# Coimisiún na Scrúduithe Stáit
State Examinations Commission

## Junior Cycle 2024

## Marking Scheme

## Engineering

## Common 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.

Coimisiún na Scrúduithe Stáit

**State Examinations Commission**

# Junior Cycle Final Examination, 2024

# Engineering

## Common Level

## Marking Scheme

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**120 Marks**

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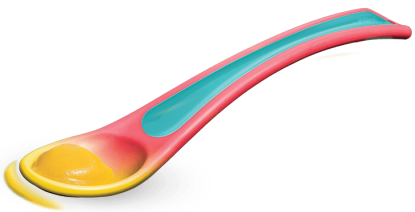
Answer **all** questions

# Outline Marking Scheme 2024

## Question 1 (29 marks)

**(a)** (i) Explanation @ 2 marks
(ii) Two metals @ 1 mark each
(iii) One application @ 2 marks

**(b)** (i) One reason @ 2 marks
(ii) One application @ 2 marks

**(c)** (i) Two advantages @ 2 marks each
(ii) One reason @ 1 mark

**(d)** (i) Explanation @ 2 marks
(ii) Two disadvantages @ 1 mark each

**(e)** (i) Material @ 1 mark
Reason @ 1 mark
(ii) Description @ 2 marks
(iii) Three steps @ 1 mark each
(iv) Draw Elevation @ 3 marks

## Question 2 (32 marks)

**(a)** Identification @ 1 + 1 + 1 mark

**(b)** (i) Name @ 2 marks
(ii) Explanation @ 2 marks
(iii) One application @ 2 marks

**(c)** (i) Identify force @ 2 mark
(ii) Explanation @ 2 marks
(iii) Two applications @ 1 mark each
(iv) Explanation @ 2 marks

**(d)** (i) Two methods @ 1 mark each
(ii) Sketch symbol @ 2 marks
(iii) Two applications @ 2 marks each

**(e)** (i) Design & sketch @ 3 marks
(ii) Material @ 2 marks
(iii) Finish @ 2 marks

## Question 3 (31 marks)

**(a)** (i) Two differences @ 1 mark each
(ii) Two Safety features @ 1 + 1 mark
(iii) Material @ 1 mark
Reason @ 1 mark
(iv) Environmental impact
@ 2 + 2 marks

**(b)** (i) Application @ 2 marks
(ii) Name @ 2 marks
(iii) Explanation @ 2 marks
(iv) Description @ 2 marks

**(c)** (i) Rendered sketch @ 3 marks
(ii) Explanation @ 2 marks
(iii) Description @ 2 marks

**(d)** (i) Identify Gate X @ 1 mark
Identify Gate Y @ 1 mark
(ii) Complete truth table @ 4 marks

## Question 4 (28 marks)

**(a)** (i) Match three @ 1 mark each
(ii) Advantage @ 2 marks
Disadvantage @ 2 marks
(iii) Name @ 1 mark
Use @ 2 marks

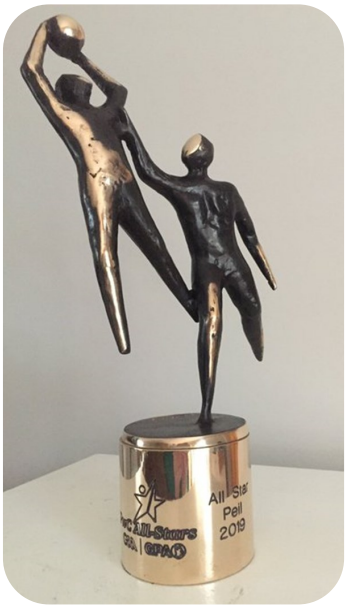
**(b)** (i) Advantage @ 2 marks
Disadvantage @ 2 marks
(ii) Calculation @ 2 marks

**(c)** (i) Explanation @ 2 marks
(ii) Identify @ 1 mark
Explanation @ 1 mark
(iii) Two processes @ 1 mark each
(iv) Reason @ 1 mark

**(d)** (i) Explanation @ 3 marks
(ii) Advantage @ 1 mark
(iii) Reason @ 1 mark

**Question 1**

**(a)** Bronze is an alloy commonly used to make trophies.



*All-Star Award Trophy*

(i) Explain the term *alloy*.

| |
|---|
| Explanation: An alloy is a metal made by combining |
| two or more metallic elements to create a new metal |
| with new properties. |

**Explanation @ 2 marks**

(ii) Name two metals present in the alloy bronze.

| |
|---|
| Metal 1: Copper. |
| Metal 2: Tin. |

**Metal 1 @ 1 mark, Metal 2 @ 1 mark**

(iii) State one other application of bronze.

| |
|---|
| Application: Money coins ..... |

**One application @ 2 marks**

**(b)** The baby feeding spoons shown are made from a thermochromic smart material, which changes colour when hot.

(i) State one reason why thermochromic materials are suitable for the manufacture of baby feeding spoons.

