Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate 2016

Marking Scheme

Technology Tasks

Ordinary and Higher Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

Information for examination candidates:

Marking Scheme Headings

The table below gives an outline of the marking headings used to assess your task. While the same headings apply at both levels, the marking criteria at Higher level demand greater detail and precision in both the design folder and the artefact. While the general headings and marks will largely remain the same, assumptions about future marking schemes on the basis of past schemes should be avoided. (Ordinary and Higher Level marking schemes are available on www.examinations.ie)

It is recommended that evidence of each stage is reflected in your design folder.

Folder		
Analysis of brief	Analysis should incorporate the following features: Breakdown of the brief and design specification/list of objectives specific to the task.	***5***
Investigation of possible solutions	Evidence of investigation: (sketches, photos, descriptions, etc.) Relevant research on the task itself and its mechanical/electronic systems.	***5***
Design Ideas	One Design Idea presented in 3D format (Ordinary level). Two Design Ideas presented in 3D format ((Higher level).	***6***
Criteria for selection of solution	Valid justification of your selected idea and the sub-system/s.	***4***
Sketches /drawings for manufacture	Working drawings of the chosen solution and circuit drawing/s (flow-sheet where applicable).	***6***
Manufacturing sequence/processes	Sequence of events for the manufacture of the chosen solution. Materials List with sizes and costs.	***5***
Testing and Evaluation	Evidence of testing/modification during manufacture and 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***
Artefact		
Artefact satisfies brief	Does the artefact produced by the candidate satisfy the brief?	***5***
Suitability, Functionality	Do all the necessary elements of the artefact function?	***5***
Design/Inventiveness	Inventive design of the artefact and sub-system?	***5***
Originality, commercial comp.	Creative use of materials/recycled parts/electro-mechanical 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/electronic sub-system?	***5***
App. manufacturing processes	Complete artefact and sub-system manufactured using appropriate processes?	***5***
Quality of processes	Quality of the artefact after manufacture?	***5***
Assembly	Appropriate methods of assembly used? Quality of assembly.	***5***
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	***5***
Tech. competencies/ Application of skills	Appropriate level and range of skills/technological competencies?	***5***
Overall presentation	Attractive, well presented artefact?	***5***

Instructions to candidates:

- Design and make any **one** of the design tasks listed opposite.
- The design task submitted for assessment must consist of two components:
  - a design folder *and*
  - an artefact
- All work submitted for assessment must be clearly identified with your examination number.
- Tasks submitted for assessment must be the candidates **own individual work**.
- The design task must be completed in school under the supervision of the class teacher.
- When using research sources, including the Internet, the sources must be acknowledged. Research material copied directly from the Internet or from other sources and presented as your own work will not receive any marks.
- Shading and colour should be used where appropriate in your design folder.
- Coursework which does not demonstrate a range of manual processing skills and assembly techniques as outlined in the syllabus will lose marks.
- Coursework where specialist processes (e.g. CAD CAM) are used, but are not supported in the design folder by the inclusion of drawings and/or descriptions as appropriate will lose marks.
- If micro-processors are used in the electronic sub-system a diagram showing Inputs and Outputs should be included in your design folder.
- All important operating features must be clearly visible without dismantling.
- Presentation and finished appearance of both folder and artefact are important.

The Design Task must be available for assessment by Friday 6th May 2016.

Storage of design tasks:

On completion of the design task, school authorities should ensure that the finished artefact and design folder are kept in a safe place under lock and key until examining commences.

Allocation of marks:

Design Tasks

240 marks are allocated for design tasks at Ordinary Level.
200 marks are allocated for design tasks at Higher Level.

The Design Folder

Forty percent (40%) of the marks are allocated for the design folder.

The Artefact

Sixty percent (60%) of the marks are allocated for the artefact.

Addendum to Technology Tasks Marking Scheme:

Task Specific Updates:

(A) Higher Level Animated Display:

- In the case of rotary motion only: -1 under 'Product satisfies the brief'
- If the event being portrayed has no relationship to the Olympics: -1 under 'Product satisfies the brief'.

