Commentary on candidate 1 evidence

This candidate has achieved the following marks for each task in the assignment.

Task 1

1(a) The candidate was awarded the full **5 marks**. All components, wiring, flowchart symbols and pin numbers are correct for the circuit and the flowchart given in the task.

1(b) The candidate was awarded **4 marks**. They were not awarded a mark for the initial test result for test 3 because they did not describe the motor turning on.

1(c) The candidate was awarded **1 mark**. They correctly amended the circuit by adding a 6V power supply but the amendment to the flowchart would not meet the requirements of the specification.

1(d) The candidate was awarded the full **1 mark** because the microcontroller code matches the candidate's flowchart in 1(c).

1(e) The candidate was awarded **3 marks**. Their description for specification point i does not mention the master switch.

Task 2

2(a) The candidate was awarded the full **2 marks**. The velocity ratio is correct (49 – 'at least a factor of 40') and they labelled 'gear 1' which implies that it is in the input gear.

2(b) The candidate was awarded the full **2 marks**. The simulated gear train and gear sizes match their design in 2(a).

2(c) The candidate was awarded the full **2 marks**. The output speed and velocity ratio are correct from their simulation in 2(b).

2(d) The candidate was awarded **0 marks**. Their description for specification point i does not describe a comparison between the achieved velocity ratio and the required velocity ratio. The description for specification point ii does not refer to the number of gears, their size or arrangement.

Task 3

3(a) The candidate was awarded the full **4 marks** as all descriptions of planned tests and expected results are correct.

3(b) The candidate was awarded **1 mark** because using AND control would be a suitable safety improvement. They did not give a justification in terms of the concert or stage context and the list of components is not specific to the given improvement therefore no other marks were awarded.

3(c) The candidate was awarded the full **3 marks** because all components and piping are correct.

Task 4

The candidate was awarded the full **4 marks** because the circuit design is correct.

Task 5

5(a)(i) The candidate was awarded **0 marks**. They stated the names of devices rather than the external input and outputs.

5(a)(ii) The candidate was awarded **3 marks**. The system boundary mark was not awarded because the box is missing around the master switch. The drivers are missing so no mark was awarded for this either.

5(b) The candidate was awarded **3 marks**. The ‘repeat 10 times’ has been placed incorrectly before the input 0 decision rather than after the decision.

Commentary on candidate 2 evidence

This candidate has achieved the following marks for each task in the assignment.

Task 1

1(a) The candidate was awarded **4 marks** because a 6 V battery has been incorporated into this circuit. As a result, the circuit does not fully match the one given in the task therefore the mark for the selection of the correct components could not be awarded.

1(b) The candidate was awarded **3 marks**. Test 1 initial and amended test results are correct if a follow through error from the evidence the candidate has provided for 1(a) is taken into account. Test 2 amended test result is correct. Test 3 amended test result is incorrect but this did not affect the marks awarded because the maximum of 2 marks for amended test results had already been awarded.

1(c) The candidate was awarded **1 mark**. They correctly amended the circuit by adding a 6 V power supply but the amendment to the flowchart would not meet the requirements of the specification.

1(d) The candidate was awarded **0 marks** because the microcontroller code does not match the flowchart pin numbers used in 1(c).

1(e) The candidate was awarded **3 marks**. The description of their suggested improvement does not specifically relate it to the context of a real concert venue.

Task 2

2(a) The candidate was awarded the full **2 marks** because the gear train design, labelling and velocity ratio are all correct.

2(b) The candidate was awarded the full **2 marks** because the gear train and gear sizes match their design in 2(a).

2(c) The candidate was awarded **1 mark**. The velocity ratio is correct for the design and simulation provided in 2(a) and 2(b). However, they incorrectly gave teeth numbers rather than input and output speeds.

2(d) The candidate was awarded the full **2 marks** because both descriptions are correct.

Task 3

3(a) The candidate was awarded **3 marks**. The expected result for specification point i is incorrect.

3(b) The candidate was awarded **2 marks**. Their suggested improvement and required components are correct. No mark was awarded for the justification. Although the response describes the prevention of accidentally pressing the down button, it does not describe why this would make it safer, for example, by preventing injury.

3(c) The candidate was awarded the full **3 marks** because the constructed circuit is fully correct.

Task 4

The candidate was awarded the full **4 marks** because the circuit design is fully correct.

Task 5

5(a)(i) The candidate was awarded **1 mark**. The external outputs are correct but the input (device rather than action) is incorrect.

5(a)(ii) The candidate was awarded **1 mark**. The master switch sub-system is correct. ‘Siren on/off’ is an action, not a sub-system, so a mark cannot be awarded here. The master switch is not within the system boundary so the system boundary mark cannot be awarded.

5(b) The candidate was awarded **2 marks**. The master switch and x10 decisions are correct. The pin 6 mark cannot be awarded as there is an infinite loop rather than an end. The pin 7 mark cannot be awarded as one of the time delays is incorrect.

Commentary on candidate 3 evidence

This candidate has achieved the following marks for each task in the assignment.

Task 1

1(a) The candidate was awarded **4 marks** because a 5V battery has been incorporated into this circuit. The circuit therefore does not fully match the one given in the task and a mark could not be awarded for the selection of correct components.

1(b) The candidate was awarded **1 mark**. The amended test result for test 2 is the only one that is correct. The rest of the descriptions do not describe all aspects of the tests. For example, test 1 initial test result describes the operation of the motor but not the relay.

1(c) The candidate was awarded **0 marks** because they made an incorrect amendment to the circuit by adding a 5 V battery instead of a 6 V battery (evidence taken from 1(a)) and made no amendment to the flowchart.

1(d) The candidate was awarded **0 marks** because the microcontroller code does not match the flowchart pin numbers used.

1(e) The candidate was awarded **0 marks**. The candidate's description for specification point i does not mention the master switch. For specification point ii, 'button' is too vague as there are two switches in the circuit. For specification point iii, the description is incorrect for the candidate's evidence in 1(a)/(c). Also, the master switch has not been mentioned.

Task 2

2(a) The candidate was awarded **1 mark** because using a compound gear train is correct but the velocity ratio is incorrect.

2(b) The candidate was awarded the full **2 marks** because the gear train and teeth numbers match their design in 2(a).

2(c) The candidate was awarded **0 marks**. The given output speed has been taken from the wrong gear. The velocity ratio is also incorrect for the values they provided.

2(d) The candidate was awarded **0 marks**. They have not referred to the velocity ratio or the context of the small space under the stage.

Task 3

3(a) The candidate was awarded **2 marks**. The planned test for specification point i has no reference to the safety guard and the expected result - also for specification point ii - is incorrect.

3(b) The candidate was awarded **1 mark** for the suggested improvement. However, the justification makes no reference to safety.

3(c) The candidate was awarded the full **3 marks** because the constructed circuit is fully correct.

Task 4

The candidate was awarded **3 marks**. The additional wiring/component (transistor) would affect the operation of the circuit, therefore 3 marks were the maximum that could be awarded.

Task 5

5(a)(i) The candidate was awarded **0 marks**. They did not provide an input action and only one of the outputs is correct.

5(a)(ii) The candidate was awarded **0 marks** because component symbols are not accepted.

5(b) The candidate was awarded **3 marks**. The pin 7 mark could not be awarded because one of the time delays is incorrect.