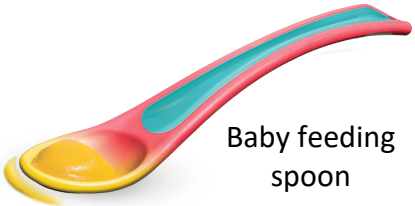
| |
|---|
| Reason: The use of a thermochromic material |
| ensures that excessively hot food will not |
| be fed to a baby or young child. |
| |

**One reason @ 2 marks**


(ii) Suggest one other application for thermochromic smart materials.

| |
|---|
| Application: Thermochromic materials are used |
| in a variety of products such as drinking cups ..... (or |
| clothing dye or smart glass used in windows). |
| |

**One application @ 2 marks**


Baby feeding spoon

**(c)** (i) The *Fitbit Smart Watch* has changed the way we think about fitness. Outline two advantages for its use.

| |
|---|
| Advantage 1: Portability, the smart watch is worn by |
| the user and can track the movements and actions of |
| the user. |
| Advantage 2: A smart watch can store large amounts |
| of data so a user can identify trends and patterns over |
| a long period of time. |

**Two advantages @ 2 marks each**

*Fitbit Smart Watch*


*Silicone Infinity Band*

(ii) The *Fitbit* strap, called an *Infinity Band,* is made from a plastic called silicone.

State one reason why silicone is a suitable material for the infinity band.

| |
|---|
| Reason: Silicone is a strong material which makes it suitable for use as a Fitbit |
| strap ..... (or light material or water and heat resistant material). |

**One reason @ 1 mark**

**(d)** (i) Self-Driving cars depend on autonomous technology. Explain the meaning of the word *autonomous*.

| |
|---|
| Explanation: Autonomous means that a |
| combination of sensors, cameras, radar and |
| AI are used to replace the human operator. |
| |
| |

**Explanation @ 2 marks**


*The Cruise Autonomous Car*

(ii) Identify two possible disadvantages associated with autonomous vehicles.

| |
|---|
| Disadvantage 1: Potential for machine error leading to the possibility of a traffic |
| accident causing serious injury or loss of life. |
| |
| Disadvantage 2: Potential for security issues due to the possibility of hacking of |
| the software used in autonomous vehicles. |
| |

**Two disadvantages @ 1 mark each**

**(e)** (i) An adjustable mobile phone holder is shown. Name a suitable material to make *Part **X*** and give a reason for your choice.

| |
|---|
| Material: Acrylic. |
| Reason: Acrylic is a light material ..... |
| (or attractive or cheap or easy to cut and |
| bend to shape or comes in a variety of |
| different colours). |
| |


**Material @ 1 mark, Reason @ 1 mark**

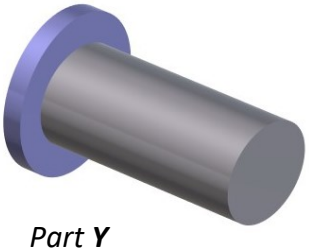
(ii) Describe how you would bend *Part **X*** to shape.

| |
|---|
| Description: The material is bent to shape using a hot wire strip heater. |
| The material is placed over the wire where it is to be bent. The hot wire softens |
| the acrylic which is then bent to the required shape and checked using an |
| engineers protractor. |
| |

**Description @ 2 marks**

(iii) List three steps involved in machining *Part **Y*** on a centre lathe.

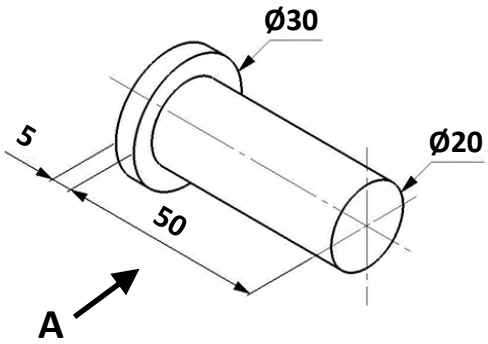
| |
|---|
| 1: Face the end of the material. |
| 2: Marking out (50mm using a callipers). |
| 3: Parallel Turn (50mm length to diameter 20mm). |



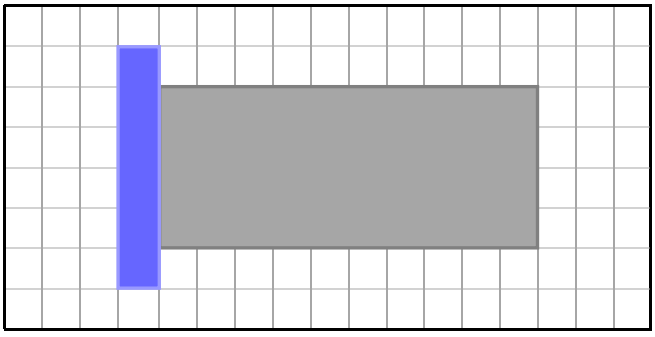
*Part **Y***

**Three steps @ 1 mark each**

(iv) In the grid provided draw an elevation of *Part **Y*** when viewed from arrow '**A**'.