(B) Higher level Dumbwaiter:

- If the lift is controlled using a single DPDT/DPDTCO switch then implement the following:

  -1 under 'Suitability, Functional', -1 under 'Design/Inventiveness', -1 under 'Appropriate sub-system'

(C) Automatic Gate & (D) Automatic Flag:

- If the gate/flag is not automatically controlled you can implement the following:

  -2 under 'Product satisfies the brief', -1 under 'Suitability, Functional',

  -1 under 'Design/Inventiveness', -1 under 'Appropriate Sub-system'

(C) Automatic Gate – where a barrier is presented:

- At Higher Level - If the candidate has made a barrier then the first four criteria when marking the product are marked out of 3 instead of 5
- At Ordinary Level – Allow for a max mark of 4 under the first four criteria when marking the product.

(B) Dumbwaiter, (C) Automatic Gate, (D) Automatic Flag & (E) Pet Grooming Table:

- If no Safety feature (any safety feature – whether programmed as a time delay etc. or the use of limit/proximity switches):

  -1 under 'Product satisfies the brief', -1 under 'Suitability, Functional',

  -1 under 'Design/Inventiveness', -1 under 'Appropriate Sub-system'

(F) Garden Shelter – Environmental sustainability:

- If no attempt has been made to use Environmentally Sustainable materials and/or a renewable energy source, then under the headings of Product Satisfies the Brief and Appropriateness of Materials the maximum mark will be 4 instead of 5.
- If the issue of Environmental Friendliness is not addressed in the Analysis then Max mark = 4
  If it is not addressed in Research then Max mark = 4.

For All Tasks

- Where there is an overuse of CAD CAM - where parts are exclusively laser cut - please apply the following adjustment to the marking scheme for the Product:

  Appropriate manufacturing processes: Max mark = 3, Quality of processes: Max mark = 3,

  Detailed Finish (if machined finish only): Max mark = 3, Tech. Competence: Max mark = 3

Recycled Circuit Boards:

- Where you suspect that populated Circuit boards have been recycled please discuss with your Advising Examiner before implementing the following:

  -1 under 'Appropriate Manufacturing processes', -1 under 'Quality of processes',

  -2 under 'Assembly', -1 under 'Tech competencies/application of skills'

A — Animated Display

Design and make an animated display/diorama for the window of a sports shop to represent the activities of at least one event in the 2016 Rio Olympic Games. The display should be electro-mechanical in operation and should attract the attention of passers-by.

Ordinary Level Folder

Analysis of brief	Design should incorporate the following features: Animated display for a sport's shop window. Rio Olympic Games theme representing at least one event. Should be electro-mechanical and attract attention.	***5***
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types sporting animated displays and/or relevant mechanical/electronic systems.	***5***
Design Ideas	Olympic Games sporting event/s animated display incorporating electro-mechanical/electronic system: Sketch of one design shown.	***6***
Criteria for selection of solution	Valid justification of this idea (at least two reasons).	***4***
Sketches /drawings for manufacture	Manufacture drawing of the chosen solution and sub-system.	***6***
Manufacturing sequence/processes	Sequence of events for manufacture of the chosen solution.	***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 animated display representing an Olympic sporting event with an electro-mechanical sub-system?	***5***
Suitability, Functional	Do all the necessary elements of the animated display function?	***5***
Design/Inventiveness	Inventive design of the animated display and sub-system?	***5***
Originality, commercial comp.	Creative use of materials/recycled parts/ electro-mechanical 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 sub-system?	***5***
App. manufacturing processes	Complete animated display and sub-system manufactured using appropriate processes?	***5***
Quality of processes	Quality of the product after manufacture?	***5***
Assembly	Appropriate methods of assembly used? Quality of assembly.	***5***
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	***5***
Tech. competencies/ Application of skillss	Appropriate level and range of skills/technological competencies?	***5***
Overall presentation	Attractive, well presented product?	***5***

