AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA | DEPARTMENT OF EDUCATION AND SCIENCE

Scrúdú an Teastais Shóisearaigh, 2002

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Junior Certificate Examination, 2002

Technology - Design Tasks

Marking Scheme

Higher Level and Ordinary Level

A — Electro-Mechanically Controlled Vehicle

Design and make a model of an electro-mechanically controlled vehicle that will stop automatically when it travels over a dark surface.

Ordinary Level Folder

Analysis of brief	Electro-Mechanically controlled vehicle stops automatically over dark surface.	5
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types of vehicles, model making, etc.	5
Design Ideas	Vehicle: Sketch of one design shown.	6
Criteria for selection of solution	Two reasons for selecting Vehicle or System.	4
Sketches /drawings for manufacture	Manufacture drawing of Vehicle	6
Manufacturing sequence/processes	Sequence of events for manufacture of Vehicle	5
Testing and Evaluation	Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.	5
Presentation of folder	Layout: use of diagrams, sketches, photographs, neat and orderly.	4

Ordinary Level Product

Product satisfies brief	Is the product a Vehicle with an electro/mech control system and is it complete?	5
Suitability, Functional	Does the Vehicle detect a dark surface?	5
Design/Inventiveness	Inventive design of Vehicle and/or mock-up of all or part of the solution?	5
Originality, commercial comp.	Creative use of materials/recycled parts/ electronic components/ mechanisms/colour/shape. Acceptable use of commercial components?	5
Appropriateness of materials	Materials selected suited to their respective functions?	5
Appropriate sub-system(s)	Appropriate electro/mechanical control system?	5
App. manufacturing processes	Vehicle manufactured using appropriate processes?	5
Quality of processes	Quality of Vehicle after manufacture?	5
Assembly	Appropriate methods of assembly used? Quality of assembly. (*available resources considered*)	5
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	5
Tech. competence/ Application of skills	Appropriate level of skill/technological competence?	5
Overall presentation	Attractive, well presented model?	5

A — Electro-Mechanically Controlled Vehicle

Design and make a model of an electro-mechanically controlled vehicle that will stop automatically when it travels over a dark surface.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? **A.** Electro/Mech. controlled vehicle to stop automatically over dark surface.....**(0-3)** **B.** Design specification generated/list of objectives.....**(0-2)** (Restate brief: Total mark = 1)	5
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Various types of vehicles, model making, etc. .....**(0-3)** **B.** Electro-mechanical control systems circuitry & mechanisms.....**(0-2)**	5
Design Ideas	**A.** Vehicle Design 1 - well sketched & annotated.....**(0-3)** **B.** Vehicle Design 2 - well sketched & annotated.....**(0-3)**	6
Criteria for selection of solution	**A.** Selected vehicle and Electro/Mechanical control system identified .....**(0-2)** **B.** Valid justification of selected design idea(s).....**(0-2)**	4
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawing of vehicle and mechanical system .....**(0-3)** **B.** Circuit drawing of electro control system.....**(0-3)**	6
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the vehicle .....**(0-2)** **B.** Materials list with sizes and costing.....**(0-3)**	5
Testing and Evaluation	**A.** Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.....**(0-3)** **B.** Possible improvements identified.....**(0-2)**	5
Presentation of folder	**A.** Layout: use of diagrams, sketches, photographs, neat and orderly .....**(0-3)** **B.** Correct sequence of presentation as outlined in form S.67 (Design Tasks) ....**(0-1)**	4

Higher Level Product

Product satisfies brief	**A.** Is the product a working model of a vehicle?.....**(0-3)** **B.** Does model incorporate an electro-mechanical system? .....**(0-2)**	5
Suitability, Functional	**A.** Does the vehicle stop over dark surface?.....**(0-3)** **B.** Does the vehicle move over bright surface?.....**(0-2)**	5
Design/Inventiveness	**A.** Inventive design of the vehicle, control system and/or mock-up of all or part of the solution? (model = 2).....**(0-5)**	5
Creativity	**A.** Creative use of materials/recycled parts/electronic components, mechanisms, colour, shape. Acceptable use of commercial components? .....**(0-5)**	5
Appropriateness of materials	**A.** Materials selected suited to their respective functions? (strong, robust, rigid, etc.).....**(0-5)**	5
Appropriate sub-system(s)	**A.** Appropriate electro control system, reliable?.....**(0-3)** **B.** Appropriate mechanical system?.....**(0-2)** (Not working max. mark 4)	5
App. manufacturing processes	**A.** Model manufactured using appropriate processes? .....**(0-3)** **B.** Control system manufactured using appropriate processes?.....**(0-2)**	5
Quality of processes	**A.** Quality of model after manufacture using the stated processes?.....**(0-3)** **B.** Quality of the control circuit after manufacture?.....**(0-2)**	5
Assembly	**A.** Appropriate methods of assembly used? (*available resources considered*)....**(0-3)** **B.** Quality of assembly .....**(0-2)**	5
Detailed finish/Safety Considerations	**A.** No sharp edges or other safety hazards?.....**(0-3)** **B.** All parts well finished? .....**(0-2)**	5
Tech. competence/ Application of skills	Does the product demonstrate that the candidate has a: **A.** High level of skill/technological competence? (model).....**(0-3)** **B.** High level of skill/technological competence? (control system).....**(0-2)**	5
Overall presentation	**A.** Attractive well presented model and electro/mech system?.....**(0-3)** **B.** Instructions for use (if needed), controls labelled? .....**(0-2)**	5

