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 **3 marks** because they drew a NOT A and OR B for 1 mark, then an exclusive OR for 1 mark and finally an AND gate for the final mark.

1(b) The candidate was awarded **2 marks** because they simulated all the gates in correct sequence and position for 1 mark and added inputs and connections to allow for testing for the final mark.

1(c) The candidate was awarded **1 mark** because they fully completed the worksheet.

1(d) The candidate was awarded **1 mark** because they described the OR gate being wrong and that it should be replaced with an AND gate.

Task 2

2(a) The candidate was awarded **2 marks** because they simulated the input part of the circuit with correct components, power supplies and correct values for 1 mark. They then simulated the process part of the circuit with the operational amplifier and supply, voltmeters and correct values for 1 mark.

2(b) The candidate was awarded **2 marks** because they described the first actual result for 1 mark then the appropriate amendment for that result for 1 mark. They then described the second actual result incorrectly therefore no mark was given and the amendment was not correct either, even with the follow through error taken into account.

2(c) The candidate was awarded **1 mark** because they provided a clear screenshot showing the transistor and relay with correct throw position, diode and motor.

2(d) The candidate was awarded **2 marks**. They did not describe the first actual result correctly therefore no mark was awarded for that. However, the amendment, which included fixing the diode and changing the NPN transistor for a PNP, would allow the circuit to function as required therefore 1 mark was awarded. The final mark was awarded for the description of the second actual result.

2(e) The candidate was awarded **1 mark.** Their reasoning for the first and third specification change points to be successful is not correct therefore no marks

were awarded there. The fourth mark is for the inclusion of a variable resistor, which they did not mention. 1 mark was awarded for the second specification point.

Task 3

3(a) The candidate was awarded **4 marks.** They drew the connection of both 5/2 valves to each cylinder with cylinder outstroke direction shown and were awarded 1 mark. The connection of V2 to 5/2 valve to give C1+ received no mark because the symbol was not correct for a plunger valve. They should have made comment if no plunger valve was available on the software and a substitute had been used instead. Follow through error was applied for the remaining plunger valves meaning the connection of V4 to 5/2 valve to give C2+ received 1 mark. Then the connection of V3 to 5/2 valve to give C2- received 1 mark. Then the 'OR' connection of V1 and V3 with shuttle valve to give C1- for 1 mark. No mark was given for the uni-directional restrictors as these were connected to the instroke exhaust and not the outstroke exhaust.

3(b) The candidate was awarded **2 marks.** They provided a simulation which included at least a UDL, a point load and supports, and were awarded 1 mark. The simulation then had the correct reactions at A and B and another mark was awarded.

Task 4

The candidate was awarded **4 marks.** 1 mark was awarded because they drew a negative error detector correctly. They correctly included an op-amp box with system boundary for another mark and correctly drew a driver box in the correct order for a third mark. They also correctly drew a motor box in the correct order for the fourth mark. The feedback loop and temperature sensor were missing an arrow into the temperature sensor, despite being drawn in the correct place, so no mark was awarded here. The output was incorrectly labelled because this should have been actual temperature not desired temperature and this also received no mark.

Task 5

5(a) The candidate was awarded **3 marks** because they correctly simulated the inputs with correct values on the microcontroller for 1 mark. Then they added the correct outputs and values to the microcontroller for 1 mark and produced the correct flowchart for the final mark.

5(b) The candidate was awarded **5 marks** because the first actual result was correct and was awarded 1 mark. The amendment made – change the operator in the decision box from "greater than or equal to" to "less than or equal to" – received 1 mark. The second actual result – the temperature warning light switches off – was correct and awarded 1 mark. The third actual result – the harness check complete indicator doesn't flash five times – received 1 mark. The final amendment – adjusting the count loop to above "output 1 ON" – received the final mark.

5 (c) The candidate was awarded **2 marks** because they received 1 mark each for showing the two changes on the flowchart correctly.