A — Animated Display

Design and make an animated display/diorama for the window of a sports shop to represent the activities of at least one event in the 2016 Rio Olympic Games. The display should be electro-mechanical in operation and should attract the attention of passers-by.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? **A.** Design should incorporate the following features: Olympic event electro-mechanically animated and eye catching ..... **(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 animated displays with sporting themes, etc. ..... **(0-3)** **B.** electro-mechanical sub-system/electronic system. ..... **(0-2)**	***5***
Design Ideas	**A.** Animated Display Design 1 - well sketched & annotated ..... **(0-3)** **B.** Animated Display Design 2 - well sketched & annotated ..... **(0-3)**	***6***
Criteria for selection of solution	**A.** Selected design identified. ..... **(0-2)** **B.** Valid justification of selected design idea and sub-system..... **(0-2)**	***4***
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawings of the chosen solution ..... **(0-3)** **B.** Circuit drawings/Graphic of PIC circuit with inputs & outputs & Flowsheet **(0-3)**	***6***
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the chosen solution..... **(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 an animated display with an Olympic event theme?..... **(0-3)** **B.** Does it incorporate an electro-mechanical sub-system?..... **(0-2)**	***5***
Suitability, Functional	**A.** Is the product suitable for a window display? ..... **(0-3)** **B.** Does the electro-mechanical system work?..... **(0-2)**	***5***
Design/Inventiveness	**A.** Inventive design of the animated display and subsystem and/or mock-up of all or part of the solution? (model = 2)..... **(0-5)**	***5***
Originality, commercial comp.	**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-mechanical sub-system, reliable? ..... **(0-5)** (Not working max. mark 4)	***5***
App. manufacturing processes	**A.** Animated Display manufactured using appropriate processes? ..... **(0-3)** **B.** sub-system manufactured using appropriate processes?..... **(0-2)**	***5***
Quality of processes	**A.** Quality of animated display after manufacture using stated processes?..... **(0-3)** **B.** Quality of the sub-system after manufacture? ..... **(0-2)**	***5***
Assembly	**A.** Appropriate methods of assembly used? ..... **(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. competencies/ Application of skills	Does the product demonstrate that the candidate has an: **A.** Appropriate range & level of technological competencies? (Display) ..... **(0-3)** **B.** Appropriate range & level of technological competencies? (sub-system)..... **(0-2)**	***5***
Overall presentation	**A.** Attractive well presented product? ..... **(0-4)** **B.** Instructions for use (if needed), controls labelled?..... **(0-1)**	***5***

B — Dumbwaiter

Design and make a working model of an electro-mechanically controlled dumbwaiter which operates between two floors. Limit switches or other appropriate safety features should be incorporated into your design.

Ordinary Level Folder

Analysis of brief	Design should incorporate the following features: Dumbwaiter, operates between two floors and has appropriate safety features.	***5***
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types of dumbwaiters and electro-mechanical sub-systems.	***5***
Design Ideas	Dumbwaiter: Sketch of one design shown.	***6***
Criteria for selection of solution	Valid justification of this idea (at least two reasons).	***4***
Sketches /drawings for manufacture	Manufacture drawing of the chosen solution and sub-system.	***6***
Manufacturing sequence/processes	Sequence of events for manufacture of the chosen solution.	***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 dumbwaiter and is it complete?	***5***
Suitability, Functional	Does the dumbwaiter function? Does it open & close automatically?	***5***
Design/Inventiveness	Inventive design of dumbwaiter and/or model 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 sub-system?	***5***
App. manufacturing processes	Complete dumbwaiter manufactured using appropriate processes?	***5***
Quality of processes	Quality of the product after manufacture?	***5***
Assembly	Appropriate methods of assembly used? Quality of assembly.	***5***
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	***5***
Tech. competencies/ Application of skillss	Appropriate level and range of skills/technological competencies?	***5***
Overall presentation	Attractive, well presented product?	***5***

