



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate 2025

Marking Scheme

***Engineering -
Materials and Technology***

Ordinary 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.

LEAVING CERTIFICATE, 2025

Marking Scheme

Written Examination and Practical Examination

***ENGINEERING –
Materials and Technology***

ORDINARY LEVEL

Introduction – written examination

In considering the marking scheme, the following should be noted.

1. The solutions presented are examples only. All other valid solutions are acceptable and are marked accordingly.
2. The detail required in any answer is determined by the context and the manner in which the question is asked, and by the number of marks assigned to the answer in the examination paper and, in any instance, therefore, may vary from year to year.
3. Bonus marks at the rate of 5% of the marks obtained will be given to a candidate who answers entirely through Irish and who obtains less than 75% of the total marks. In calculating the bonus to be applied decimals are always rounded down, not up e.g., 4.5 becomes 4; 4.9 becomes 4, etc. The bonus table given on the next page applies to candidates who answer entirely through Irish and who obtain more than 75% of the total marks.
4. The table below contains information about annotations used for marking throughout the exam paper.

Annotation	Meaning
	Blank page
	Page marked by examiner



Coimisiún na Scrúduithe Stáit

Marcanna Breise as ucht freagairt trí Ghaeilge

Léiríonn an tábla thíos an méid marcanna breise ba chóir a bhronnadh ar iarrthóirí a ghnóthaíonn níos mó ná 75% d'iomlán na marcanna.

N.B. Ba chóir marcanna de réir an ghnáthrata a bhronnadh ar iarrthóirí nach ghnóthaíonn níos mó ná 75% d'iomlán na marcanna don scrúdú. Ba chóir freisin an marc bó nais sin **a shlánú síos**.

Tábla 200 @ 5%

Bain úsáid as an tábla seo i gcás na n-ábhar a bhfuil 200 marc san iomlán ag gabháil leo agus inarb é 5% gnáthrata an bhónais.

Bain úsáid as an ngnáthrata i gcás 150 marc agus faoina bhun sin. Os cionn an mharc sin, féach an tábla thíos.

Bunmharc	Marc Bónais
151 - 153	7
154 - 160	6
161 - 166	5
167 - 173	4

Bunmharc	Marc Bónais
174 - 180	3
181 - 186	2
187 - 193	1
194 - 200	0

LEAVING CERTIFICATE

ENGINEERING - Materials and Technology

(Ordinary Level – 200 marks)

Written Examination Marking Scheme 2025

Answer any four questions

Question 1: 50 marks

Any eight parts @ 6 marks each.

Award 1 extra mark for each of the first two correctly answered parts.

Question 2: 50 marks

- (a) One part @ 15 marks (15)
- (b) One part @ 12 marks (12)
- (c) (i) Three parts @ 3 marks (9)
(ii) Three parts @ 2 marks (6)
- (d) (i) One part @ 4 marks (4)
(ii) One part @ 4 marks (4)

Question 5: 50 marks

- (a) (i) Three parts @ 3 marks (9)
(ii) One part @ 11 marks (11)
- (b) Any two parts @ 5 marks (10)
- (c) Any two parts @ 5 marks (10)
- (d) Two parts @ 5 marks (10)

Question 3: 50 marks

- (a) Any two parts @ 7 marks (14)
 - (b) Any two parts @ 7 marks (14)
 - (c) Any two parts @ 5 marks (10)
 - (d) Any two parts @ 6 marks (12)
- Or**
- (d) Three parts @ 4 marks (12)

Question 6: 50 marks

- (a) Any three parts @ 5 marks (15)
 - (b) Any three parts @ 5 marks (15)
 - (c) (i) Any two @ 3 marks (6)
(ii) One part @ 6 marks (6)
(iii) Any two @ 4 mark (8)
- Or**
- (c) (i) One part @ 6 marks (6)
(ii) One part @ 6 marks (6)
(iii) Any two parts @ 4 marks (8)

Question 4: 50 marks

- (a) (i) One part @ 6 marks (6)
(ii) One part @ 6 marks (6)
- (b) Any three parts @ 5 marks (15)
- (c) Any three parts @ 5 marks (15)
- (d) One part @ 8 marks (8)

Question 7: 50 marks

- (a) (i) One @ 4 marks (4)
(ii) Any one @ 4 marks (4)
(iii) Any one @ 4 marks (4)
 - (b) (i) One part @ 5 marks (5)
(ii) One part @ 5 marks (5)
(iii) One part @ 5 marks (5)
(iv) One part @ 5 marks (5)
 - (c) Any three parts @ 6 marks (18)
- Or**
- (c) (i) One part @ 6 marks (6)
(ii) Any two @ 3 marks (6)
(iii) One part @ 6 marks (6)

Question 1

(50 Marks)

Any eight parts @ 6 marks each.

Award 1 extra mark for each of the two question parts answered correctly. (Max: + 2 marks)

(a) State two safety precautions to be observed, when using a bandsaw.

- Wear personal protective equipment (PPE) such as safety goggles to protect your eyes from flying debris.
- Always maintain a safe distance between your hands and the blade.

Precautions

Award 3 + 3 Marks

Total (6) Marks

(b) Explain the term permanent joint and give one example of a permanent joint in engineering.

- A permanent joint is a joint that cannot be disassembled without destroying the parts or damaging the surfaces.
- An example of a permanent joint in engineering is a welded joint.