5 (d) The candidate was awarded **1 mark.** They did not give a description of the change required despite saying that specification point 1 was met therefore a mark could not be awarded. When they evaluated specification point 3 there was also no mention of the change required, so no mark was awarded. There was no evaluative comment about the overall system, so no mark could be given. However, 1 mark was awarded for specification point 2.

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 **2 marks** because they drew a NOT A and OR B for 1 mark, then an exclusive OR for 1 mark. They drew a NAND gate instead of an AND gate therefore no mark was awarded for this.

1(b) The candidate was awarded **2 marks** because they simulated all the gates in the correct sequence and position for 1 mark, and added inputs and connections to allow for testing for the final mark.

1(c) The candidate was awarded **1 mark** because they completed the worksheet fully.

1**(**d**)** The candidate was awarded **0 marks** because although they said that there was a fault/different gate in the circuit they did not say what the fault was.

Task 2

2(a) The candidate was awarded **2 marks** because they simulated the input part of the circuit with correct components, power supplies and correct values, which received 1 mark. They then simulated the process part of the circuit with the operational amplifier and supply, voltmeters and correct values for a further mark.

2(b) The candidate was awarded **1 mark.** They described the first actual result and received 1 mark but said no amendment was needed, which was incorrect. They then described the second actual result incorrectly therefore no mark was awarded for this. The amendment described was incorrect because a change is required to make it change at 3 V and no further mark was awarded.

2(c) The candidate was awarded **1 mark** because they provided a clear screenshot showing the transistor and relay with correct throw position, diode and motor.

2(d) The candidate was awarded **3 marks** because they gained marks taking account of a follow through error from 2(b). The motor will turn in their circuit at a low light level and no amendment is required therefore 2 marks were awarded here. The third mark was given because this is what happens in their circuit.

2**(**e**)** The candidate was awarded **1 mark** because, based on their results, their evaluative comment on specification point 1 is correct. There was not enough

information given for specification point 2 and nothing else was evaluated, so no more marks were awarded.

Task 3

3(a) The candidate was awarded **1 mark** because a follow through error was applied and a mark was given for V4. No other marks were awarded.

3**(**b**)** The candidate was awarded **1 mark** because they provided the correct reactions at A and B. Despite evidence of a screenshot being taken there was no evidence of the simulation taking place so the first mark available could not be awarded.

Task 4

The candidate was awarded **3 marks.** They drew a negative error detector correctly for 1 mark. Although they included a control box there was no system boundary so no mark could be awarded for that. They drew a driver box correctly, in the correct order and received a further mark. Then they drew a motor box correctly in correct order for the third mark. The feedback device was a thermometer, which is not accepted, and there were missing arrows so no mark was awarded. Finally, the output was incorrectly labelled – this should have been actual temperature and not desired temperature – and did not receive a mark.

Task 5

5(a) The candidate was awarded **3 marks**. They correctly simulated the inputs with correct values on the microcontroller and received 1 mark. Then they added the correct outputs and values to the microcontroller for a further mark. Finally they produced the correct flowchart for the third mark.

5(b) The candidate was awarded **5 marks.** They received 1 mark for the first actual result because it was correct. The amendment made – changing the operator in the decision box from “greater than or equal to” to “less than or equal to” – also received a mark. The second actual result – the temperature warning light switches off – was correct and received a further mark. The third actual result – the harness check complete indicator doesn’t flash five times – received the fourth mark while the final amendment - adjusting the count loop to above “output 1 ON” – received the final mark.

5(c) The candidate was awarded **2 marks** because they correctly showed the two changes on the flowchart and each change received 1 mark.

5(d) The candidate was awarded **4 marks** because they described the four specification points correctly, with changes where required, but did not give an evaluative comment about the overall system.

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 **3 marks** because they drew a NOT A and OR B for 1 mark, then an exclusive OR for 1 mark and finally an AND gate for the final mark.