B — Dumbwaiter

Design and make a working model of an electro-mechanically controlled dumbwaiter which operates between two floors. Limit switches or other appropriate safety features should be incorporated into your design.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? (Restate: mark = 1) **A.** Dumbwaiter, electro-mechanical with appropriate safety features ..... **(0-3)** **B.** Design specification generated/list of objectives..... **(0-2)**	***5***
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Various types of dumbwaiters, ... **(0-3)** **B.** Electro-mechanical sub-systems, various mechanisms.. ..... **(0-2)**	***5***
Design Ideas	**A.** Dumbwaiter & sub-system design 1 - well sketched & annotated ..... **(0-3)** **B.** Dumbwaiter & sub system design 2 - well sketched & annotated..... **(0-3)**	***6***
Criteria for selection of solution	**A.** Selected design identified. ..... **(0-2)** **B.** Valid justification of selected design idea and sub-system..... **(0-2)**	***4***
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawings of the chosen solution ..... **(0-3)** **B.** Circuit drawings/Graphic of PIC circuit with inputs & outputs & Flowsheet **(0-3)**	***6***
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the chosen solution. ..... **(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 an dumbwaiter and is it complete? ..... **(0-3)** **B.** Does it have an electro-mechanical sub-system? ..... **(0-2)**	***5***
Suitability, Functional	**A.** Is the dumbwaiter suitable for use? ..... **(0-3)** **B.** Does it operate upward and downward with appropriate safety features?..... **(0-2)**	***5***
Design/Inventiveness	**A.** Inventive design of the Dumbwaiter and sub-system and/or mock-up of all or part of the solution? (model = 2)..... **(0-5)**	***5***
Originality, commercial comp.	**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 mechanical sub-system? ..... **(0-3)** **B.** Appropriate electronic sub-system? ..... **(0-2)** (Not working max. mark 4)	***5***
App. manufacturing processes	**A.** Product manufactured using appropriate processes? ..... **(0-3)** **B.** Control system manufactured using appropriate processes? ..... **(0-2)**	***5***
Quality of processes	**A.** Quality of dumbwaiter after manufacture..... **(0-3)** **B.** Quality of the control system after manufacture?..... **(0-2)**	***5***
Assembly	**A.** Appropriate methods of assembly used? ..... **(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. competencies/ Application of skillss	Does the product demonstrate that the candidate has an: **A.** Appropriate range & level of technological competencies? (dumbwaiter) .... **(0-3)** **B.** Appropriate range & level of technological competencies? (sub-system)..... **(0-2)**	***5***
Overall presentation	**A.** Attractive well presented product? ..... **(0-4)** **B.** Instructions for use (if needed), controls labelled?..... **(0-1)**	***5***

C — Automatic Gate

Security is an issue which becomes more significant for homes and businesses as darkness falls. With this in mind, design and make a working model of a gate that closes automatically at nightfall. Your model should incorporate appropriate safety features.

Ordinary Level Folder

Analysis of brief	Design should incorporate the following features: Electro-mechanically automatic gate. Must close automatically at night.	***5***
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types of Automatic gates and control systems.	***5***
Design Ideas	Automatic gate: Sketch of one design shown.	***6***
Criteria for selection of solution	Valid justification of this idea (at least two reasons).	***4***
Sketches /drawings for manufacture	Manufacture drawing of the chosen solution and sub-system.	***6***
Manufacturing sequence/processes	Sequence of events for manufacture of the chosen solution.	***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 gate that closes automatically at night?	***5***
Suitability, Functional	Does the Gate close automatically at night?	***5***
Design/Inventiveness	Inventive design of the Automatic gate and control system and/or model 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 height adjusting mechanism ?	***5***
App. manufacturing processes	Complete automatic gate and control system manufactured using appropriate processes?	***5***
Quality of processes	Quality of the product after manufacture?	***5***
Assembly	Appropriate methods of assembly used? Quality of assembly.	***5***
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	***5***
Tech. competencies/ Application of skillss	Appropriate level and range of skills/technological competencies?	***5***
Overall presentation	Attractive, well presented product?	***5***

