MODULE A SYSTEMS ARCHITECTURE · A6

Embedded systems: mark scheme

20 marks · Cambridge 0478 syllabus 3.1.5

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.

QUESTION	ANSWER	MARKS	GUIDANCE
1(a) 0478 3.1.5	Any two from: To perform a dedicated function // one specific task It is (built) within a larger device / system To control / monitor the device it is part of It is a computer system / has a microprocessor / CPU	**2**	max 2.
2(a) 0478 3.1.5	electric oven street-lighting controller train-ticket machine	**3**	One mark for each correct circle. If more than three are circled, deduct one mark for each extra (minimum 0).
3(a) 0478 3.1.5	Any one from: To open and close the (roof) vents // to control the temperature in the greenhouse // to stop the greenhouse getting too warm	**1**	Must be in context.
3(b) 0478 3.1.5	Any two from: It is a computer system / has a microprocessor It is part of a larger device // built into the vent motor It performs one dedicated function // only opens/closes the vents It cannot be used for other tasks // user cannot install other programs	**2**	max 2.
3(c) 0478 3.1.5	Any two from: Performs a dedicated function / single task Part of a larger device Small (in size) Low power (consumption) Low cost Simple / limited / no user interface Program stored in ROM // firmware // not usually changed by the user Reliable // works in real time	**2**	max 2. Do not award the same idea twice (e.g. "dedicated function" and "single task").

QUESTION	ANSWER	MARKS	GUIDANCE
4(a) 0478 3.1.5	One dedicated function: embedded system Install many applications: general purpose computer Contains a processor: both Built into a larger device: embedded system	**4**	One mark per correct row. More than one tick in a row: 0 for that row.
5(a) 0478 3.1.5	Any four from: The security system's control unit is an embedded system It performs a dedicated function // only monitors the sensors / keypad and sounds the alarm It is part of a larger system // built into the security system Its program is not usually changed by the user // stored in ROM / firmware The PC is a general purpose computer The PC performs many different functions // e.g. drawing plans, email, web browsing The user can install / run different software on the PC	**4**	max 4. max 3 if only the control unit or only the PC is described.
6(a) 0478 3.1.5	Any two from: Engine management // engine control Anti-lock braking (ABS) Airbag control Satnav / GPS Climate control / air conditioning Central locking // alarm // immobiliser Parking sensors Entertainment system / radio // dashboard display	**2**	max 2. Accept any other valid control system in a car. Do not accept a passenger's phone or laptop.

Total: 20 marks