Explanation

Award 3 Marks

Example

Award 3 Marks

Total (6) Marks

(c) State one reason for testing electronic circuits before assembly.

- To ensure they operate as required and to identify any errors in design or assembly.

Reason

Award 6 Marks

Total (6) Marks

(d) Give one reason why it is important to work in a ventilated area when using adhesives.

- Adhesives produce dangerous fumes, which can be harmful if inhaled, ventilation provides a flow of fresh air which helps to dilute the dangerous fumes.

Reason

Award 6 Marks

Total (6) Marks

(e) State two advantages of using a 3D printer for manufacture in engineering.

- Less material waste is produced as 3D printing is an additive manufacturing process.
- More complex products can be designed and produced.

Advantages

Award 3 + 3 Marks

Total (6) Marks

(f) Explain the term non-ferrous and name a non-ferrous metal.

- Metals which do not contain iron, are referred to as non-ferrous metals.
- Brass is an example of a non-ferrous metal.

Explanation

Award 3 Marks

Example

Award 3 Marks

Total (6) Marks

(g) Give one reason for producing a prototype when designing new products.

- To give engineers and designers the ability to explore new design alternatives and to test if the product functions as required.

Reason

Award 6 Marks

Total (6) Marks

(h) Define malleability in relation to the properties of materials and name one material which is malleable.

- Malleability is the ability of a material to be hammered / flattened out in all directions without breaking.
- Lead is a malleable metal.

Definition

Award 3 Marks

Name

Award 3 Marks

Total (6) Marks

(i) Give one reason why metal edges are deburred.

- Deburring removes sharp edges and burrs that can pose a safety hazard to workers when handling parts. Metal parts often require deburring following manufacturing.



Reason

Award 6 Marks

Total (6) Marks

(j) Any one:

(i) Artificial intelligence (AI):

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and learn like humans. AI systems can analyse data, recognise patterns, make decisions, and even improve their performance over time without human intervention.

Applications of AI include voice assistants like Siri and Alexa, self-driving cars, and recommendation systems used by platforms like Netflix and Amazon. AI has the potential to transform various industries by automating tasks, enhancing productivity, and providing insights based on data analysis.



Any one explanation

Award 6 Marks

Total (6) Marks

(ii) Renewable energy:

Renewable energy is energy that is generated from natural sources that are continuously replenished, such as sunlight, wind, rain, tides, and geothermal heat. Unlike fossil fuels, which can deplete and contribute to environmental pollution, renewable energy sources are more sustainable and have a lower impact on the planet. Common forms of renewable energy include solar power, wind energy, hydroelectric power, and biomass. The use of renewable energy is crucial for reducing greenhouse gas emissions and combating climate change.



(iii) Virtual reality (VR):

Virtual Reality (VR) is an immersive technology that creates a simulated environment that can be experienced through a headset or other devices. In VR, users are transported into a 3-dimensional digital space where they can interact with the environment and objects as if they were real. This technology is commonly used in gaming, training simulations, education, and therapy, allowing users to experience scenarios that may be difficult or impossible to recreate in the real world.

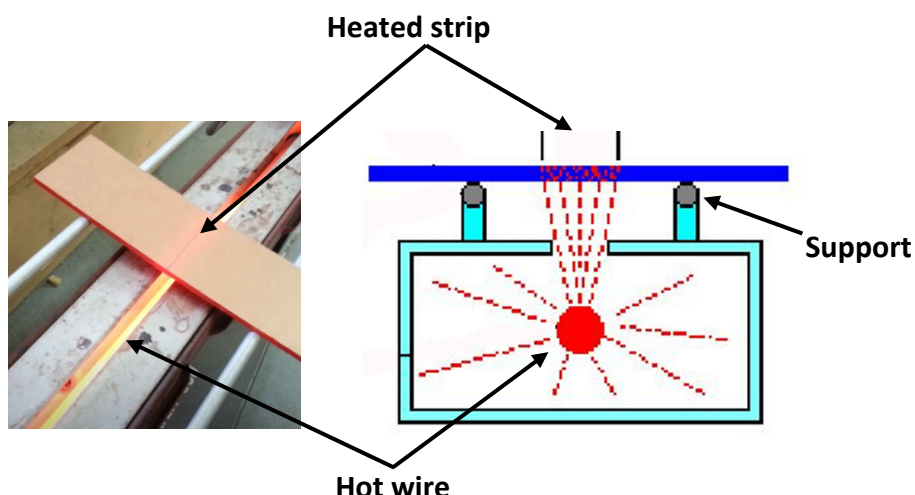


Virtual Welding

(k) Any one:

(i) Hot wire strip heater:

A hot wire strip heater is used to form straight or small curvature bends in thermoplastic sheet material. An electric element or hot wire is enclosed in a channel which has an opening at the top. The thermoplastic sheet is placed across supports above the opening. By adjusting the height of the supports the width of strip to be heated can be altered. The supports are set to a low height for tight bends. If a more gradual bend is required, the heated area is widened by setting the supports higher. Different thicknesses of sheet may be formed by controlling the heating temperature.