B Toy with Secondary Motion

A playschool requires a toy suitable for young children. The movement of the toy should result in some form of secondary motion. Design and make a toy suitable for this purpose.

Ordinary Level Folder

Analysis of brief	Toy for playschool, incorporating secondary motion when moved.	5
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types of toys etc.	5
Design Ideas	Moving Toy with secondary motion: Sketch of one design.	6
Criteria for selection of solution	Two reasons for selecting Toy or motion mechanism.	4
Sketches /drawings for manufacture	Manufacture drawing of Toy.	6
Manufacturing sequence/processes	Sequence of events for manufacture of Toy.	5
Testing and Evaluation	Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.	5
Presentation of folder	Layout: use of diagrams, sketches, photographs, neat and orderly.	4

Ordinary Level Product

Product satisfies brief	Is the product a Toy with secondary motion and is it complete?	5
Suitability, Functional	Is the product suitable for use in a playschool?	5
Design/Inventiveness	Inventive design of Toy and/or mock-up of all or part of the solution?	5
Originality, commercial comp.	Creative use of materials/recycled parts/ electronic components/ mechanisms/colour/shape. Acceptable use of commercial components?	5
Appropriateness of materials	Good materials selection for the toy?	5
Appropriate sub-system(s)	Appropriate device giving reliable secondary motion?	5
App. manufacturing processes	Toy manufactured using appropriate processes?	5
Quality of processes	Quality of Toy after manufacture?	5
Assembly	Appropriate methods of assembly used? Quality of assembly. (*available resources considered*)	5
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	5
Tech. competence/ Application of skills	Appropriate level of skill/technological competence?	5
Overall presentation	Attractive, well presented toy with movement	5

B Toy with Secondary Motion

A playschool requires a toy suitable for young children. The movement of the toy should result in some form of secondary motion. Design and make a toy suitable for this purpose.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? **A.** Toy for playschool, incorporating secondary motion when moved ..... **(0-3)** **B.** Design specification generated/list of objectives ..... **(0-2)** (Restate brief: Total mark = 1)	5
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Toys: type, shape, size ..... **(0-3)** **B.** Mechanical or electronic device(s) ..... **(0-2)**	5
Design Ideas	**A.** Toy Design 1 - well sketched & annotated ..... **(0-3)** **B.** Toy Design 2 - well sketched & annotated ..... **(0-3)**	6
Criteria for selection of solution	**A.** Selected Toy, trigger device/secondary motion identified ..... **(0-2)** **B.** Valid justification of selected design idea(s) ..... **(0-2)**	4
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawing of Toy . ..... **(0-3)** **B.** Drawing of trigger device/secondary motion mechanism ..... **(0-3)**	6
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of Toy & mechanisms ..... **(0-2)** **B.** Materials list with sizes and costing ..... **(0-3)**	5
Testing and Evaluation	**A.** Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation ..... **(0-3)** **B.** Possible improvements identified ..... **(0-2)**	5
Presentation of folder	**A.** Layout: use of diagrams, sketches, photographs, neat and orderly ..... **(0-3)** **B.** Correct sequence of presentation as outlined in form S.67 (Design Tasks) .... **(0-1)**	4