*Part **Y***



Note: Each grid square represents 5mm.

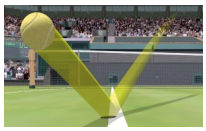
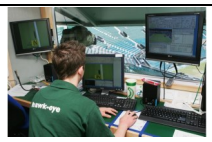
**Draw Elevation @ 3 marks**

**Question 2**

*Engineering has been instrumental in progressing the standards achieved within sports and plays a crucial role in assisting in the fairest outcome of sporting results.*

**(a)** Hawk-Eye was introduced in tennis to track the trajectory of a tennis ball by using cameras to triangulate the ball position. The system is made up of three main components listed in the table below.

Identify the components as either input, process or output.

| Component | Answer: |
|---|---|
| Hawk-Eye camera  | Input. |
| Viewing screen  | Output. |
| Triangulation metric software  | Process. |

**Correct identification @ 1 mark each**

**(b)** (i) Name the mechanism shown opposite used to tension the tennis net.

| |
|---|
| Name: Worm and wormwheel. |

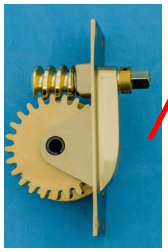
**Name @ 2 marks**

*Tennis Net*

(ii) Explain how this mechanism is used to tension the tennis net.

| |
|---|
| Explanation: The operator turns the handle which is |
| connected to the worm. The worm engages the wormwheel |
| which pulls the net from the opposite post, placing it in |
| tension. |

**Explanation @ 2 marks**



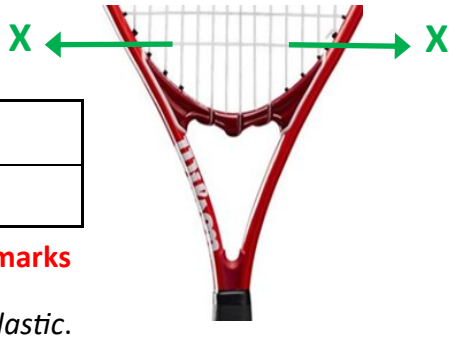
*Mechanism*

(iii) Identify one other application of this mechanism.

| |
|---|
| Application: Lifts ..... (or elevators or presses and rolling |
| mills or clothes lines or fencing wire). |

**One application @ 2 marks**

**(c)** (i) Tennis racket strings are made from nylon. Identify the force acting on the string at **X**.




| Force: Tension. |
|---|
| |

**Identify force @ 2 marks**

(ii) Nylon is a thermoplastic. Explain the term *thermoplastic*.

| Explanation: Thermoplastic polymers can be softened by |
|---|
| heating before being processed or shaped after which |
| they are then left to cool and harden to their final shape. |
| |
| |
| |

**Explanation @ 2 marks**

*Wilson Pro Staff Precision Tennis Racket*

(iii) Identify two other applications of Nylon.

| Application 1: Guitar strings. |
|---|
| |
| Application 2: Clothing such as Nylon socks. |
| |

**Two applications @ 1 mark each**

(iv) Explain one reason for using a thermoplastic over a thermosetting plastic.

| Explanation: Thermoplastic materials are more suitable for use in situations where |
|---|
| it is desirable to be able to recycle or reuse the material. |
| |
| |
| |

**Explanation @ 2 marks**

**(d)** (i) LED's, often used to indicate serve speeds, have polarity (positive and negative leg). Identify two suitable methods used to determine the polarity of an LED.

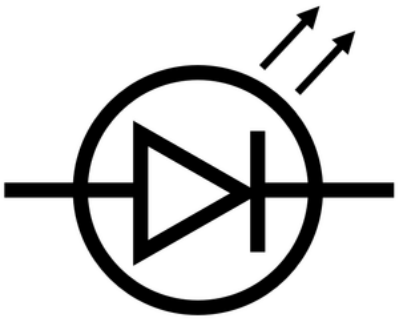

*LED Serve Speed Board*

| |
|---|
| Method 1: The shorter leg of an LED is the cathode or negative (-) leg. |
| |
| |
| |
| Method 2: The flat edge on the bottom rim of the LED is closest to the |
| the cathode or negative (-) leg. |
| |
| |

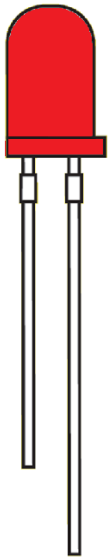
**Two methods @ 1 marks each**

(ii) Sketch the electronic symbol used to represent an LED.