Any one explanation

Award 6 Marks

Total (6) Marks

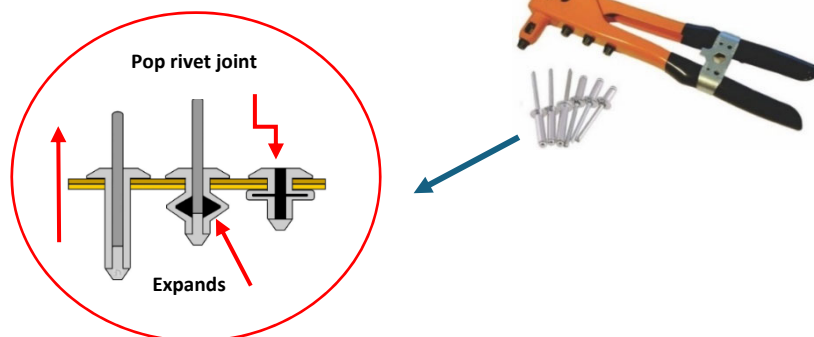
(ii) Soldering iron

A soldering iron is a hand tool used to join electronic components and other materials using solder. It supplies heat to the components and materials so that melted solder can flow into the joint between the two workpieces. A soldering iron has a heated metal tip and an insulated handle. Heating is achieved by passing an electric current through a heating element.



(iii) Pop rivet gun:

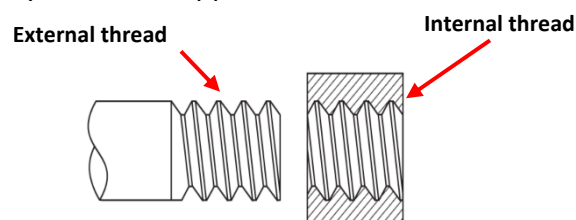
A pop riveting gun is used to create a pop rivet joint in sheet metal. A pop rivet is placed into the gun and passed through pre-drilled holes in the metals to be joined. As the handles of the gun are squeezed, a clamping mechanism grips the shaft of the rivet and draws it back into the gun. The enlarged end of the shaft causes the remaining part of the rivet to expand thereby clamping the sheets together. When the tensile force on the rivet gets too great the shaft breaks off leaving the pop



(I) Any one

(i) Internal thread:

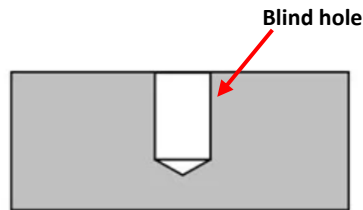
An internal thread refers to the threads or grooves that are cut into the inside surface of a hole, allowing it to accept a corresponding external thread from a screw or bolt. Internal threads are commonly found in components such as nuts and holes designed to receive screws. The purpose of internal threading is to create a secure connection by allowing the external threaded component to screw into it, providing mechanical fastening and stability in various applications.



Any one explanation
Award 6 Marks
Total (6) Marks

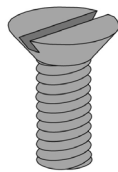
(ii) Blind hole:

A blind hole refers to a hole that is reamed, drilled, or milled to a specified depth without breaking through to the other side of the workpiece.

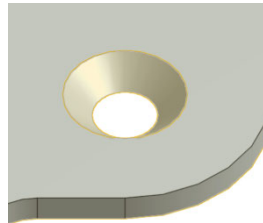


(iii) Countersunk hole:

A countersunk hole is a conical-shaped hole that is drilled to allow the head of a countersunk machine screw to sit flush with or below the surface of the material. The countersink is wider at the top, allowing the screw head to fit into it, providing a smooth surface finish and reducing the risk of snagging or catching.



Countersunk machine screw



Countersunk hole

(m)

Name:

Locknut

Application:

A lock nut is a type of nut that is designed to resist loosening under vibration and torque. Its primary application is in situations where secure fastening is critical, particularly in machinery and structural assemblies. Lock nuts are frequently used in vehicle parts such as suspension components, wheel hubs, and engine mounts to ensure that critical fasteners remain secure despite the vibrations and forces encountered during operation.

Name

Award 3 Marks

Application

Award 3 Marks

Total (6) Marks

Question 2

(50 Marks)

(a)

- **Furnace A** – Blast furnace
- **Furnace B** – Electric Arc furnace
- **Furnace C** – Basic Oxygen furnace

Name

Award 3 @ 5 Marks

Total (15) Marks

(b) **Any one**

Furnace A – Blast furnace

(i) **Materials used: -**

Iron ore
Coke
Limestone

(ii) **Heating the charge: -**

The coke is burned to produce heat.

(iii) **Metal produced: -**

Pig iron.

Furnace B – Electrical Arc furnace: -

(i) **Materials used: -**

Scrap iron / steel
Carbon
Limestone

(ii) **Heating the charge: -**

Heat for the furnace is produced by an electric arc created between carbon electrodes and the charge.

(iii) **Metal produced: -**

Steel.

(i) Materials

Award 3 Marks

(ii) Heat

Award 6 Marks

(iii) Metal

Award 3 Marks

Total (12) Marks

Furnace C – Basic Oxygen furnace: -

(i) Materials used: -

Pig iron / scrap
Carbon
Limestone

(ii) Heating the charge: -

Heat for the furnace is produced by blowing oxygen through a lance onto the molten metal.

(iii) Metal produced: -

Steel.