Higher Level Product

Product satisfies brief	**A.** Is the product a Toy? ..... **(0-2)** **B.** Does it incorporate a trigger device/secondary motion? ..... **(0-2)** **C.** Does movement of toy result in some form of secondary motion? ..... **(0-1)**	5
Suitability, Functional	**A.** Will this product function as a playschool Toy? ..... **(0-3)** **B.** Is the Toy suitable for young children? ..... **(0-2)**	5
Design/Inventiveness	**A.** Inventive design of Toy/trigger device/secondary motion, and/or mock-up of all or part of the solution (model = 2) ..... **(0-5)**	5
Creativity	**A.** Creative use of materials/re-cycled parts/electronic components/ mechanisms/colour/shape. Acceptable use of commercial components ..... **(0-5)**	5
Appropriateness of materials	**A.** Materials selection for Toy and trigger device/secondary motion: (strong, robust, suitable for young children) ..... **(0-5)**	5
Appropriate sub-system(s)	**A.** Appropriate secondary motion, reliable ..... **(0-3)** **B.** Easily triggered ..... **(0-2)** (Not working max. mark 4)	5
App. manufacturing processes	**A.** Toy and mechanism manufactured using appropriate processes ..... **(0-3)** **B.** Circuit/mechanisms manufactured using appropriate processes ..... **(0-2)**	5
Quality of processes	**A.** Quality of Toy after manufacture using stated processes? ..... **(0-3)** **B.** Quality of circuit/mechanisms after manufacture? ..... **(0-2)**	5
Assembly	**A.** Appropriate methods of assembly used? (*available resources considered*) .... **(0-3)** **B.** Quality of assembly ..... **(0-2)**	5
Detailed finish/Safety Considerations	**A.** No sharp edges or other safety hazards? ..... **(0-3)** **B.** Has an attractive durable finish been applied? All parts well finished? ..... **(0-2)**	5
Tech. competence/ Application of skills	Does the product demonstrate that the candidate has a: **A.** high level of skill/technological competence? (Toy) ..... **(0-3)** **B.** high level of skill/technological competence? (secondary motion) ..... **(0-2)**	5
Overall presentation	**A.** Attractive, well presented Toy? ..... **(0-3)** **B.** Attractive, well presented secondary motion device? ..... **(0-2)**	5

C Portable Automatic Watering Unit

Many people leave their homes to go on summer holidays. Plants can dry up during this time. Design and make a portable unit, incorporating a reservoir, which will automatically water a potted plant when its soil moisture content falls to a low level.

Ordinary Level Folder

Analysis of brief	Portable unit incorporating a reservoir. Sensor detects when soil is dry and triggers system to water potted plant.	5
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Portable unit; type, shape, size or portability issues etc. Automatic watering sensors and devices.	5
Design Ideas	Portable unit: Sketch of one design shown.	6
Criteria for selection of solution	Two reasons for selecting portable unit or automatic system.	4
Sketches /drawings for manufacture	Manufacture drawing of portable unit.	6
Manufacturing sequence/processes	Sequence of events for manufacture of portable unit & watering system.	5
Testing and Evaluation	Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.	5
Presentation of folder	Layout: use of diagrams, sketches, photographs, neat and orderly.	4

Ordinary Level Product

Product satisfies brief	Is the product a portable watering unit with auto control system and is it complete?	5
Suitability, Functional	Is the product suitable for use in the home for its intended purpose?	5
Design/Inventiveness	Inventive design of portable unit and/or mock-up of all or part of the solution?	5
Originality, commercial comp.	Creative use of materials/recycled parts/ electronic components/ mechanisms/colour/shape. Acceptable use of commercial components?	5
Appropriateness of materials	Good materials selection for the portable unit?	5
Appropriate sub-system(s)	Appropriate device providing reliable watering when soil is dry?	5
App. manufacturing processes	Portable unit/watering system manufactured using appropriate processes?	5
Quality of processes	Quality of portable unit after manufacture?	5
Assembly	Appropriate methods of assembly used? Quality of assembly. (*available resources considered*)	5
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	5
Tech. competence/ Application of skills	Appropriate level of skill/technological competence?	5
Overall presentation	Attractive, well presented portable unit and automatic watering system.	5

C Portable Automatic Watering Unit

Many people leave their homes to go on summer holidays. Plants can dry up during this time. Design and make a portable unit, incorporating a reservoir, which will automatically water a potted plant when its soil moisture content falls to a low level.

Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? **A.** Portable unit incorporating a reservoir. Sensor detects when soil is dry and triggers system to water potted plant. ....(0-3) **B.** Design specification generated/list of objectives....(0-2) (Restate brief: Total mark = 1)	5
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Portable unit; type, shape, size or portability issues etc....(0-3) **B.** Mechanical/Electrical/Electronic automatic watering system....(0-2)	5
Design Ideas	**A.** Portable Unit - Design 1 - well sketched & annotated....(0-3) **B.** Portable Unit - Design 2 - well sketched & annotated....(0-3)	6
Criteria for selection of solution	**A.** Selected portable unit with automatic watering system identified....(0-2) **B.** Valid justification of selected design idea(s)....(0-2)	4
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawing of portable unit....(0-3) **B.** Drawing of automatic watering system....(0-3)	6
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of portable unit and automatic watering system....(0-2) **B.** Materials list with sizes and costing....(0-3)	5
Testing and Evaluation	**A.** Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation....(0-3) **B.** Possible improvements identified....(0-2)	5
Presentation of folder	**A.** Layout: use of diagrams, sketches, photographs, neat and orderly....(0-3) **B.** Correct sequence of presentation as outlined in form S.67 (Design Tasks)....(0-1)	4