Sketch:



**Sketch symbol @ 2 marks**



*LED*

(iii) Outline two other applications of an LED.

| |
|---|
| Application 1: Television screens as in a ULED Television or a QLED Television. |
| |
| Application 2: Car headlights. |
| |

**Two applications @ 2 marks each**

**(e)** (i) Using rendered sketching, design a storage unit which will:

- hold a single tennis racket
- have a place to store a water bottle
- hold three tennis balls.


*Rendered sketch:*

**Design and Sketch @ 3 marks**

(ii) Identify the material(s) used to make this storage unit.

| Material(s) used: Aluminium is a suitable material for the manufacture of |
|---|
| the storage unit. |
| |

**Suitable material @ 2 marks**

(iii) Indicate your choice of finish for the materials used in your design.

| Finish applied: Painting is a suitable finish to apply to aluminium. |
|---|
| |
| |

**Suitable finish @ 2 marks**

**Question 3**

*With the help of Engineering over the past century, cars have been transformed in terms of appearance, materials and drive systems.*

**(a)** (i) Identify two differences between the design features of the Lotus Evija compared to the Ford Model T.

| |
|---|
| Difference 1: Spoke wheels with solid tyres on the Model |
| T while alloy wheels and pneumatic tyres on the Lotus. |
| Difference 2: Model T is open to the elements while |
| the lotus is enclosed. |

**Two differences @ 1 mark each**

*Ford Model T*

(ii) Identify two safety features in modern cars.

| |
|---|
| 1: Seatbelts. |
| 2: Airbag. |

**Two safety features @ 1 mark each**

(iii) Select one material which is suitable for use in the manufacture of the Lotus Evija and give a reason for your choice.

| |
|---|
| Material: Carbon fibre. |
| Reason: Carbon fibre is a strong material- ..... (or can be |
| easily shaped or lightweight or attractive finish). |

**Material @ 1 mark, Reason @ 1 mark**

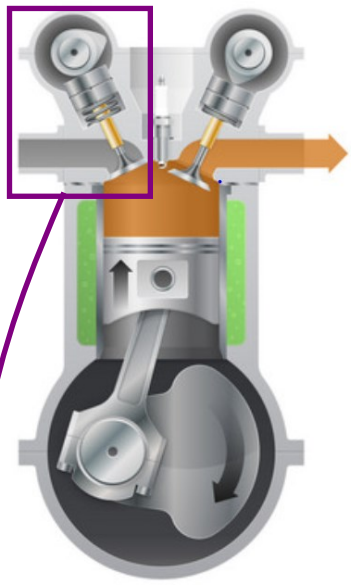
*Lotus Evija electric hypercar*

(iv) Describe the environmental impact of each of the cars shown above.

| |
|---|
| Ford Model T: Uses an internal combustion engine which produces exhaust fumes |
| from the burning of fossil fuel and causing environmental pollution. |
| |
| Lotus Evija: Electric vehicles are considered good for the environment as they |
| use renewable energy instead of fossil fuels. |
| |

**Two environmental impacts @ 2 marks each**

**(b)** Prior to the introduction of electric vehicles, society depended on the internal combustion engine.



*Four stroke engine*

(i) Give one application of a four stroke engine.

| |
|---|
| Application: Automobiles ..... (or trucks or trains or |
| Light aircraft or motorcycles). |

**Application @ 2 marks**

(ii) Name the engine stroke shown opposite.

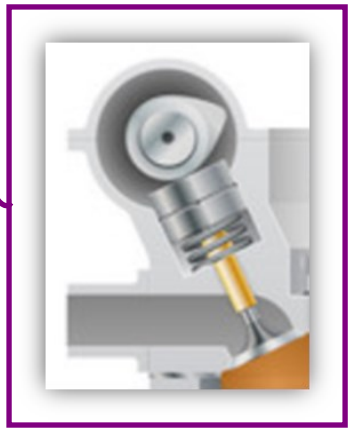
| |
|---|
| Stroke: Exhaust stroke. |
| |
| |

**Name @ 2 marks**

(iii) Explain how a four stroke engine is lubricated.

| |
|---|
| Explanation: Four-stroke engines are lubricated by |
| oil which is held in an oil sump. The oil is distributed |
| around the engine when it is operating. |
| |
| |
| |

**Explanation @ 2 marks**



*Mechanism **A***

(iv) Describe the operation of mechanism **A**, shown above, in the engine.

| |
|---|
| Description: Mechanism A is the camshaft and inlet valve. |
| As the camshaft rotates it presses against and pushes the valve open. |
| As the camshaft continues to rotate the spring ensures that the valve will |
| return to close the inlet valve. |
| |
| |
| |

**Description @ 2 marks**

**(c)** A dash cam may be placed in a car to monitor car journeys.

(i) Complete a rendered sketch of the HD dash cam shown.