(c)

Seat: -

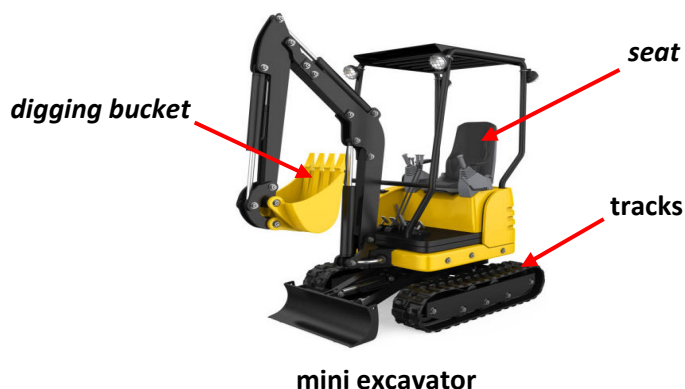
- (i)** Material: Vinyl
- (ii)** Reason: Comfortable and easy to clean.

Tracks: -

- (i)** Material: Rubber
- (ii)** Reason: Light, flexible and shock absorption

Digging bucket: -

- (i)** Material: Steel
- (ii)** Reason: Strong, durable and wear resistant.



**(i) Material
Award 3 @ 3 Marks**

**(ii) Reason
Award 3 @ 2 Marks
Total (15) Marks**

(d) Any two

Mechanism A: -

Name - Chain and sprocket

Use - Bicycle / Motor bicycles



Name

Award 2 @ 2 Marks

Use

Award 2 @ 2 Marks

Total (8) Marks

Mechanism B: -

Name - Pulley and belt

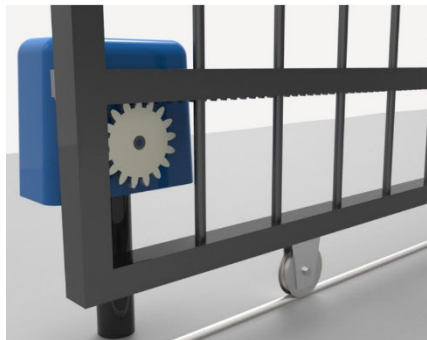
Use - Washing machine,
Pillar drilling machines.



Mechanism C: -

Name - Rack and pinion.

Use - Pillar drilling machine table,
Automatic sliding gates.



Question 3

(50 Marks)

(a) Each:

(i) **Normalising:** -

Normalising is carried out to refine the structure of steel and to remove internal stresses caused by cold working such as hammering, rolling or bending. It is similar to the annealing of steel, except the cooling rate is much faster.

(ii) **Hardening:** -

When high carbon steel is heated to a cherry red it undergoes structural changes, and rapid cooling does not allow it to revert to its normal soft condition. The high carbon steel becomes hard resisting indentation, scratching and wear. The point of a centre punch is hardened to ensure it retains its point during use.

Explain

Award 2 @ 7 Marks

Total (14) Marks

(b) Any two:

(i) **Annealing:** -

Annealing is a heat treatment process used to soften metals. To anneal steel, it is heated to a cherry red colour, approx. 900° and allowed to cool down as slow as possible. This can be achieved by leaving the metal in a furnace while the furnace is cooling down. Annealing relieves internal stresses, increases ductility and malleability of a metal.

(ii) **Tempering:** -

Tempering is where a metal is heated to a suitable temperature, which is below the reddening temperature and then cooled in oil or water.

(iii) **Quenching:** -

Quenching is when a metal is plunged into a cooling liquid such as water. Quenching cools the metal as fast as possible and ensures that any structural changes which have taken place during heating are not allowed to revert.

Describe

Award 2 @ 7 Marks

Total (14) Marks

(c) Two items of PPE

- **PPE 1** – Wear heat resistant gloves to protect the hands.
- **PPE 2** – Wear a face shield to protect the face from high temperatures.

Items

Award 5 + 5 Marks

Total (10) Marks

(d)

Any two

(i) Toughness:-

This property enables a material to withstand blows or an impact. The amount of energy it takes to fracture a material is an indicator of its toughness.

(ii) Melting point:-

Melting point is the temperature at which a metal changes its state from solid to liquid.

(iii) Brittleness:-

A brittle material will break / shatter under impact. Cast iron, glass and concrete are brittle materials.

Explain

Award 2 @ 6 Marks

Total (12) Marks

OR

(d)

(i) Parcel deliveries

Robotic technology improves sorting accuracy, reducing errors in shipping and ensuring parcels reach the correct destinations. Autonomous delivery robots and drones are also emerging to handle last-mile deliveries, providing faster and more reliable service for customers.

(ii) Medical procedure

Robotic-assisted surgeries, such as those using the Da Vinci system, allow surgeons to perform highly complex procedures with enhanced precision, stability, and control. This minimizes damage to surrounding tissues, leads to smaller incisions, and shortens recovery times.

(iii) Mass production

Industrial robots on production lines can work continuously without fatigue, significantly increasing production speed. Robots handle repetitive tasks such as assembly, welding, and painting with consistency, improving output and lowering production costs.

