## Section 1 (20 marks)

| Question | Definitive Mark | Comment |
|---|---|---|
| 1.   (a) | 1/1 | Correct statement provided. |
| (b) | 2/2 | Correct answers. |
| 2 (a) | 1/2 | 1 mark awarded for use of gears but no explanation why. |
| (b) | 0/2 | This is not an acceptable explanation. |
| 3.  (a) | 0/3 | No understanding of function shown throughout the detailed answer. A basic understanding of function is required in order to allow analysis and calculation of a switch in an application, and an explanation of suitability for an application. |
| 4. | 2/3 | Reasonable skills given but uploading a programme and testing it considered too similar for 3 marks. |
| 5. | 4/4 | Two reasonable role statements for engineer 1 given, one clear and the other (calculation of suitability for given loads) implied. Engineer 2 also had two acceptable role statements given.<br><br>NB: Engineering branches and sub-branches are ever evolving and so cannot be definitive in an answer. |
| 6. | 2/3 | 5% subtracted rather than added. |

## Section 2 (70 marks)

| Question | Definitive Mark | Comment |
|---|---|---|
| 7. (a) (i) | 3/3 | Correct expression provided. |
| (a) (ii) | 4/4 | Correct conversion and simplification. |
| (b)(i) | 1/2 | Difference correct. |
| (b)(ii) | 1/4 | 1 mark awarded for difference. |
| (c) | 2/2 | Clear explanation of Mark/Space given. |
| 8. (a) | 3/4 | Full marks could not be awarded as the total load was not divided by three to give load per metre. |
| (b) (i) | 3/3 | Correct working and answer to this focussed task. |
| (b)(ii) | 1/3 | Both areas required. 1 mark given for answer as a follow through. Error with scaling considered to have occurred earlier in calculation. |
| (c) | 5/5 | Correct answer and unit. |
| 9. (a) | 3/3 | Three acceptable benefit points given. |
| (b)(i) | 2/2 | Correct steps and answer. |
| (b)(ii) | 2/2 | Correct steps and answer. |
| 9.(c) | 4/4 | Correct steps and answer. |
| (d) | 4/4 | Very good response gaining all 4 marks. This candidate has correctly interpreted what the question is asking them to do with their op-amp knowledge. |
| (e) | 4/5 | Error in FOS rest of marks follow through. |
| 10. (a) | 1/2 | Some understanding shown but the response is vague. |
| (b) | 6/7 | Good explanation of circuit function. |
| (c) | 0/3 | Wrong restrictor position and the explanation is incorrect. |
| (d) | 8/8 | Good answer showing the whole function. |
| **Total marks** | **69/90** | |