*HD dash cam*

Rendered Sketch:

**Rendered sketch @ 3 marks**

(ii) Explain the term *HD*.

Explanation: HD stands for High-definition. This means that this type of video is of a higher resolution and quality than a standard-definition video.

**Explanation @ 2 marks**

(iii) Describe a method of securing a dash cam in a car.

Description: A dash cam can be attached in a car using a mounting having a connection that fits the camera housing at one end with a suction cup at the other end. The suction cup is capable of providing a firm attachment of the camera to the car windscreen.

**Description @ 2 marks**

**(d)**


*Car Ignition*

*Windscreen wiper switch*

A car windscreen wiper system shown opposite, has three inputs:

- Input A - Car Ignition
- Input B - Wiper Switch
- Input C - Rain Sensor.

Once the Car Ignition is turned on, any of the other two inputs can activate the wiper system.

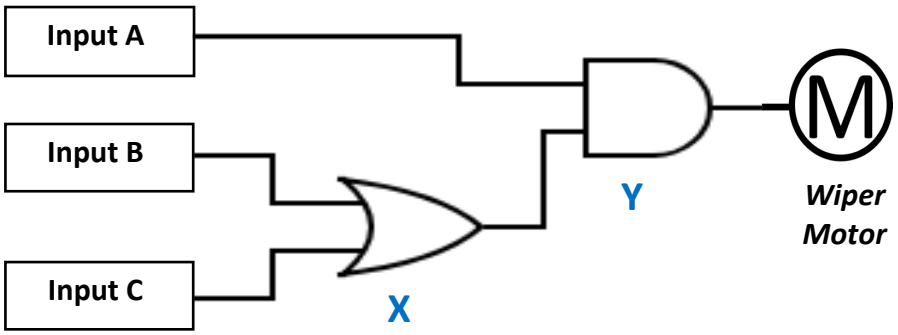
*Rain Sensor*

(i) Identify the logic gates at **X** and **Y** below:

| |
|---|
| Logic Gate at **X**: Or gate. |
| Logic Gate at **Y**: And gate. |

**Identify X @ 1 mark, Identify Y @ 1 mark**

(ii) Complete the truth table below for the logic gates shown at **X** and **Y**.





Input A

Input B

Input C

| Input A | Input B | Input C | Output |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

**Complete truth table @ 4 marks**

**Question 4**

*Engineers can help to tackle climate change, manage the environment and create a more sustainable way of living.*

**(a)** Many types of renewable energies and technologies have been promoted in Ireland in recent years.

(i) Match the following renewable technologies with the corresponding energy conversion:

1) Wind Turbines

2) Battery operated devices

3) Solar Panels.

| Energy Conversion | Renewable Technology |
|---|---|
| Kinetic Energy to Electrical Energy | 1. Wind Turbines. |
| Light Energy to Electrical Energy | 3. Solar Panels. |
| Chemical Energy to Electrical Energy | 2. Battery operated devices. |

**Match three @ 1 mark each**

(ii) List one advantage and one disadvantage of renewable energy.

| |
|---|
| Advantage: Using renewable energy helps to reduce greenhouse gas emissions ..... |
| (or helps to reduce some types of air pollution). |
| |
| Disadvantage: Renewable energy systems can be very expensive to install and may |
| not always be a commercially viable option. |
| |

**Advantage @ 2 marks, Disadvantage @ 2 marks**

(iii) Name one other type of renewal energy and give an example of its use.

| |
|---|
| Name: Biomass energy. |
| Use: Burning organic fuels such as plant material can be used to produce |
| electrical energy. |

**Name @ 1 mark, Use @ 2 marks**

**(b)** Battery operated equipment is frequently used by engineers and construction workers.

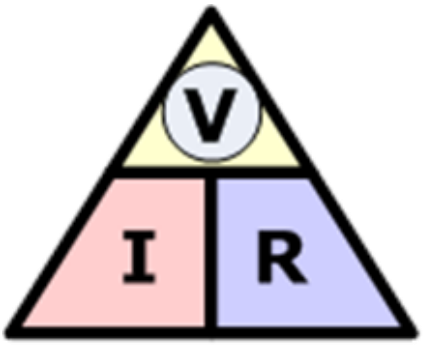
(i) State one advantage and one disadvantage of using battery operated equipment.