Product

Product satisfies brief	**A.** Is the product a portable unit?....(0-3) **B.** Does it incorporate an automatic watering system?....(0-2)	5
Suitability, Functional	**A.** Will this product function as a portable automatic watering system?....(0-3) **B.** Does the sensor system operate?....(0-2)	5
Design/Inventiveness	**A.** Inventive design of portable unit/sensor system and/or mock-up of all or part of the solution (model = 2)....(0-5)	5
Creativity	**A.** Creative use of materials/re-cycled parts/electronic components/ mechanisms/colour/shape. Acceptable use of commercial components ....(0-5)	5
Appropriateness of materials	**A.** Materials selection for portable unit and automatic watering system: (strong, robust, no leaks)....(0-5)	5
Appropriate sub-system(s)	**A.** Appropriate automatic sensor system, reliable and easily activated ....(0-3) **B.** Appropriate and reliable water control system ....(0-2) (Not working max. mark 4)	5
App. manufacturing processes	**A.** Portable unit manufactured using appropriate processes ....(0-3) **B.** Circuit manufactured using appropriate processes ....(0-2)	5
Quality of processes	**A.** Quality of portable unit after manufacture using stated processes? ....(0-3) **B.** Quality of sensor and water control system after manufacture? ....(0-2)	5
Assembly	**A.** Appropriate methods of assembly used? (*available resources considered*)....(0-3) **B.** Quality of assembly ....(0-2)	5
Detailed finish/Safety Considerations	**A.** No sharp edges or other safety hazards? ....(0-3) **B.** Has an attractive durable finish been applied? All parts well finished?....(0-2)	5
Tech. competence/ Application of skills	Does the product demonstrate that the candidate has a: **A.** high level of skill/technological competence? (portable unit) ....(0-3) **B.** high level of skill/technological competence? (sensor/control system) ....(0-2)	5
Overall presentation	**A.** Attractive, well presented portable unit?....(0-3) **B.** Attractive, well presented sensor/control system?....(0-2)	5

D Electro-Mechanically Controlled Crane

Design and make a working model of an electro-mechanically controlled crane.

Ordinary Level Folder

Analysis of brief	Working model of electro-mechanically controlled Crane.	5
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Cranes, structures, model making, etc.	5
Design Ideas	Crane: Sketch of one design shown.	6
Criteria for selection of solution	Two reasons for selecting Crane or control system.	4
Sketches /drawings for manufacture	Manufacture drawing of Crane.	6
Manufacturing sequence/processes	Sequence of events for manufacture of the Crane.	5
Testing and Evaluation	Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.	5
Presentation of folder	Layout: use of diagrams, sketches, photographs, neat and orderly.	4

Ordinary Level Product

Product satisfies brief	Is the product a working model of a Crane and is it complete?	5
Suitability, Functional	Is it suitable for lifting specific loads?	5
Design/Inventiveness	Inventive design of the Crane and/or mock-up of all or part of the solution?	5
Originality, commercial comp.	Creative use of materials/recycled parts/ electronic components/ mechanisms/colour/shape. Acceptable use of commercial components?	5
Appropriateness of materials	Appropriate material selection for the Crane?	5
Appropriate sub-system(s)	Appropriate mechanical system with up/down movement?	5
App. manufacturing processes	Model manufactured using appropriate processes?	5
Quality of processes	Quality of model after manufacture?	5
Assembly	Appropriate methods of assembly used? Quality of assembly. (*available resources considered*)	5
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	5
Tech. competence/ Application of skills	Appropriate level of skill/technological competence?	5
Overall presentation	Attractive, well presented model.	5

