

6. Automated and emerging technologies

6.1 Automated systems

[Marking scheme](#)

Q1)

Question	Answer	Marks
5(a)	Any one from: <ul style="list-style-type: none"> • Level • Pressure • Moisture 	1
5(b)	Any Six from: <ul style="list-style-type: none"> • Sensor continually sends digitised data to microprocessor • Microprocessor compares data to stored value(s) • If value is outside range / matches microprocessor sends signal to release water to refill water bowl • ... bowl filled by set amount // bowl filled for certain time • Actuator used to release water • Whole process repeats until turned off/stopped 	6

Q2)

Question	Answer	Marks
11(a)	– Amount of liquid/gas/steam flowing/moving through an environment	1
11(b)	Two from (for benefit and matching description) e.g.: <ul style="list-style-type: none"> – Increases safety – ...meaning that workers do not need to go into dangerous areas to collect data/make checks/do dangerous tasks – Can increase jobs/skills – ...as employees are needed to learn/maintain the equipment – No need to do repetitive tasks – ... so, they can use their time on other/more skilled tasks 	2
11(c)	Two from (for drawback and matching description) e.g.: <ul style="list-style-type: none"> – High set-up/installation costs – ... it would mean the company need to find a lot of money up front to pay for the equipment // employees will need training – Utility/maintenance/repair costs – ... increase in bills such as electricity // skilled employees will be required to maintain the system // equipment will break/need updating – Deskilling of the workforce – ... may mean that workers will no longer have the skills for some of the manufacturing jobs, should the equipment break 	2

Q3)

8(c)	<p>Any six from:</p> <ul style="list-style-type: none"> • A proximity sensor is used • The sensor continuously sends digitised data to the microprocessor • The microprocessor compares the data to a stored value/range of values • If the value is within the range/matches the robot continues planting • If the value is above/below/outside the range a signal is sent by the microprocessor to turn/stop the robot • ... using an actuator to turn/stop the robot • This process repeats until the robot is turned off 	6
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Q4)

A robot vacuum cleaner uses sensors to navigate around obstacles in a room.

(a) Tick (✓) **one** box to show which sensor would be the most suitable for this purpose.

- A** proximity ☒
- B** flow ☐
- C** pressure ☐
- D** level ☐

[1]

Q5)

Question	Answer	Marks
5(a)	(A system) that can perform actions without human intervention	1
5(b)	<ul style="list-style-type: none"> • It receives data from the sensor • It analyses the data // It checks if the data is within/out of a range // • It sends signals to trigger actions based on the data 	3
5(c)	<p>Any two from:</p> <p>For example:</p> <ul style="list-style-type: none"> • It stops the farmer having to handle heavy equipment • It frees the farmer up to do other jobs • It doesn't need to take breaks // Can work 24/7 • It can perform boring repetitive tasks • Can save money on labour costs • May be more accurate at ploughing/planting • May be more efficient than the farmer at ploughing 	2