Explanation

Award 3 @ 4 Marks

Total (12) Marks

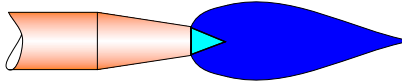
Question 4

(50 Marks)

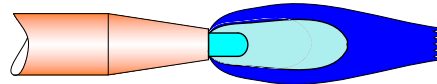
(a)

(i) Name each of the flames produced:

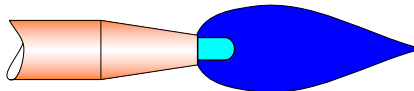
- **Flame A** – Oxidising flame



- **Flame B** – Carburising flame



- **Flame C** – Neutral flame



(i) Proportions of oxygen and acetylene

- **Flame A** – Excess oxygen
- **Flame B** – Excess acetylene
- **Flame C** – An equal balance of oxygen and acetylene

(i) Name

Award 3 @ 2 Marks

(ii) Proportions

Award 3 @ 2 Marks

Total (12) Marks

(b) Any three

(i) **Welding curtain**

The welding curtain is a flame-retardant shield used to deflect welding and grinding sparks. They also absorb harmful UV light to protect bystanders within the vicinity of the welder.

(ii) **Chipping hammer**

The chipping hammer is used to remove the slag which forms on top of the welded joint after arc welding.

(iii) **Electrode holder**

An electrode holder is a device that holds the electrode / welding rod during the welding process. The handle is insulated which protects the user from current flowing to the electrode.

(iv) **Welding mask**

The welding mask protects your eyes and face from severe sparks, ultraviolet and infrared rays emitted by the arc when welding.

Explanations

Award 3 @ 5 Marks

Total (15) Marks

(c) Any three

(i) Outline one benefit of using an R-clip.

R-clips are similar in function to split pins and linchpins. Compared to split pins, they are easier to remove and are re-usable. They are particularly common in automotive and construction applications, such as securing hitch pins in trailers or locking parts in place on equipment.

(ii) Suggest one method of joining sheet aluminium.

- Pop riveting / Machine screws.

(iii) Give two reasons why flux is required when soldering.

- Flux cleans the surfaces and protects them from oxidation during the soldering process, ensuring better adhesion.
- Flux enhances the wetting properties of the solder, allowing it to flow more easily and uniformly across the surfaces being joined.

(iv) Name tool A and give one use for this tool.

- **Name:** Allen key
- **Use:** Allen keys are designed to tighten or loosen hexagonal-shaped bolts and screws. Allen keys are highly versatile hand tools and can be used to assemble flatpack furniture and to adjust seat posts, handlebars on a bicycle.

Explanation

Award 3 @ 5 Marks

Total (15) Marks

(d) Two safety precautions:

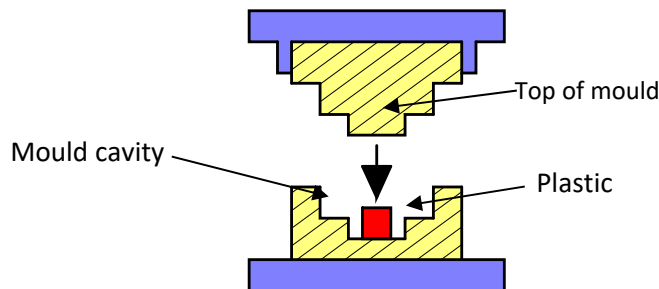
- The gas hoses should be checked for damage before starting the welding process.
- The correct PPE is worn while welding, such as dark welding goggles.



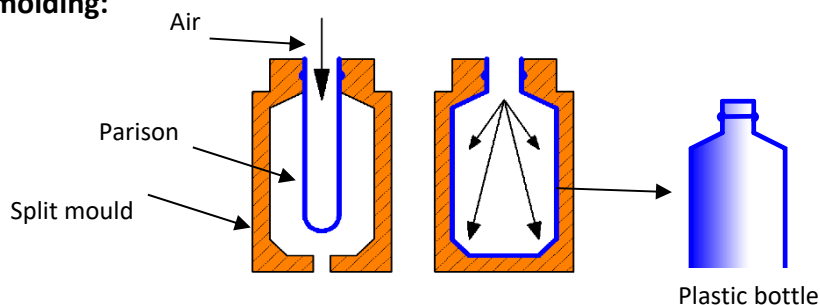
Precautions

Award 2 @ 4 Marks

Total 8 Marks

Question 5**(50 Marks)****(a)****(i) Name each:****A:** Compression moulding**B:** Blow moulding**C:** Vacuum forming.**(i) Name****Award 3 @ 3 Marks****(ii) Describe****Award 1 @ 11
Marks****Total (20) Marks****ii) Describe any one plastic manufacturing process:****A - Compression moulding:**

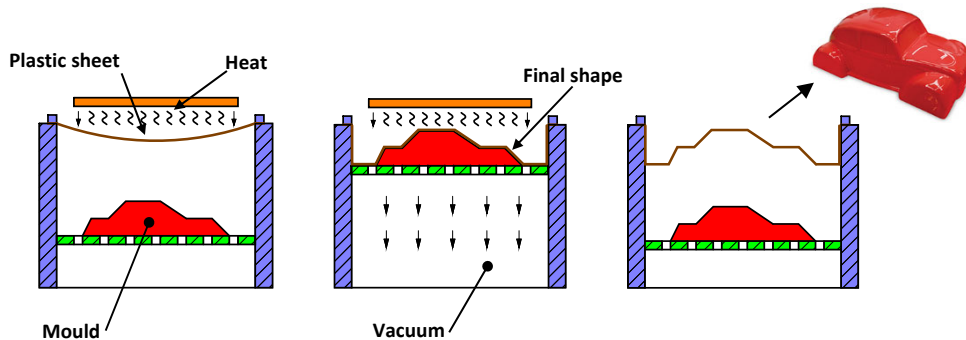
A measured amount of thermosetting plastic polymer is placed into the cavity of the mould. Heat from the mould causes the polymer to melt. The mould cavity is shaped to form the outside of the object. The top half of the mould closes dispensing the melted plastic to form the object. Pressure is maintained to allow the plastic to harden. Once solidified the mould is opened and the part is released.