D Electro-Mechanically Controlled Crane

Design and make a working model of an electro-mechanically controlled crane.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? **A.** Working model of electro-mechanically controlled crane. ..... **(0-3)** **B.** Design specification generated/list of objectives ..... **(0-2)** (Restate brief: Total mark = 1)	5
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Various Cranes, structures, model making, etc. ..... **(0-3)** **B.** Electro-mechanical control systems circuitry & mechanisms. ..... **(0-2)**	5
Design Ideas	**A.** Crane Design 1 - well sketched & annotated ..... **(0-3)** **B.** Crane Design 2 - well sketched & annotated ..... **(0-3)**	6
Criteria for selection of solution	**A.** Selected Crane and electro-mechanically. control system identified ..... **(0-2)** **B.** Valid justification of selected design idea(s) ..... **(0-2)**	4
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawing of Crane and mechanical system ..... **(0-3)** **B.** Circuit drawing of electro control system. ..... **(0-3)**	6
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the Crane ..... **(0-2)** **B.** Materials list with sizes and costing ..... **(0-3)**	5
Testing and Evaluation	**A.** Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation ..... **(0-3)** **B.** Possible improvements identified. ..... **(0-2)**	5
Presentation of folder	**A.** Layout: use of diagrams, sketches, photographs, neat and orderly ..... **(0-3)** **B.** Correct sequence of presentation as outlined in form S.67 (Design Tasks) .... **(0-1)**	4

Higher Level Product

Product satisfies brief	**A.** Is the product a working model of a Crane? ..... **(0-2)** **B.** Does model incorporate a mechanical system? ..... **(0-2)** **C.** Does model incorporate a control system? ..... **(0-1)**	5
Suitability, Functional	**A.** Does the Crane move up and down using the controls? ..... **(0-3)** **B.** Is it suitable for lifting specific loads? ..... **(0-2)**	5
Design/Inventiveness	**A.** Inventive design of the Crane, control system and/or mock-up of all or part of the solution? (model = 2) ..... **(0-5)**	5
Creativity	**A.** Creative use of materials/recycled parts/electronic components, mechanisms, colour, shape. Acceptable use of commercial components? ..... **(0-5)**	5
Appropriateness of materials	**A.** Materials selected suited to their respective functions? (strong, robust, rigid, etc.) ..... **(0-5)**	5
Appropriate sub-system(s)	**A.** Appropriate electro control system, reliable? ..... **(0-3)** **B.** Appropriate mechanical system with up/down movement? ..... **(0-2)** (Not working max. mark 4)	5
App. manufacturing processes	**A.** Working model manufactured using appropriate processes? ..... **(0-3)** **B.** Control system manufactured using appropriate processes? ..... **(0-2)**	5
Quality of processes	**A.** Quality of working model after manufacture using the stated processes? ..... **(0-3)** **B.** Quality of the control circuit after manufacture? ..... **(0-2)**	5
Assembly	**A.** Appropriate methods of assembly used? (*available resources considered*) .... **(0-3)** **B.** Quality of assembly ..... **(0-2)**	5
Detailed finish/Safety Considerations	**A.** No sharp edges or other safety hazards? ..... **(0-3)** **B.** All parts well finished? ..... **(0-2)**	5
Tech. competence/ Application of skills	Does the product demonstrate that the candidate has a: **A.** High level of skill/technological competence? (working model) ..... **(0-3)** **B.** High level of skill/technological competence? (control system) ..... **(0-2)**	5
Overall presentation	**A.** Attractive well presented working model and electro/mech system? ..... **(0-3)** **B.** Instructions for use (if needed), controls labelled? ..... **(0-2)**	5

E Water-Powered Generator

The use of renewable energy sources is very important from an environmental point of view. Design and make a working model of a water-powered generator to power a small electrical system.

Ordinary Level Folder

Analysis of brief	Working model of water-powered generator to drive small output device.	5
Investigation of possible solutions	Water powered systems; type, shape, size, model making etc.	5
Design Ideas	Working model: Sketch of one design shown.	6
Criteria for selection of solution	Two reasons for selecting working model or generator system.	4
Sketches /drawings for manufacture	Manufacture drawing of working model.	6
Manufacturing sequence/processes	Sequence of events for manufacture of working model & generator system.	5
Testing and Evaluation	Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.	5
Presentation of folder	Layout: use of diagrams, sketches, photographs, neat and orderly.	4

Ordinary Level Product

Product satisfies brief	Is the product a working model & generator system and is it complete?	5
Suitability, Functional	Will this product function as a model of a water-powered generator?	5
Design/Inventiveness	Inventive design of working model and/or mock-up of all or part of the solution?	5
Originality, commercial comp.	Creative use of materials/recycled parts/ electronic components/ mechanisms/colour/shape. Acceptable use of commercial components?	5
Appropriateness of materials	Good materials selection for the working model ?	5
Appropriate sub-system(s)	Appropriate automatic generation system, reliable and easily activated?	5
App. manufacturing processes	Working model & generator system manufactured using appropriate processes?	5
Quality of processes	Quality of working model after manufacture?	5
Assembly	Appropriate methods of assembly used? Quality of assembly. (*available resources considered*)	5
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	5
Tech. competence/ Application of skills	Appropriate level of skill/technological competence?	5
Overall presentation	Attractive, well presented working model & generator system.	5

E Water-Powered Generator

The use of renewable energy sources is very important from an environmental point of view. Design and make a working model of a water-powered generator to power a small electrical system.

Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? **A.** Working model of water-powered generator to drive small output device. ... **(0-3)** **B.** Design specification generated/list of objectives ... **(0-2)** (Restate brief: Total mark = 1)	5
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Water powered systems; type, shape, size, model making etc ... **(0-3)** **B.** Motor/generator issues ... **(0-2)**	5
Design Ideas	**A.** Water-powered generator - Design 1 - well sketched & annotated ... **(0-3)** **B.** Water-powered generator - Design 2 - well sketched & annotated ... **(0-3)**	6
Criteria for selection of solution	**A.** Selected working model with generating and output system identified ... **(0-2)** **B.** Valid justification of selected design idea(s) ... **(0-2)**	4
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawing of working model ... **(0-3)** **B.** Drawing of generating and output system ... **(0-3)**	6
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of working model and generating/output system ... **(0-2)** **B.** Materials list with sizes and costing ... **(0-3)**	5
Testing and Evaluation	**A.** Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation ... **(0-3)** **B.** Possible improvements identified ... **(0-2)**	5
Presentation of folder	**A.** Layout: use of diagrams, sketches, photographs, neat and orderly ... **(0-3)** **B.** Correct sequence of presentation as outlined in form S.67 (Design Tasks) ... **(0-1)**	4

Product

Product satisfies brief	**A.** Is the product a water-powered generator? ... **(0-3)** **B.** Does it incorporate a generating and output system? ... **(0-2)**	5
Suitability, Functional	**A.** Will this product function as a model of a water-powered generator? ... **(0-3)** **B.** Does the output system operate? ... **(0-2)**	5
Design/Inventiveness	**A.** Inventive design of water-powered generator and output system and/or mock-up of all or part of the solution (model = 2) ... **(0-5)**	5
Creativity	**A.** Creative use of materials/re-cycled parts/electronic components/ mechanisms/colour/shape. Acceptable use of commercial components ... **(0-5)**	5
Appropriateness of materials	**A.** Materials selection for model of water-powered generator: (strong, robust) ... **(0-5)**	5
Appropriate sub-system(s)	**A.** Appropriate automatic generation system, reliable and easily activated ... **(0-3)** **B.** Appropriate and reliable output system ... **(0-2)** (Not working max. mark 4)	5
App. manufacturing processes	**A.** Working model manufactured using appropriate processes ... **(0-3)** **B.** Circuit manufactured using appropriate processes ... **(0-2)**	5
Quality of processes	**A.** Quality of working model after manufacture using stated processes? ... **(0-3)** **B.** Quality of generating and output system? ... **(0-2)**	5
Assembly	**A.** Appropriate methods of assembly used? (*available resources considered*) ... **(0-3)** **B.** Quality of assembly ... **(0-2)**	5
Detailed finish/Safety Considerations	**A.** No sharp edges or other safety hazards? ... **(0-3)** **B.** Has an attractive durable finish been applied? All parts well finished? ... **(0-2)**	5
Tech. competence/ Application of skills	Does the product demonstrate that the candidate has a: **A.** high level of skill/technological competence? (portable unit) ... **(0-3)** **B.** high level of skill/technological competence? (sensor/control system) ... **(0-2)**	5
Overall presentation	**A.** Attractive, well presented working model ? ... **(0-3)** **B.** Attractive, well presented output system? ... **(0-2)**	5

F Stairs Lift

Many elderly and disabled people have difficulty climbing stairs. Design and make a model of an electro-mechanical device that will transport a person up and down a straight flight of stairs.

Ordinary Level Folder

Analysis of brief	Model electro-mechanical device to transport person up & down straight stairs.	5
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types of stair lift devices, etc. Electro-mechanical control systems.	5
Design Ideas	Electro-Mechanical device: Sketch of one design shown.	6
Criteria for selection of solution	Two reasons for selecting electro-mechanical device.	4
Sketches /drawings for manufacture	Manufacture drawing of electro-mechanical device.	6
Manufacturing sequence/processes	Sequence of events for manufacture of electro-mechanical device.	5
Testing and Evaluation	Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.	5
Presentation of folder	Layout: use of diagrams, sketches, photographs, neat and orderly.	4