| |
|---|
| Advantage: Battery operated equipment is |
| very portable so can be used in places |
| without an electrical supply. |
| |
| Disadvantage: Batteries can run out quickly ..... |
| (or can take a while to be recharged). |
| |
| |

*Husqvarna k535i battery powered disc cutter*

**Advantage @ 2 marks, Disadvantage @ 2 marks**

(ii) The Husqvarna disc cutter uses a 36V Lithium-ion battery. The battery has 9A capacity. Using the formula for Ohms law, calculate the resistance in this battery.




V= Voltage

I = Current (Amps)

R = Resistance (Ohms)

$$V = I \times R$$

Calculation:

Voltage (V) = 36V

Current (I) = 9A

V / I = R  36 / 9 = 4

Resistance is 4 Ohms

**Calculation @ 2 marks**

**(C)** The cutting disc shown is made from hardened steel with diamond particles bonded to the cutting surface.
Heat treatment plays an important role in the manufacture of the cutting disc.


*Cutting Disc*

(i) Explain how the heat treatment process of hardening is carried out.

| |
|---|
| Explanation: Hardening is a heat treatment process that involves heating the |
| steel to a high temperature (cherry red). The heated steel is then quenched in |
| oil or water making the steel hard but also brittle. |
| |
| |
| |
| |

**Explanation @ 2 marks**

(ii) Hardened steel can be very brittle. Identify and explain one process that could be used to reduce some of the brittleness caused by the hardening process.

| |
|---|
| Identify: Tempering. |
| Explanation: The hardened steel is gradually heated until a desired temper colour |
| is achieved to strike the correct balance between hardness and toughness. The |
| steel is then re-quenched at the desired tempered colour / temperature. |
| |
| |
| |

**Identify @ 1 mark, Explanation @ 1 mark**

(iii) Name two other heat treatment processes.

| |
|---|
| Process 1: Annealing. |
| Process 2: Stress relieving. |

**Two processes @ 1 mark each**

(iv) State one reason why the cutting surface has diamond particles bonded to it.

| |
|---|
| Reason: Diamond particles are very hard and they ensure that the cutting disc will |
| maintain an ability to cut for a long period of time. |

**One reason @ 1 mark**

**(d)** Upcycling is a process by which old products are modified and get a second life as a new product. Old electrical appliances and unwanted domestic items can be upcycled for use in our gardens and outdoor living spaces.

(i) Explain how the washing machine drum shown, may be upcycled for a different purpose.

*Washing Machine Drum*

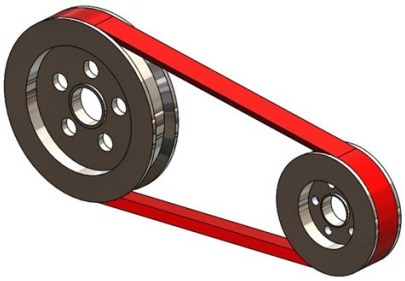
**Explanation:** In order for the washing machine drum to be upcycled it will firstly have to be removed from the washing machine. The drum will then need to be modified to turn it into a new usable product. Washing machine drums may may be engineered for a new use (upcycled) such as a light shade..... (seating, tables, bins etc.)

**Explanation @ 3 marks**

(ii) The drum of a washing machine is rotated using a vee belt and pulley mechanism. Describe one advantage of using a vee belt.