C — Automatic Gate

Security is an issue which becomes more significant for homes and businesses as darkness falls. With this in mind, design and make a working model of a gate that closes automatically at nightfall. Your model should incorporate appropriate safety features.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? (Restate: mark = 1) **A.** Automatic gate, electro-mechanically controlled, closes in the dark..... **(0-3)** **B.** Design specification generated/list of objectives..... **(0-2)**	***5***
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Various types of automatic gates, etc. ..... **(0-3)** **B.** Various mechanical/electro-mechanical solutions..... **(0-2)**	***5***
Design Ideas	**A.** Automatic gate design 1 - well sketched & annotated..... **(0-3)** **B.** Automatic gate design 2 - well sketched & annotated..... **(0-3)**	***6***
Criteria for selection of solution	**A.** Selected design identified. ..... **(0-2)** **B.** Valid justification of selected design idea and sub-system ..... **(0-2)**	***4***
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawings of the chosen solution ..... **(0-3)** **B.** Circuit drawings/Graphic of PIC circuit with inputs & outputs & Flowsheet **(0-3)**	***6***
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the chosen solution. ..... **(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 automatic gate and is it complete? ..... **(0-3)** **B.** Does the electro-mechanical system satisfy the brief? ..... **(0-2)**	***5***
Suitability, Functional	**A.** Does the gate close automatically at night?..... **(0-3)** **B.** Are there appropriate safety features? ..... **(0-2)**	***5***
Design/Inventiveness	**A.** Inventive design of the automatic gate and control system and/or mock-up of all or part of the solution? (model = 2)..... **(0-5)**	***5***
Originality, commercial comp.	**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, weather proof, etc.) ..... **(0-5)**	***5***
Appropriate Sub-system	**A.** Appropriate mechanical system?..... **(0-3)** **B.** Appropriate electrical/electronic control system? ..... **(0-2)** (Not working max. mark 4)	***5***
App. manufacturing processes	**A.** Automatic gate manufactured using appropriate processes? ..... **(0-3)** **B.** Control system manufactured using appropriate processes? ..... **(0-2)**	***5***
Quality of processes	**A.** Quality of the automatic gate after manufacture using the stated processes?..... **(0-3)** **B.** Quality of the control system after manufacture?..... **(0-2)**	***5***
Assembly	**A.** Appropriate methods of assembly used? ..... **(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. competencies/ Application of skillss	Does the product demonstrate that the candidate has an: **A.** Appropriate range & level of technological competencies? (gate)..... **(0-3)** **B.** Appropriate range & level of technological competencies? (sub-system)..... **(0-2)**	***5***
Overall presentation	**A.** Attractive well presented product? ..... **(0-4)** **B.** Instructions for use (if needed), controls labelled?..... **(0-1)**	***5***

D Automatic Flag

In recognition of Ireland's commemoration of the 1916 Rising, design and make a working model of a flagstaff that raises a flag automatically in the morning and lowers it automatically at night.

Ordinary Level Folder

Analysis of brief	Design should incorporate the following features: Automatic flagstaff, raise the flag in the morning and lower it at night.	***5***
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types of flagstaff. Possible electro-mechanical systems.	***5***
Design Ideas	Automatic flagstaff: Sketch of one design shown.	***6***
Criteria for selection of solution	Valid justification of this idea (at least two reasons).	***4***
Sketches /drawings for manufacture	Manufacture drawing of the chosen solution and sub-system.	***6***
Manufacturing sequence/processes	Sequence of events for manufacture of the chosen solution.	***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 Automatic flagstaff designed to raise and lower the flag automatically in response to lighting conditions?	***5***
Suitability, Functional	Does the Automatic flagstaff raise and lower the flag automatically in response to light and dark conditions?	***5***
Design/Inventiveness	Inventive design of the automatic flagstaff 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 sub-systems?	***5***
App. manufacturing processes	Complete automatic flagstaff manufactured using appropriate processes?	***5***
Quality of processes	Quality of the product after manufacture?	***5***
Assembly	Appropriate methods of assembly used? Quality of assembly.	***5***
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	***5***
Tech. competencies/ Application of skillss	Appropriate level and range of skills/technological competencies?	***5***
Overall presentation	Attractive, well presented product?	***5***