Ordinary Level Product

Product satisfies brief	Is the product an electro/mechanical Stairs Lift and is it complete?	5
Suitability, Functional	Does the model electro/mech device function?	5
Design/Inventiveness	Inventive design of Stairs Lift and/or mock-up of all or part of the solution?	5
Originality, commercial comp.	Creative use of materials/recycled parts/ electronic components/ mechanisms/colour/shape. Acceptable use of commercial components?	5
Appropriateness of materials	Materials selected suited to their respective functions?	5
Appropriate sub-system(s)	Appropriate electro/mechanical control system?	5
App. manufacturing processes	Stairs Lift manufactured using appropriate processes?	5
Quality of processes	Quality of Stairs Lift after manufacture?	5
Assembly	Appropriate methods of assembly used? Quality of assembly. (*available resources considered*)	5
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	5
Tech. competence/ Application of skills	Appropriate level of skill/technological competence?	5
Overall presentation	Attractive, well presented model?	5

F Stair Lift

Many elderly and disabled people have difficulty climbing stairs. Design and make a model of an electro-mechanical device that will transport a person up and down a straight flight of stairs.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? **A.** Model electro/mech device to transport person up & down straight stairs.....**(0-3)** **B.** Design specification generated/list of objectives.....**(0-2)** (Restate brief: Total mark = 1)	5
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Various types of stair lift devices, etc.....**(0-3)** **B.** Electro-mechanical control systems circuitry & mechanisms.....**(0-2)**	5
Design Ideas	**A.** Stair Lift design 1 - well sketched & annotated.....**(0-3)** **B.** Stair Lift design 2 - well sketched & annotated.....**(0-3)**	6
Criteria for selection of solution	**A.** Selected electro/mech device & control system identified .....**(0-2)** **B.** Valid justification of selected design idea(s).....**(0-2)**	4
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawing of stair lift .....**(0-3)** **B.** Circuit drawing of electro control system.....**(0-3)**	6
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the electro/mech device .....**(0-2)** **B.** Materials list with sizes and costing.....**(0-3)**	5
Testing and Evaluation	**A.** Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.....**(0-3)** **B.** Possible improvements identified.....**(0-2)**	5
Presentation of folder	**A.** Layout: use of diagrams, sketches, photographs, neat and orderly .....**(0-3)** **B.** Correct sequence of presentation as outlined in form S.67 (Design Tasks) ....**(0-1)**	4

Higher Level Product

Product satisfies brief	**A.** Is the product a model of a Stair Lift? .....**(0-2)** **B.** Does model incorporate an electro-mechanical system? .....**(0-2)** **C.** Does model incorporate a control system?.....**(0-1)**	5
Suitability, Functional	**A.** Does the model electro/mech device function? .....**(0-3)** **B.** Does the electro/mech device stop and start correctly? .....**(0-2)**	5
Design/Inventiveness	**A.** Inventive design of the electro/mech device, control system and/or mock-up of all or part of the solution? (model = 2).....**(0-5)**	5
Creativity	**A.** Creative use of materials/recycled parts/electronic components, mechanisms, colour, shape. Acceptable use of commercial components? .....**(0-5)**	5
Appropriateness of materials	**A.** Materials selected suited to their respective functions? (strong, robust, rigid, etc.).....**(0-5)**	5
Appropriate sub-system(s)	**A.** Appropriate electro control system, reliable?.....**(0-3)** **B.** Appropriate mechanical system?.....**(0-2)** (Not working max. mark 4)	5
App. manufacturing processes	**A.** Model manufactured using appropriate processes? .....**(0-3)** **B.** Control system manufactured using appropriate processes?.....**(0-2)**	5
Quality of processes	**A.** Quality of model after manufacture using the stated processes?.....**(0-3)** **B.** Quality of the control circuit after manufacture?.....**(0-2)**	5
Assembly	**A.** Appropriate methods of assembly used? (*available resources considered*)....**(0-3)** **B.** Quality of assembly .....**(0-2)**	5
Detailed finish/Safety Considerations	**A.** No sharp edges or other safety hazards?.....**(0-3)** **B.** All parts well finished? .....**(0-2)**	5
Tech. competence/ Application of skills	Does the product demonstrate that the candidate has a: **A.** High level of skill/technological competence? (model).....**(0-3)** **B.** High level of skill/technological competence? (control system).....**(0-2)**	5
Overall presentation	**A.** Attractive well presented model and electro/mech system?.....**(0-3)** **B.** Instructions for use (if needed), controls labelled? .....**(0-2)**	5

G Computer Controlled Vehicle

Design and make a computer controlled vehicle that will change direction after making contact with an object in its path.