**Advantage:** The vee belt makes greater surface area contact with the pulley meaning it is less lightly to slip.

**Advantage @ 1 mark**



*Vee belt and pulley*

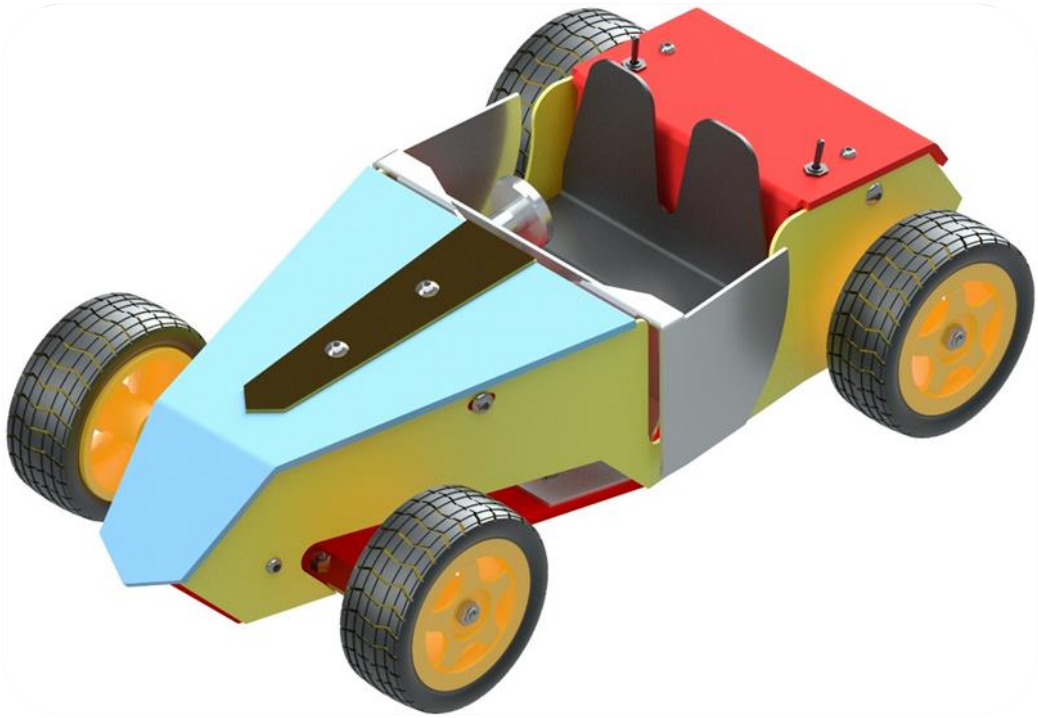
(iii) Give one reason for the drilled holes in the pulleys shown.

**Reason:** The drilled holes are used to mount the pulley wheel ..... (or ensure the movement of air through the pulley wheel ensuring that the pulley does not overheat).

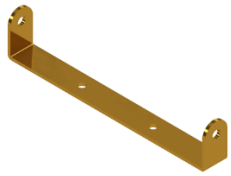
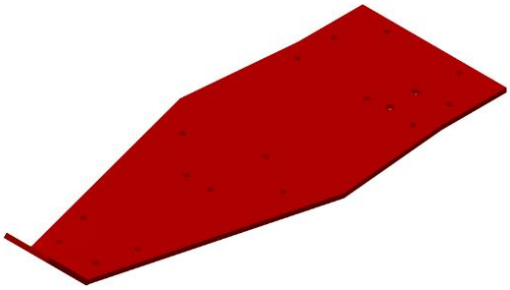
**One reason @ 1 mark**

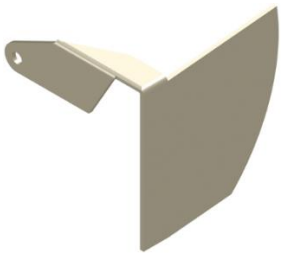
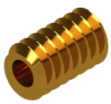
Coimisiún na Scrúduithe Stáit
State Examinations Commission

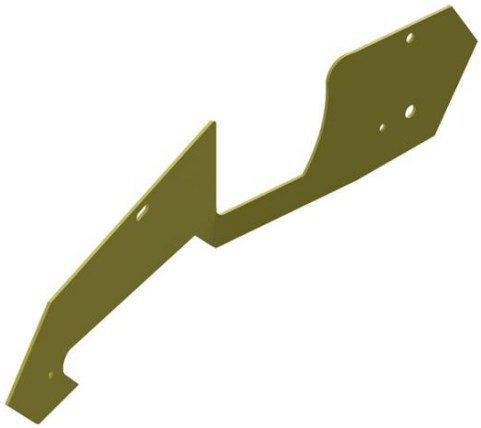
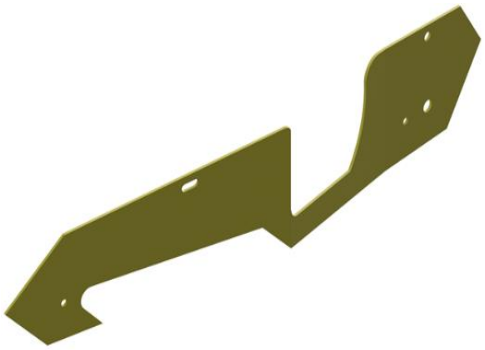
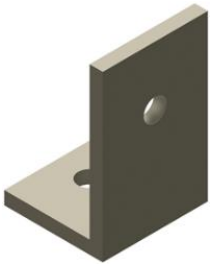
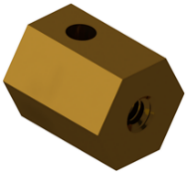
# Junior Cycle Engineering Project
# Model Gullwing Vehicle
# Marking Scheme 2024

