MODULE H SOFTWARE · H2

What an operating system does: mark scheme

20 marks · Cambridge 0478 syllabus 4.1.2 (describe the role and basic functions of an operating system: managing files, handling interrupts, providing an interface, managing peripherals and drivers, managing memory, managing multitasking, providing a platform for running applications, providing system security, managing user accounts)

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. Credit any other valid answer that shows the same understanding. No marks for brand names of software.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) 0478 4.1.1, 4.1.2	Any two from: It is system software // provides the services that the computer requires Manages / controls the computer's hardware // resources Manages the software / applications that are running Provides an interface between the user and the computer / hardware Provides a platform for (running) applications Carries out basic functions, e.g. managing files / memory / peripherals / user accounts	**2**	max 2. A list of functions alone scores max 1 (last bullet). Do not accept "lets the user carry out tasks such as bookings" (that is application software).
2(a) 0478 4.1.2	Any two from: A driver is software that lets the operating system communicate with / control the printer It translates data / instructions from the computer into a form the printer understands Different printers / models work differently // need different instructions, so each needs its own driver Without the driver the printer would not work // would not print correctly	**2**	max 2. Do not accept "a driver is hardware / a cable". Do not accept "to connect the printer" alone.
2(b) 0478 4.1.2	Any one from: Sends data to the printer // controls the transfer of data to the printer Manages a queue of print jobs // prints jobs in order Holds data until the printer is ready // spooling // buffering Deals with signals / interrupts from the printer, e.g. out of paper, paper jam Detects when the printer is connected / disconnected Updates the printer's driver Shows the printer's status / error messages to the user	**1**	Mark the first answer only. Do not accept "installs the driver" (not another task). Credit any other valid peripheral-management task.

QUESTION	ANSWER	MARKS	GUIDANCE
3(a) 0478 4.1.2	One mark for each correct row: New / removed staff accounts: managing user accounts Barcode scanner software installed: managing peripherals and drivers RAM freed when an application closes: managing memory Folder renamed and moved: managing files Key press signal, task paused: handling interrupts Processor time shared between applications: managing multitasking	**6**	One function per row; if two functions are written in a row, 0 for that row. Accept clear equivalents (e.g. "user account management", "file management", "memory management").
4(a) 0478 4.1.2	Any three from: Each member of staff has their own user account Staff must log on with a username and password // biometric // the OS checks who is using the computer Access rights / permissions are set for the file // for its folder Only the managers' accounts are given access to open the file Other staff accounts are given no access // the file is hidden from them // the OS refuses to open it for them The OS checks the account's access rights before it opens the file	**3**	max 3. Accept answers using a "managers" group of accounts. Do not accept "put a password on the computer" alone for more than one mark. Do not accept "delete the file".
4(b) 0478 4.1.2	Any one from: Firewall (Automatically) installs security updates // patches Anti-malware // anti-virus scanning (built into the OS) Encrypts files / data stored on the computer Access rights // permissions on files / folders Locks the screen / logs the user off after a period of no use Locks the account after several failed log-on attempts	**1**	Mark the first answer only. Do not accept user accounts / passwords (excluded by the question). Credit any other valid security feature an OS provides.

QUESTION	ANSWER	MARKS	GUIDANCE
5(a) 0478 4.1.2	Any five from: **Managing memory** Loads each application (from secondary storage) into RAM when it is opened Allocates each application its own area / space in memory Makes sure applications do not use / overwrite each other's memory Keeps track of which memory is in use and which is free Frees an application's memory when it is closed Uses virtual memory // moves pages of data to secondary storage if RAM is full **Managing multitasking** Shares the processor's time between the applications // allocates processor time to each in turn Switches between the applications very quickly ... ... so they appear to run at the same time Decides which application / task uses the processor next // gives tasks priorities Makes sure each application gets the resources (e.g. memory, processor time) it needs	**5**	max 5. Max 3 if only memory or only multitasking is described. Do not accept "stores the applications in ROM".

Total: 20 marks