D Automatic Flag

In recognition of Ireland's commemoration of the 1916 Rising, design and make a working model of a flagstaff that raises a flag automatically in the morning and lowers it automatically at night.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? **A.** Automatic flagstaff. ..... **(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 automatic flagstaffs, ... **(0-3)** **B.** Possible position/proximity sensors and outputs for the display. ..... **(0-2)**	***5***
Design Ideas	**A.** Automatic flagstaff design 1 - well sketched & annotated ..... **(0-3)** **B.** Automatic flagstaff design 2 - well sketched & annotated ..... **(0-3)**	***6***
Criteria for selection of solution	**A.** Selected design identified. ..... **(0-2)** **B.** Valid justification of selected design idea and sub-system..... **(0-2)**	***4***
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawings of the chosen solution ..... **(0-3)** **B.** Circuit drawings/Graphic of PIC circuit with inputs & outputs & Flowsheet **(0-3)**	***6***
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the chosen solution. ..... **(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 an automatic flagstaff?..... **(0-3)** **B.** Is it designed to raise and lower the flag automatically at night? ..... **(0-2)**	***5***
Suitability, Functional	**A.** Does the automatic flagstaff respond to light and dark conditions? ..... **(0-3)** **B.** Does it have a working automatic raising and lowering system? ..... **(0-2)**	***5***
Design/Inventiveness	**A.** Inventive design of the flagstaff and electro-mechanical sub-system? and/or mock-up of all or part of the solution? (model = 2)..... **(0-5)**	***5***
Originality, commercial comp.	**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-mechanical sub-system ..... **(0-5)** (Not working max. mark 4)	***5***
App. manufacturing processes	**A.** Automatic flagstaff manufactured using appropriate processes? ..... **(0-3)** **B.** Sub-system manufactured using appropriate processes?..... **(0-2)**	***5***
Quality of processes	**A.** Quality of the flagstaff after manufacture using the stated processes?..... .**(0-3)** **B.** Quality of the electro-mechanical sub-system? ..... **(0-2)**	***5***
Assembly	**A.** Appropriate methods of assembly used? ..... **(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. competencies/ Application of skillss	Does the product demonstrate that the candidate has an: **A.** Appropriate range & level of technological competencies? (flagstaff) ..... **(0-3)** **B.** Appropriate range & level of technological competencies? (sub-system)..... **(0-2)**	***5***
Overall presentation	**A.** Attractive well presented product? ..... **(0-4)** **B.** Instructions for use (if needed), controls labelled?..... **(0-1)**	***5***

E

Pet Grooming Table

Design and make a working model of an adjustable pet-grooming table where the height of the table can be adjusted electro-mechanically. Your model should incorporate appropriate safety features.

Ordinary Level Folder

Analysis of brief	Design should incorporate the following features: Adjustable pet grooming table, electro-mechanical with appropriate safety features.	***5***
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types of adjustable pet grooming tables & electro-mechanical systems.	***5***
Design Ideas	Adjustable pet grooming table: Sketch of one design shown.	***6***
Criteria for selection of solution	Valid justification of this idea (at least two reasons).	***4***
Sketches /drawings for manufacture	Manufacture drawing of the chosen solution and sub-system.	***6***
Manufacturing sequence/processes	Sequence of events for manufacture of the chosen solution.	***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-mechanically controlled pet grooming table?	***5***
Suitability, Functional	Does the adjustable pet grooming table work? (allowing for complexity of the solution)	***5***
Design/Inventiveness	Inventive design of the adjustable pet grooming table 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 mechanical/electro-mechanical sub-system?	***5***
App. manufacturing processes	Complete Adjustable pet grooming table manufactured using appropriate processes?	***5***
Quality of processes	Quality of product after manufacture?	***5***
Assembly	Appropriate methods of assembly used? Quality of assembly.	***5***
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	***5***
Tech. competencies/ Application of skillss	Appropriate level and range of skills/technological competencies?	***5***
Overall presentation	Attractive, well presented product?	***5***