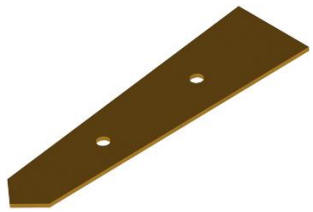
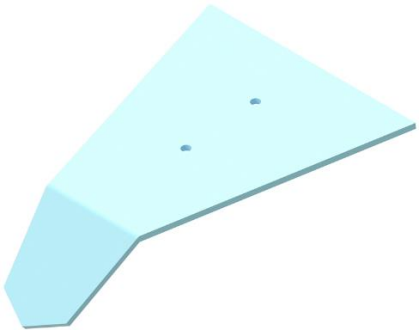
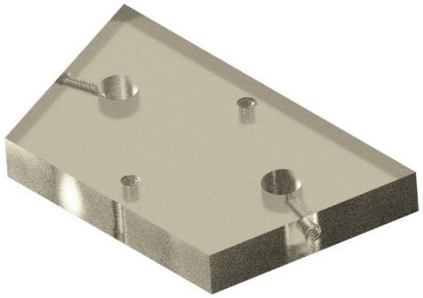
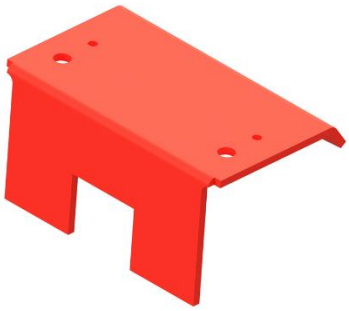


| **Section 1: Complete Model** (‘*Design Element*’ not included) | | |
|---|---|---|
| ***Headings*** | ***Description*** | ***Marks*** |
| **Assembly** | Subjective Grade 1 – 20 | **20** |
| **Finish** | Subjective Grade 1 – 20 | **20** |
| **Mechanical Function** | Subjective Grade 1 – 15 | **15** |
| **Electrical Function** | Subjective Grade 1 – 15 | **15** |
| **Section 1 - Total** | | **70** |
| **Section 2: *‘Design Element’*** (Not required for 2024) | | |
| **Section 2 - Total** | | **--** |

| Section 3: | | | |
|---|---|---|---|
| ***Headings*** | ***Description*** | | ***Marks*** |
| **Part 1 –** Front Axle Support  | Mark out, Shape, Drill & Bend | *5* | **10** |
| **Part 5 –** Rear Panel  | Mark out, Drill & Bend | *5* | |
| **Part 2 –** Dash Panel  | Mark out, Shape, Drill & Bend | *6* | **10** |
| **Part 6 –** Steering Wheel  | Machine, Taper turn & Drill | *4* | |
| **Part 3 –** Chassis  | Mark out, Drill, Shape & Bend | *10* | **10** |

| | | | |
|---|---|---|---|
| **Part 4 –** Drive Motor Holder  | Mark out, Drill, Slots & Shape | *7* | **15** |
| **Part 13 –** Rear Axle Bushing (x2)  | Drill | *4* | |
| **Part 16 –** Drive Motor Adaptor (x2)  | Drill & Tap M4 | *4* | |
| **Part 7 –** Left Door  | Mark out, Shape, Drill & Bend | *15* | **15** |
| **Part 8 –** Right Door  | Mark out, Shape, Drill & Bend | | |
| **Part 14 –** Door Motor Bracket  | Mark out, Drill, Slot & Shape | *8* | **10** |
| **Part 15 –** Door Bushing Support (x2)  | Machine to length & Drill | *2* | |
| **Section 3 - Total** | | | **70** |

| Section 4: | | | |
|---|---|---|---|
| ***Headings*** | ***Description*** | | ***Marks*** |
| **Part 10 –** Right Side Panel  | Mark out, Shape, Drill & Bend | *10* | **20** |
| **Parts 11 –** Left Side Panel  | Mark out, Shape, Drill & Bend | *10* | |
| **Part 9 –** Side Panel Support Bracket (x4)  | Mark out & Drill | *8* | **15** |
| **Part 12 –** Boot Cover Support (x2)  | Machine to length, Drill and Tap | *7* | |

| | | | |
|---|---|---|---|
| **Part 17 –** Bonnet Strip  | Mark out, Drill, & Shape | *5* | **15** |
| **Parts 18 –** Bonnet  | Mark out, Shape, Drill & Bend | *10* | |
| **Part 19 –** Bonnet Support  | Mark out, Drill, Tap & Shape | *10* | **10** |
| **Part 20 –** Boot Cover  | Mark out, Shape, Drill & Bend | *10* | **10** |
| **Section 4 – Total** | | | **70** |
| **Overall Total** | | | **210** |