Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2023

ENGINEERING – MATERIALS AND TECHNOLOGY

(Higher level – 300 marks)

THURSDAY, 8 JUNE MORNING 9:30 – 12:30

The 2023 examination papers were adjusted to compensate for disruptions to learning due to COVID-19.
This examination paper does not necessarily reflect the same structure and format as the examination papers of past or subsequent years.

INSTRUCTIONS

1. Answer **any SIX questions.**

2. All answers must be written in ink on the answerbook supplied.

3. Diagrams should be drawn in pencil.

4. Squared paper is supplied for graphs, as required.

5. Please label and number carefully each question attempted.

Question 1. **(50 marks)**

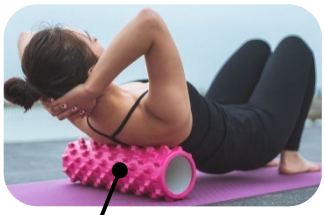
Give **brief answers** to **any ten** of the following:

(a) Outline **one** advantage and **one** disadvantage of 'smart' glasses.

(b) Briefly describe the principle of operation of a bridge rectifier in electric arc welding circuits.

(c) In engineering, explain the importance of specifying *limits* on component drawings prior to manufacture.

(d) Give **two** properties of expanded polypropylene (EPP) which make it suitable for use in exercise foam rollers, as shown opposite.



foam roller

(e) Describe how the structure of the metallic bond facilitates electrical conductivity in metals.

(f) Discuss the contribution that **any one** of the following has made to technology:
(i) Ivan Sutherland **(ii)** Eileen Gray **(iii)** Dugald Clerk.

(g) Describe **two** health benefits of using high efficiency particulate air (HEPA) purifiers, such as the Dyson air purifier shown, in modern offices.

(h) Outline **two** benefits of using pneumatic power over electrical power in engineering manufacture.

(i) Give **two** advantages of using anodised aluminium in engineering projects.

(j) Describe **two** safety features integrated into a CNC lathe.

(k) State **two** benefits of using the wireless charging station shown opposite.

(l) Explain the term *material creep* in relation to jet-engine components.

(m) Wave energy technology captures the energy of water waves to do useful work such as generating electricity.
Give **two** possible disadvantages associated with wave energy technology as an energy source.

Question 2. **(50 marks)**

Answer **all** of the following:

(a) The arrival of the digital age brings Extended Reality (XR) into our daily lives, transforming our reality with the use of technology to create immersive environments, experiences and interactions.

(i) Describe the term *Extended Reality (XR)*.

(ii) Identify **two** benefits of Extended Reality (XR).

(b) Extended Reality (XR) encompasses a range of other digital technologies. Explain **each** of the following types of Extended Reality:

(i) Virtual Reality (VR).

(ii) Augmented Reality (AR).

(iii) Mixed Reality (MR).

(c) Discuss how Extended Reality (XR) immersive technology might provide a more engaging educational environment for learners of the future.

(d) Describe **any two** of the following real applications in relation to Extended Reality (XR):

(i) Gaming and entertainment.

(ii) Vehicle design and development.

(iii) Surgical applications and physiotherapy.

(iv) Real estate property viewing.

(e) While XR presents many creative opportunities, it has however a number of drawbacks. Discuss **any two** of the following drawbacks associated with Extended Reality (XR):

(i) Privacy.

(ii) Social engagement.

(iii) Implementation costs.

Question 3. **(50 marks)**

(a) Stainless steel is traditionally used in hotel, restaurant and other industrial catering settings. It is becoming increasingly popular for use in domestic kitchens.

Stainless steel kitchen

(i) Define the term *material hardness*.

(ii) Describe, with the aid of a diagram(s), the Vickers Hardness test, with reference to:

- indenter shape
- test procedure
- hardness calculation.

(iii) Outline **one** advantage and **one** disadvantage of the use of stainless steel for kitchen countertops in domestic settings.

(b) The results shown below were obtained from a tensile test carried out on a test specimen of 16 mm diameter with a gauge length of 80 mm.

Load (kN)	22	44	66	80	89	100	110	123	135	132	118
Extension (mm)	0.1	0.2	0.3	0.4	0.5	0.8	1.0	1.5	2.5	4.0	4.3

(i) Using the graph paper supplied, plot the load-extension diagram.

(ii) Determine the ultimate tensile strength (UTS) for the specimen.

(iii) Calculate the 0.1% proof stress.

(c) Ultrasonic sound wave technology is employed in the non-destructive testing of finished components in engineering.

(i) Describe, with the aid of suitable diagrams, ultrasonic non-destructive testing.

(ii) Distinguish, with examples, between microscopic and macroscopic non-destructive testing methods.