1(b) The candidate was awarded **2 marks** because they simulated all the gates in correct sequence and position for 1 mark and added inputs and connections to allow for testing for the final mark.

1(c) The candidate was awarded **1 mark** because they completed the worksheet fully.

1**(**d**)** The candidate was awarded **1 mark** because they described the OR gate being wrong and said that it should be replaced with an AND gate.

Task 2

2(a) The candidate was awarded **2 marks.** They simulated the input part of the circuit with correct components, power supplies and correct values to receive 1 mark. They then simulated the process part of the circuit with the operational amplifier and supply, voltmeters and correct values for the second mark.

2(b) The candidate was awarded **4 marks** because they described the first actual result to gain 1 mark then the appropriate amendment for that result for a further mark. They then described the correct second actual result for 1 mark with appropriate amendment for the final mark.

2(c) The candidate was awarded **1 mark** because they provided a clear screenshot showing the transistor and relay with correct throw position, diode and motor.

2(d) The candidate was awarded **3 marks** because they described the first actual result correctly for 1 mark followed by the correct amendment which included fixing the diode and changing the relay pole for a second mark. The final mark was given for the description of the second actual result.

2**(**e**)** The candidate was awarded **2 marks**. They gained 1 mark for using the phrase ‘like it should’ when evaluating the first specification point. They evaluated the second specification point and used the phrase ‘as its meant to’ for the second mark. They did not receive a mark for the third specification point

because they did not say if it was met or not and did not describe adding an LDR to make the circuit adjustable. Both would have been required to gain the final 2 marks.

Task 3

3(a) The candidate was awarded **5 marks.** They drew the connection of both 5/2 valves to each cylinder with cylinder outstroke direction shown to receive 1 mark. They gained a further 3 marks for drawing the connections of:

- V2 to 5/2 valve to give C1+.
- V4 to 5/2 valve to give C2+.
- V3 to 5/2 valve to give C2-.

Then they drew the 'OR' connection of V1 and V3 with shuttle valve to give C1- for the fifth mark. No mark was awarded for the uni-directional restrictors as these were connected to the instroke exhaust and not the outstroke exhaust.

3 **(**b**)** The candidate was awarded **2 marks.** They provided a simulation which included at least a UDL, a point load and supports for 1 mark. The simulation then had the correct reactions at A and B and another mark was awarded.

Task 4

The candidate was awarded **5 marks.** They were awarded 1 mark for correctly drawing a negative error detector. Despite writing 'a compactor', they did not correctly draw the system boundary and no mark was awarded here. They drew a driver box correctly in the correct order and received a second mark. They also drew a motor box correctly in the correct order for a further mark. The feedback loop and temperature sensor, from correct position and direction received the fourth mark. Both input and output with appropriate connections was added for the final mark.

Task 5

5(a) The candidate was awarded **3 marks.** They correctly simulated the inputs with correct values on the microcontroller for 1 mark. Then they added the correct outputs and values to the microcontroller for another mark, and finally produced the correct flowchart for the third mark.

5(b) The candidate was awarded **5 marks.** The first actual result was correct gaining 1 mark. The amendment made – change the operator in the decision box from "greater than or equal to" to "less than or equal to" – received 1 mark. The second actual result – the temperature warning light switches off – was correct and gained 1 mark. The third actual result – the harness check complete indicator' doesn't flash five times – received the fourth mark. The final amendment – adjusting the count loop to above "output 1 ON" – received the final mark.

5(c) The candidate was awarded **2 marks** because they correctly showed the two changes on the flowchart which received 1 mark each.

5(d) The candidate was awarded **3 marks.** No mark was awarded for saying that specification point 1 was met because a description of the change required was not given. When they evaluated specification point 3 there was also no mention of the change required and no mark could be awarded. Marks were awarded for specification points 2 and 4 along with the evaluative comment on the overall system.