B - Blow molding:

Used to produce articles from a heated thermoplastic tube called a parison. The mould closes around the extruded parison and air is blown inside forcing the parison out against the wall of the mould. The article is moulded by the internal shape of a split mould. The component is allowed to cool before being removed from the opened moulding.

C - Vacuum forming:

A thermoplastic sheet is clamped in a frame and heat is applied until the sheet begins to sag. At this stage, the mould is lifted up into the plastic sheet and vacuum pressure is applied. This causes the plastic sheet to pull against the mold and form the final shape. After cooling, the mould is lowered and the plastic part is removed from the frame. Excess material is trimmed away.



(b) Any two

(i) Thermosetting plastic

Thermosetting plastic is a plastic which remains hard when heated.

(ii) Laminating

Laminating is a bonding process which produces a sheet material manufactured from multiple layers of paper with a top layer of plastic, usually 1.5 mm thick, with a decorative finish. It can be used in flat sheets or heat-formed and bent and adhered to single curved base material. It is commonly referred to by the brand name "Formica."

(iii) Thermoplastic

Thermoplastic is a plastic which softens when heated.

(iv) Elastic memory.

This describes the ability of a plastic to return to its original shape after being formed. The plastic remembers its original shape and will return to this shape if heated.

Description

Award 2 @ 5 Marks

Total (10) Marks

(c) Any two

Safety precautions when using a 3D printer.

- 3D printing may result in the release of ultrafine particles, (UFPs) and volatile organic components (VOCs), it is important to use a ventilation system which contains an air filter.
- 3D printers generate high temperatures and have hot moving parts that can cause injury. Never reach inside a 3D printer while it is in operation. Always allow 3D printers to cool down for at least 5 minutes before reaching inside.

Precautions
Award 2 @ 5 Marks
Total (10) Marks

(d) Any two

Suitable plastic:

- (i) **Vehicle chassis** – Acrylic
- (ii) **Battery holder** – Polypropylene or Nylon
- (iii) **3D printed part** – PLA
- (iv) **Gears** - Nylon

Material
Award 2 @ 5 Marks
Total (10) Marks

Question 6

(50 Marks)

(a) Any three

A - Foot operated safety stop switch

B - Tailstock

C - Toolholder

D - Chuck safety guard

Identify

Award 3 @ 5 Marks

Total (15) Marks

(b) Any three

(i) **Cutting fluids**

Cutting fluids are used when machining metals to improve tool life, reduce the buildup of heat, improve surface finish and flush away chips from the cutting zone.



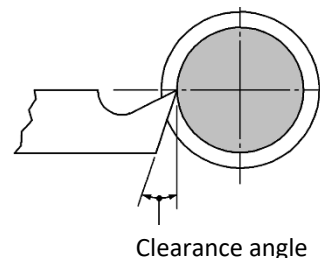
Explanation

Award 3 @ 5 Marks

Total (15) Marks

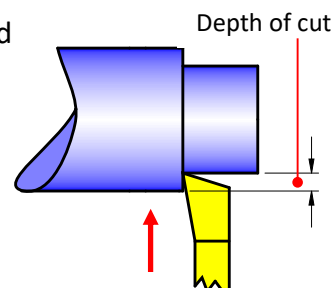
(ii) **Clearance angle**

Without a clearance angle, no cutting would take place. The clearance angle ensures that only the cutting edge of a tool contacts a piece. It provides clearance between the cutting tool face and the workpiece



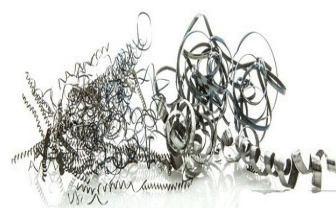
(iii) **Depth of cut**

This is the distance the cutting tool is moved into the workpiece when cutting



(iv) **Swarf**

Swarf is the waste material produced when the chip is cut from a workpiece



(c)

(i)

- Knurling
- Drilling

(iii) **Knurling**

A knurling tool is fitted to the tool post and set at 90° to work. The centre lathe is then turned on at a very slow speed. The knurling tool is moved into the workpiece. Two opposing rollers which press into the piece are moved parallel to the axis of the work producing a diamond pattern on the surface of the material. A lubricant should be used on the workpiece and rollers to help reduce friction.



(iii)

- Wear goggles.
- Protective clothing i.e. gloves

OR

(c)

(i) CAD software enables developers to work more quickly, cut production costs and decrease errors.

(ii) Computer numerically controlled (CNC) lathes are commonly used in the engineering workshop.

(iii) High precision and capable of producing highly complex parts.

(i) Name

Award 2 @ 3 Marks

(ii) Describe

Award 1 @ 6 Marks

(iii) PPE

Award 2 @ 4 Marks

Total (20) Marks

(i) Advantage

Award 1 @ 6 Marks

(ii) Name

Award 1 @ 6 Marks

(iii) Advantages

Award 2 @ 4 Marks

Total (20) Marks

Question 7

(50 Marks)

(a)

(i) Clearance fit.

