MODULE D DATA TRANSMISSION · D3

The USB interface: mark scheme

20 marks · Cambridge 0478 syllabus 2.1.3

How to use. One mark per creditworthy point up to the maximum shown. **/** separates alternative words; **//** separates alternative answers. Words in (brackets) are not needed for the mark. Benefit and drawback lists follow the points Cambridge credited in its 0478 Oct/Nov 2025 mark scheme; they are not exhaustive. Credit any other valid benefit or drawback. "Fast" or "faster" on its own is not enough; "fast transmission" // "adequate transmission speed" is credited. "Can be used over long distances" is not credited.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) 0478 2.1.3	Universal serial bus	**1**	All three words needed. Ignore capitals.
1(b) 0478 2.1.3	Serial	**1**	Both boxes ticked = 0.
2(a) 0478 2.1.3	Any two from: Data is sent one bit at a time // bit by bit Data is sent down a single wire / channel / line	**2**	"Serial" alone is not a mark; it must be explained. Do not accept "down a cable" alone (too vague). Do not credit "several bits at once" (that is parallel).
2(b) 0478 2.1.3	Any two from: The tablet is (automatically) detected (by the computer) The (device) driver is automatically downloaded / installed The tablet is ready to use without the user setting it up // plug and play	**2**	"Plug and play" alone = 1. Do not accept "the user installs the driver".
3(a) 0478 2.1.3	Any two from: The keyboard is (automatically) detected // driver automatically installed // plug and play The keyboard can be powered by the computer (through the connection) It is a universal connection / standard It is backward compatible The cable cannot be inserted incorrectly // cannot be plugged in the wrong way round Supports different data transmission speeds High / adequate transmission speed Less chance of errors / skewing // unlikely to have interference / crosstalk	**2**	"Fast" / "faster" alone = NE. Do not accept "can be used over long distances". Do not accept "it is cheap" or "it is wireless".
3(b) 0478 2.1.3	Any one from: The wire may get in the way // the wire may limit where the keyboard can be moved Slower transmission than a parallel connection Limited (maximum) cable length // cannot be used over long distances (without a repeater)	**1**	"Slow" / "slower" alone = NE; it must be compared with parallel. Credit any other valid drawback of USB.

QUESTION	ANSWER	MARKS	GUIDANCE
4(a) 0478 2.1.3	Several bits at the same time down several wires: False Can be powered through its USB connection: True Driver must always be installed by hand: False Backward compatible: True	**4**	1 mark per correct row. More than one tick in a row = 0 for that row. Row 1 describes parallel transmission; USB is serial. Row 3: the driver is installed automatically (plug and play).
5(a) 0478 2.1.3	Any two from: USB uses serial transmission // sends data one bit at a time (down a single wire) Parallel sends several bits at the same time (down several wires) So (over a short distance) USB is slower than a parallel connection	**2**	The answer must show the technician is wrong. Do not credit "USB is faster".
6(a) 0478 2.1.3	Any five from, max 4 from benefits and max 2 from drawbacks: **How it sends data** Data is sent one bit at a time down a single wire (serial) **Benefits** Each device is automatically detected // drivers installed automatically // plug and play, so staff can set up desks without installing software The mouse / webcam can be powered by the computer through the connection It is a universal connection, so the mouse, webcam and drive can all use the same type of port It is backward compatible (with older ports / devices) It cannot be plugged in the wrong way round Supports different data transmission speeds // adequate transmission speed for the devices Less chance of errors / skewing // interference **Drawbacks** Slower transmission than a parallel connection (e.g. when copying large files to the storage drive) The wires may get in the way // may limit movement of the mouse Limited (maximum) cable length // cannot be used over long distances (without a repeater) Credit any other valid drawback of USB	**5**	No drawback given: max 4. A bare list of one-word benefits ("universal, power, plug and play") = max 2. "Fast" alone = NE. Do not accept "can be used over long distances", "wireless" or "more secure" as benefits.

Total: 20 marks