MODULE A SYSTEMS ARCHITECTURE · A6

Embedded systems: mark scheme

20 marks · OCR J277 spec 1.1.3

How to use. 1 mark per bullet up to the maximum shown. **/** 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) J277 1.1.3	A computer system (built) inside a larger device / system ... with a dedicated function / that performs one specific task	**1**	Both ideas needed for the mark. Accept "single purpose" for dedicated function. Do not accept "a small computer" alone.
2(a) J277 1.1.3	Thermostat: embedded Laptop: not embedded Lift controller: embedded Desktop PC: not embedded	**4**	1 mark per correct row. A row with both boxes ticked scores 0.
3(a) J277 1.1.3	To water the plants / to switch the pump on and off depending on how dry the soil is / to keep the soil moist	**1**	Must be in context. Do not accept "to control the greenhouse" alone (too vague).
3(b) J277 1.1.3	It is a computer system / has a processor / runs a program ... ... that is built into a larger device / is part of the pump / watering system It has (only) one dedicated function / only waters the plants It cannot be used for other tasks / the user cannot install other programs on it Its program is fixed / stored in ROM / firmware / hard to change	**3**	1 mark per bullet, max 3. Answers that are generic and not linked to the controller: max 2.

QUESTION	ANSWER	MARKS	GUIDANCE
3(c) J277 1.1.3	Dedicated function (1) ... it only switches the pump on and off to water the plants (1) Part of a larger device (1) ... it is built into the pump (1) Small / compact (1) ... fits on a circuit board inside the pump (1) Low power (1) ... can run all the time / for long periods without using much electricity (1) Low cost (1) ... cheap enough to fit in every pump / many greenhouses (1) Simple / limited user interface (1) ... it only has a power light / no screen (1) Program stored in ROM / firmware / not changed by user (1) ... staff cannot reprogram the controller / it always runs the watering program (1) Reliable / responds in real time (1) ... must switch the pump off when soil is wet, or plants are overwatered / it runs without being looked after (1)	**4**	Two characteristics x 2 marks: 1 for the characteristic, 1 for the link to the controller. The link mark requires the matching characteristic. Do not award the same characteristic twice. Dedicated function credited here even if given in (b).
4(a) J277 1.1.3	(Electronic key-card) door lock Air-conditioning unit Coffee machine	**3**	1 mark each. Do not accept wardrobe, guidebook or laptop. If more than three items are listed, mark the first three.
4(b) J277 1.1.3	It is a general-purpose computer / performs many different functions e.g. the guest can use it for email, games, browsing, documents The user can install / run (any) new software / apps It is not part of a larger device / it is a standalone device	**2**	1 mark per bullet, max 2. Do not accept "it is too big" / "it is too expensive" alone.
5(a) J277 1.1.3	Engine management / engine control system Anti-lock braking (ABS) Satnav / GPS tracking unit Airbag control system Climate control / air conditioning Central locking / alarm / immobiliser Parking sensors / reversing camera system Entertainment / radio system / dashboard display	**2**	1 mark each, max 2. Accept any other valid control system in a vehicle. Do not accept a driver's phone or laptop. Do not accept "the van" / "the engine" alone.

Total: 20 marks