E Pet Grooming Table

Design and make a working model of an adjustable pet-grooming table where the height of the table can be adjusted electro-mechanically. Your model should incorporate appropriate safety features.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? (Restate: mark = 1) **A.** Height adjustable pet grooming table, electro-mechanical with appropriate safety features. ..... **(0-3)** **B.** Design specification generated/list of objectives ..... **(0-2)**	***5***
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Pet Grooming table designs, mechanical/electro-mechanical sub-systems .... **(0-3)** **B.** Limit switching/other safety features ..... **(0-2)**	***5***
Design Ideas	**A.** Adjustable pet grooming table- Design 1 - well sketched & annotated ..... **(0-3)** **B.** Adjustable pet grooming table- Design 2 - well sketched & annotated ..... **(0-3)**	***6***
Criteria for selection of solution	**A.** Selected design identified ..... **(0-2)** **B.** Valid justification of selected design idea and sub-system ..... **(0-2)**	***4***
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawings of the chosen solution..... **(0-3)** **B.** Circuit drawings/Graphic of PIC circuit with inputs & outputs & Flowsheet **(0-3)**	***6***
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the chosen solution ..... **(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 height adjustable pet grooming table? .. **(0-3)** **B.** Does it incorporate a mechanical/electro-mechanical sub-system?..... **(0-2)**	***5***
Suitability, Functional	**A.** Will this product function as a height adjustable pet grooming table?..... **(0-3)** **B.** Does it have a functional sub-system with appropriate safety features? ..... **(0-2)**	***5***
Design/Inventiveness	**A.** Inventive design of the Adjustable pet grooming table 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.** Suitability of the materials selected for the Adjustable pet grooming table and sub-system..... **(0-5)**	***5***
Appropriate sub-system(s)	**A.** Appropriate mechanical/electro-mechanical sub-system with safety feature. **(0-5)** (Not working max. mark 4)	***5***
App. manufacturing processes	**A.** Adjustable pet grooming table manufactured using appropriate processes.... **(0-3)** **B.** Control system manufactured using appropriate processes..... **(0-2)**	***5***
Quality of processes	**A.** Quality of the artefact after manufacture using stated processes?..... **(0-3)** **B.** Quality of the control system?..... **(0-2)**	***5***
Assembly	**A.** Appropriate methods of assembly used? ..... **(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. competencies/ Application of skillss	Does the product demonstrate that the candidate has an: **A.** Appropriate range & level of technological competencies? (table)..... **(0-3)** **B.** Appropriate range & level of technological competencies? (sub-system)..... **(0-2)**	***5***
Overall presentation	**A.** Attractive well presented product? ..... **(0-4)** **B.** Instructions for use (if needed), controls labelled?..... **(0-1)**	***5***

F

Garden Shelter

Design and make a working model of an environmentally friendly garden shelter. The shelter should be designed so that it can be electro-mechanically rotated on its own axis as desired by the user. The shelter should illuminate automatically at nightfall.