Ordinary Level Folder

Analysis of brief	Computer controlled vehicle to change direction after collision.	5
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types of vehicles, model making, etc.	5
Design Ideas	Vehicle: Sketch of one design shown.	6
Criteria for selection of solution	Two reasons for selecting vehicle and control system.	4
Sketches /drawings for manufacture	Manufacture drawing of vehicle.	6
Manufacturing sequence/processes	Sequence of events for manufacture of the vehicle.	5
Testing and Evaluation	Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.	5
Presentation of folder	Layout: use of diagrams, sketches, photographs, neat and orderly.	4

Ordinary Level Product

Product satisfies brief	Is the product a computer controlled vehicle and is it complete?	5
Suitability, Functional	Does the vehicle detect an object in it's path and change direction?	5
Design/Inventiveness	Inventive design of vehicle and/or mock-up of all or part of the solution?	5
Originality, commercial comp.	Creative use of materials/recycled parts/ electronic components/ mechanisms/colour/shape. Acceptable use of commercial components?	5
Appropriateness of materials	Appropriate material selection for the vehicle?	5
Appropriate sub-system(s)	Appropriate electro control system, reliable?	5
App. manufacturing processes	Vehicle manufactured using appropriate processes?	5
Quality of processes	Quality of vehicle after manufacture?	5
Assembly	Appropriate methods of assembly used? Quality of assembly. (*available resources considered*)	5
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	5
Tech. competence/ Application of skills	Appropriate level of skill/technological competence?	5
Overall presentation	Attractive, well presented computer controlled vehicle with clear instructions.	5

G Computer Controlled Vehicle

Design and make a computer controlled vehicle that will change direction after making contact with an object in its path.

Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? **A.** Computer controlled vehicle to change direction after collision.....**(0-3)** **B.** Design specification generated/list of objectives.....**(0-2)** (Restate brief: Total mark = 1)	5
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Various types of vehicles, model making, etc. .....**(0-3)** **B.** Computer control systems circuitry & mechanisms. .....**(0-2)**	5
Design Ideas	**A.** Vehicle Design 1 - well sketched & annotated.....**(0-3)** **B.** Vehicle Design 2 - well sketched & annotated.....**(0-3)**	6
Criteria for selection of solution	**A.** Selected vehicle and Computer control system identified .....**(0-2)** **B.** Valid justification of selected design idea(s).....**(0-2)**	4
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawing of vehicle and interface system .....**(0-3)** **B.** Circuit drawings.....**(0-3)**	6
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the vehicle .....**(0-2)** **B.** Materials list with sizes and costing.....**(0-3)**	5
Testing and Evaluation	**A.** Evidence of testing/modification during manufacture and/or evaluation against the brief/design specification and/or third party evaluation.....**(0-3)** **B.** Possible improvements identified.....**(0-2)**	5
Presentation of folder	**A.** Layout: use of diagrams, sketches, photographs, neat and orderly .....**(0-3)** **B.** Correct sequence of presentation as outlined in form S.67 (Design Tasks) ....**(0-1)**	4

Product

Product satisfies brief	**A.** Is the product a vehicle?.....**(0-3)** **B.** Is the vehicle controlled by a computer program?.....**(0-2)**	5
Suitability, Functional	**A.** Does the vehicle detect an object in it's path?.....**(0-3)** **B.** Does the vehicle change direction after a collision?.....**(0-2)**	5
Design/Inventiveness	**A.** Inventive design of the vehicle, control system and/or mock-up of all or part of the solution? (model = 2).....**(0-5)**	5
Creativity	**A.** Creative use of materials/recycled parts/electronic components, mechanisms, colour, shape. Acceptable use of commercial components?.....**(0-5)**	5
Appropriateness of materials	**A.** Materials selected suited to their respective functions? (strong, robust, rigid, etc.).....**(0-5)**	5
Appropriate sub-system(s)	**A.** Appropriate electro control system, reliable?.....**(0-3)** **B.** Appropriate electro-mechanical system with directional control?.....**(0-2)** (Not working max. mark 4)	5
App. manufacturing processes	**A.** Vehicle manufactured using appropriate processes? .....**(0-3)** **B.** Control system constructed using appropriate processes?.....**(0-2)**	5
Quality of processes	**A.** Quality of vehicle after manufacture using the stated processes?.....**(0-3)** **B.** Quality of the control circuit/software?.....**(0-2)**	5
Assembly	**A.** Appropriate methods of assembly used? (*available resources considered*)....**(0-3)** **B.** Quality of assembly .....**(0-2)**	5
Detailed finish/Safety Considerations	**A.** No sharp edges or other safety hazards?.....**(0-3)** **B.** All parts well finished? .....**(0-2)**	5
Tech. competence/ Application of skills	Does the product demonstrate that the candidate has a: **A.** High level of skill/technological competence? (model).....**(0-3)** **B.** High level of skill/technological competence? (control system).....**(0-2)**	5
Overall presentation	**A.** Attractive, well presented computer controlled vehicle.....**(0-3)** **B.** Clear instructions for use, controls labelled, software details? .....**(0-2)**	5