(iv) **Name:** Interference fit

Application: A roller bearing fitted to a gear shaft.



(i) Name

Award 1 @ 4 Marks

(ii) Name

Award 1 @ 4 Marks

(ii) Application

Award 1 @ 4 Marks

Total (12) Marks

(b)

(i) Nominal diameter of the flange; 50.00 mm

(ii) Smallest diameter of the hole; 19.50 mm

(iii) Largest diameter of the hole; 20.50 mm

(iv) Tolerance of the hole; 1.00 mm

Calculations

Award 4 @ 5 Marks

Total (20) Marks

(c) **Any three**

(i) **Digital vernier callipers**

Used for accurately measuring the diameter of round bars or internal diameters of holes.

Measurements can be read directly from a digital display.



Name

Award 3 @ 3 Marks

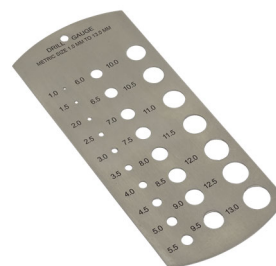
Application

Award 3 @ 3 Marks

Total (18) Marks

(ii) **Drill gauge**

Used to check the diameter of twist drills.



(iii) Micrometer

Micrometers are specially designed for the measurement of very small objects. They allow for the highly precise measurement of any item that fits between the anvil and spindle.



(iv) Engineering protractor

Used to help in marking out and checking angles.



OR

(c)

(i) PCB

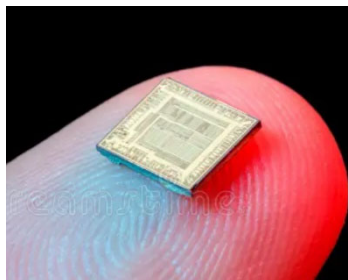
- Ensures the correct assembly of components as all component positions are identified on the PCB.
- Quicker to assemble and ensures better circuit operation when complete.

(ii) Use

- Smart phones
- Computers

(iii) Microchip

A microchip is an integrated circuit (IC) containing a set of micro-electronic circuits made up of transistors, resistors and capacitors and their interconnectors etched onto small pieces of semiconductor material.



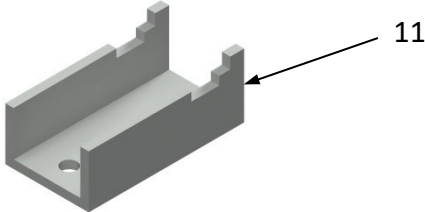
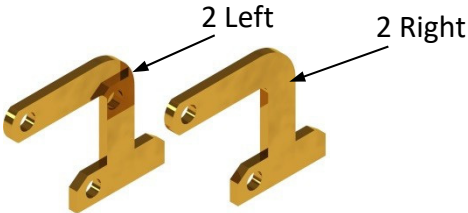
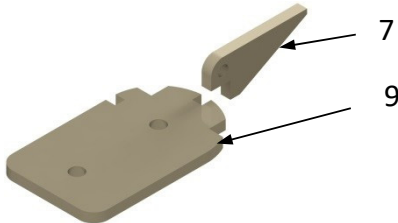
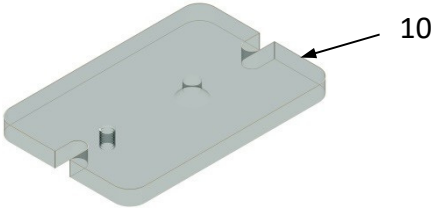
(i) Advantage
Award 1 @ 6 Marks

(ii) Examples
Award 2 @ 3 Marks

(iii) Explanation
Award 1 @ 6 Marks
Total (18) Marks



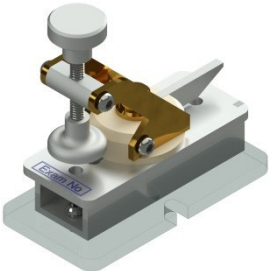
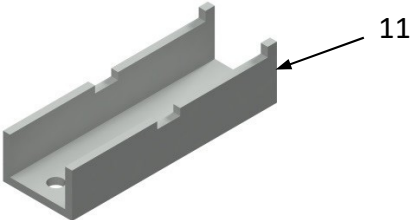
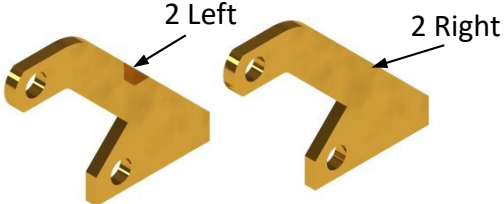
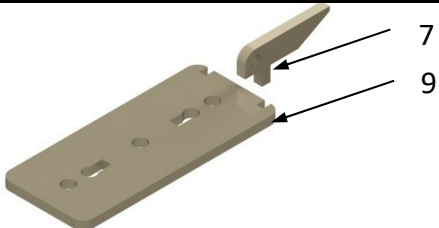
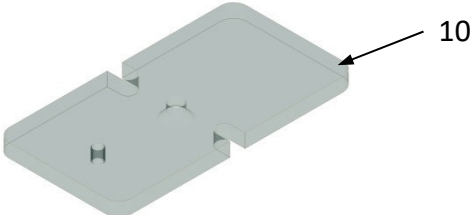
Day 1 – Leaving Certificate – Engineering – Practical Test – Marking Scheme - 2025