Ordinary Level Folder

Analysis of brief	Design should incorporate the following features: A garden shelter, electro-mechanically rotate and automatically illuminate at night.	***5***
Investigation of possible solutions	Evidence of investigation: (sketches, photos, etc.) Various types of garden shelters, possible mechanisms and circuitry.	***5***
Design Ideas	Garden shelter: Sketch of one design shown.	***6***
Criteria for selection of solution	Valid justification of this idea (at least two reasons).	***4***
Sketches /drawings for manufacture	Manufacture drawing of the chosen solution and sub-system.	***6***
Manufacturing sequence/processes	Sequence of events for manufacture of the chosen solution.	***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 rotatable garden shelter with an automatic lighting system?	***5***
Suitability, Functional	Does the garden shelter & lighting system work? Can it be electro-mechanically rotated? If not, has it the potential to work?	***5***
Design/Inventiveness	Inventive design of the garden shelter and/or mock-up of 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 mechanical & lighting system, reliable?	***5***
App. manufacturing processes	Complete rotatable garden shelter and electronic lighting system manufactured using appropriate processes?	***5***
Quality of processes	Quality of the product after manufacture?	***5***
Assembly	Appropriate methods of assembly used? Quality of assembly?	***5***
Detailed finish/Safety Considerations	No sharp edges or safety hazards (loose parts, toxic paints etc.?)	***5***
Tech. competencies/ Application of skillss	Appropriate level and range of skills/technological competencies?	***5***
Overall presentation	Attractive, well presented product?	***5***

F

Garden Shelter

Design and make a working model of an environmentally friendly garden shelter. The shelter should be designed so that it can be electro-mechanically rotated on its own axis as desired by the user. The shelter should illuminate automatically at nightfall.

Higher Level Folder

Analysis of brief	Problem posed by brief broken down into identifiable units? (Restate: mark = 1) **A.** Garden shelter, electro-mechanically rotatable & automatic lighting system. **(0-3)** **B.** Design specification generated/list of objectives..... **(0-2)**	***5***
Investigation of possible solutions	Evidence of investigation/identification/research: (sketches, photos, etc.) **A.** Various types of garden shelters, mechanisms. ..... **(0-3)** **B.** Electro-mechanical & lighting sub-systems. ..... **(0-2)**	***5***
Design Ideas	**A.** Garden shelter design 1 - well sketched & annotated..... **(0-3)** **B.** Garden shelter design 2 - well sketched & annotated..... **(0-3)**	***6***
Criteria for selection of solution	**A.** Selected design identified..... **(0-2)** **B.** Valid justification of selected design idea and sub-system..... **(0-2)**	***4***
Sketches /drawings for manufacture	Dimensioned/scaled drawings-sketches associated with manufacture. **A.** Detailed drawings of the chosen solution ..... **(0-3)** **B.** Circuit drawings/Graphic of PIC circuit with inputs & outputs & Flowsheet **(0-3)**	***6***
Manufacturing sequence/processes	**A.** Sequence of events for manufacture of the chosen solution..... **(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 garden shelter with electro-mechanical rotation? ..... **(0-3)** **B.** Does the garden shelter have an automatic lighting system?..... **(0-2)**	***5***
Suitability, Functional	**A.** Does the garden shelter have a functioning mechanical system? ..... **(0-3)** **B.** Is the lighting system reliable? ..... **(0-2)**	***5***
Design/Inventiveness	**A.** Inventive design of the garden shelter, mechanical & lighting 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 mechanical & electronic sub-system ..... **(0-5)** (Not working max. mark 4)	***5***
App. manufacturing processes	**A.** Garden shelter manufactured using appropriate processes? ..... **(0-3)** **B.** Lighting system manufactured using appropriate processes?..... **(0-2)**	***5***
Quality of processes	**A.** Quality of the garden shelter after manufacture?..... **(0-3)** **B.** Quality of the lighting sub-system?..... **(0-2)**	***5***
Assembly	**A.** Appropriate methods of assembly used? ..... **(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. competencies/ Application of skillss	Does the product demonstrate that the candidate has an: **A.** Appropriate range & level of technological competencies? (garden shelter) . **(0-3)** **B.** Appropriate range & level of technological competencies? (sub-system)..... **(0-2)**	***5***
Overall presentation	**A.** Attractive well presented product? ..... **(0-4)** **B.** Instructions for use (if needed), controls labelled?..... **(0-1)**	***5***