

Commentary on candidate evidence

The candidate evidence has achieved the following marks for each section of the project.

Please note: this commentary contains the equivalent of a full project response; however, this is not a complete project submitted by one candidate. We have taken the work of different candidates and pieced it together, to better exemplify a range of responses across the different sections of the project. As such, there is no exemplification of the last section, 'presentation'. Please refer to the marking instructions for information on this section.

Candidate 1

Outline (5 marks awarded)

Aims, objectives and methodology: Although the project aim reference is not in the bibliography, it is presented using a formal system with some good analysis in terms of sub-systems. Methodology is implicit in the initial timescale planning and the analysis, and a visit is undertaken. **(3 marks)**

Outline specification and resources requirements: Resources are detailed and there is an outline specification and an outline timescale for project work. **(2 marks)**

Research, analysis and specification (11 marks awarded)

Analysis of the problem or issue and identifying suitable factors to research: Initial sub-system analysis is in the outline, but full sub-systems analysis is not explicit. The candidate integrated a lot of the problem analysis with their research notes, which are extensive but cover many sub-systems and inform the numerical analysis that will be required in the project. **(4 marks)**

Research: Sources are referenced formally (bibliography) in the research. The candidate has provided a detailed research strategy, and a clear outline of the information required and where it might be found. **(5 marks)**

Specification: Although the candidate has specified a number of relevant sub-systems and the individual specification points are numbered for easy future reference, numerical values are required in more detail to award 3 or more marks. **(2 marks)**

Production and maintenance of a project plan (9 marks awarded)

Project plan: The candidate has provided a detailed project plan, including a Gantt chart, detailing targets and a resources list. The candidate would have to provide more resources detail to achieve all 7 marks available in this section. **(6 marks)**

Project plan maintenance and/or refinement: The candidate provided evidence of ongoing refinement of the plan, with a detailed and reflective commentary. **(3 marks)**

Mathematical modelling and analysis (11 marks awarded)

Mathematical modelling and analysis of a major 'electronics and control' sub-system: Using the 555 timer as the electronics and control sub-system, the candidate has correctly used one technique using Advanced Higher content. The values are realistic and applied to the project solution with reflective commentary. The nodal analysis is not connected to this sub-system and therefore was not considered along with this. **(3 marks)**

Mathematical modelling and analysis of a major 'mechanisms and structures' sub-system: Using the drive system sub-system, the candidate has correctly used one technique using Advanced Higher content. The values are realistic and applied to the project solution. There is reflective commentary, values are discussed in terms of system applicability, and it is noted that they will increase during acceleration and deceleration. **(3 marks)**

Mathematical modelling and analysis of **another** major 'electronics and control' **OR** 'mechanisms and structures' sub-system: Using the structural sub-system, the candidate has correctly used three mathematical modelling techniques appropriate to Advanced Higher Engineering Science. The candidate has analysed shear force, bending moments, the maximum bending moment and how that feeds into the geometry of the member. **(5 marks)**

Constructing and/or simulating a solution (8 marks awarded)

Construction and/or simulation of a major 'electronics and control' sub-system: The circuit modelled by the candidate includes Advanced Higher content (555 timer circuit). While the circuit involves some poor electronic design, in theory it could still perform the desired functions. Annotations are basic but adequate and there is a detailed description of the purpose of the sub-system. **(4 marks)**

Construction and/or simulation of a major 'mechanisms and structures' sub-system: The candidate has simulated bridge structure. **(1 mark)**

Materials and components: The candidate has provided some limited justification of choice of materials and components. **(1 mark)**

Reflective commentary on construction and/or simulation: The candidate has provided some detailed commentary. **(2 marks)**

Evaluation (9 marks awarded)

Evaluation of the solution: The candidate has produced some quantitative evaluation of the solution with some valid, relevant conclusions. **(3 marks)**

Evaluation of the process: The candidate has made relevant and justified evaluative commentary on the development process and their own performance, referring to entries in the record of progress and the detailed project plan. **(4 marks)**

Further developments: The candidate has provided a detailed description of possible further developments. **(2 marks)**