Section	Part Number	Pictorial Sketch / Description	Concept		Mark	Mark
1	All Parts of Test-piece		Assembly – 5 Function – 10 Finish – 5		20	20
2	Part 11		Part 11 - 20 Marks	Marking Out	5	20
				10 mm × 3 mm Slots	5	
				Length, Ø5.5 mm Holes	5	
				Top Profile	5	
3	Parts 2		Part 2 Left - 10 Marks	Marking Out, Ø5.5 mm Holes	5	20
				External Profile	5	
			Part 2 Right - 10 Marks	Marking Out, Ø5.5 mm Holes	5	
				External Profile	5	
4	Parts 7 and 9		Part 7 - 5 Marks	Marking Out, Ø4.2 mm Hole, External Profile	5	20
			Part 9 - 15 Marks	Marking Out, Ø5.5 mm Holes	5	
				4mm Locking Slots	5	
				External Profile and Recess × 2	5	
5	Part 10		Part 10 - 20 Marks	Marking Out	5	20
				Drill and Tap M5, Drill and CSK Ø5.5 mm	5	
				Length and R6 mm Radii	5	
				6mm Slots	5	

100 Marks (× 1.5 = 150 Total)



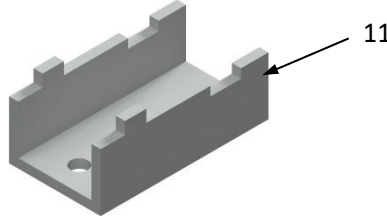
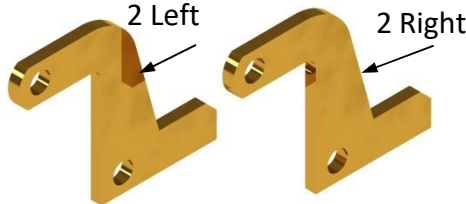
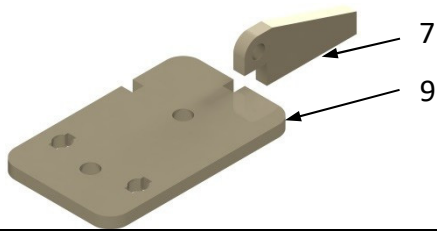
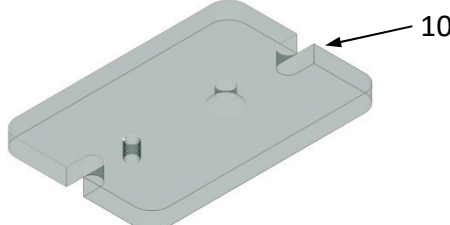
Day 2 – Leaving Certificate – Engineering – Practical Test – Marking Scheme - 2025

Section	Part Number	Pictorial Sketch / Description	Concept		Mark	Mark
1	All Parts of Test-piece		Assembly – 5 Function – 10 Finish – 5		20	20
2	Part 11		Part 11 - 20 Marks	Marking Out	5	20
				10 mm × 3 mm Slots	5	
				Length, Ø6 mm Holes	5	
				Top Profile	5	
3	Parts 2		Part 2 Left - 10 Marks	Marking Out, Ø5.5 mm Holes	5	20
				External Profile	5	
			Part 2 Right - 10 Marks	Marking Out, Ø5.5 mm Holes	5	
				External Profile	5	
4	Parts 7 and 9		Part 7 - 5 Marks	Marking Out, Ø4.2 mm Hole, External Profile	5	20
			Part 9 - 15 Marks	Marking Out, Ø5.5 mm Holes	5	
				4mm Locking Slots	5	
				External Profile and 3 mm Recess × 2	5	
5	Part 10		Part 10 - 20 Marks	Marking Out	5	20
				Drill and Tap M5, Drill and CSK Ø5.5 mm	5	
				Length and R6 mm Radii	5	
				6mm Slots	5	

100 Marks (× 1.5 = 150 Total)



Day 3 – Leaving Certificate – Engineering – Practical Test – Marking Scheme - 2025

Section	Part Number	Pictorial Sketch / Description	Concept		Mark	Mark	
1	All Parts of Test-piece		Assembly – 5 Function – 10 Finish – 5		20	20	
2	Part 11		Part 11 - 20 Marks	Marking Out	5	20	
				10 mm × 3 mm Slots	5		
				Length, Ø5.5 mm Holes	5		
				Top Profile	5		
3	Parts 2		Part 2 Left -10 Marks	Marking Out, Ø5.5 mm Holes	5	20	
				External Profile	5		
			Part 2 Right -10 Marks	Marking Out, Ø5.5 mm Holes	5		
				External Profile	5		
4	Parts 7 and 9		Part 7 - 5 Marks	Marking Out, Ø4.2 mm Hole, External Profile	5	20	
			Part 9 - 15 Marks	Marking Out, Ø5.5 mm Holes	5		
				4mm Locking Slots	5		
				External Profile & Internal 3 mm Recess × 2	5		
5	Part 10		Part 10 - 20 Marks		Marking Out	5	20
					Drill and Tap M5, Drill and CSK Ø5.5 mm	5	
					Length and R6 mm Radii	5	
					6mm Slots	5	

100 Marks (× 1.5 = 150 Total)

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