower" alone is not enough.
5(b) 0478 3.3.4	Install / add more RAM so more programs / data fit in RAM // RAM is full less often // fewer pages need to be transferred	**2**	1 mark for the action, 1 for a reason that follows it. Also credit: close programs / films not in use, so less RAM is used.

Total: 20 marks