Question 4. **(50 marks)**

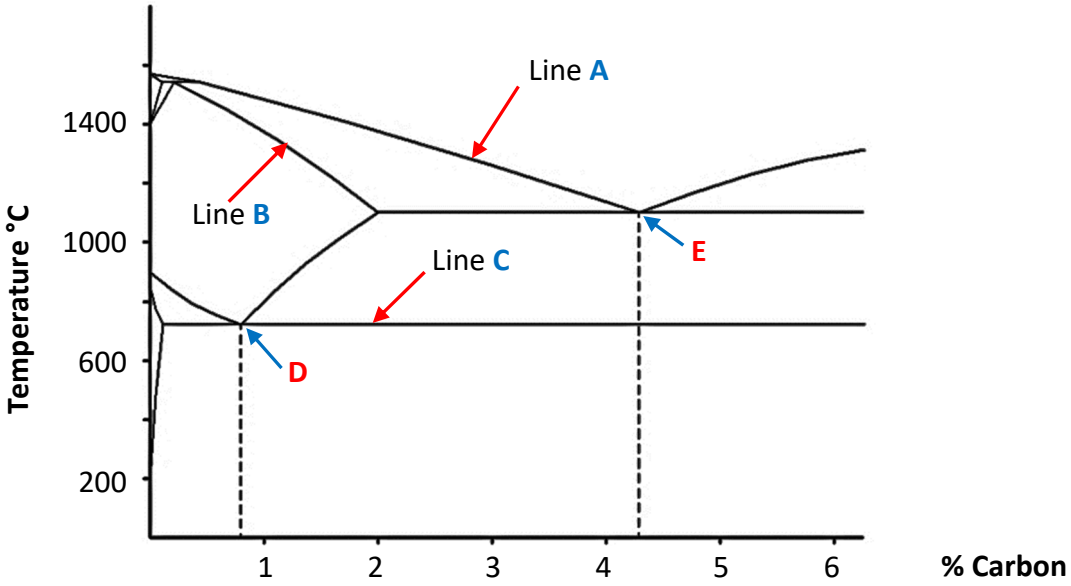
(a) The arbour of the keyless self-tightening chuck shown opposite is made from case hardened steel.

(i) Describe, with the aid of a diagram, a case hardening process.

(ii) Outline **two** reasons for case hardening the arbour of the keyless chuck.

(iii) Explain **one** advantage of case hardening over full hardening.

(b) A simplified portion of the iron-carbon equilibrium diagram is shown.



(i) Name the transformation boundary lines **A**, **B** and **C** shown.

(ii) Explain the significance of point **D** and point **E**.

(iii) Compare *austenite* and *pearlite* with reference to carbon content, temperature and structure.

(c) Answer **any two** from **(i)**, **(ii)** or **(iii)** below:

(i) Explain the differences between annealing and normalising.

(ii) Compare induction hardening and flame hardening.

(iii) Describe the material composition of 18/10 stainless steel.

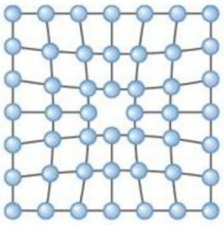
Question 5. **(50 marks)**

(a) During metal solidification, crystal defects can easily occur. Two diagrams of crystal point defects are shown opposite.

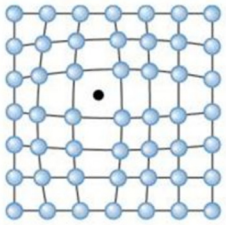
(i) Name and describe crystal defect **A** and crystal defect **B** shown.

(ii) Describe **one** material property which may be affected by defect **B**.

(iii) Name **one** other possible crystal point defect.



defect **A**



defect **B**

(b) The table shows the solidification temperatures for various alloys of metal **A** and metal **B**.

% of metal B in alloy	**0**	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**
Start of solidification (°C)	350	345	335	317	293	260	220	175	250	282	300
End of solidification (°C)	175	175	175	175	175	175	175	175	175	175	175

Using the graph paper supplied:

(i) Draw the equilibrium diagram according to the given data, label the liquidus and solidus lines and the eutectic point.

(ii) For the alloy containing **30%** metal **B**, determine from the diagram the ratio of the phases at **200 °C**.

(iii) For the alloy containing **70%** metal **B**, describe the transformation which occurs from the liquid phase.

(c) Select **any two** from **(i)**, **(ii)** or **(iii)** below and explain the difference between the terms in **each**:

(i) Body Centred Cubic (BCC) and Face Centred Cubic (FCC) structures.

(ii) Cooling curve for a pure metal and cooling curve for an alloy.

(iii) Solid solution alloys and partial solubility alloys.

Question 6. **(50 marks)**

(a) The process of classic car restoration can involve removing corroded steel panels and replacing them with fresh sheet steel which are then Metal Inert Gas (MIG) welded into place.

(i) Describe, with the aid of a diagram, the principles of MIG welding.

(ii) Explain **two** reasons for the use of MIG welding in the restoration of classic cars.

(b) Answer **any three** of the following:

(i) Describe, with the aid of a diagram, the neutral flame in oxy-acetylene welding.

(ii) Name **three** types of welding suitable for automated control.

(iii) Outline **one** safety benefit of using a granulated flux in submerged arc welding.

(iv) Describe how *multi-run welding* can impact the quality of a weld.

(v) Explain the function of a pressure regulator in oxy-acetylene welding.

(c) Motorbike fuel tanks can be manufactured from two pieces of pressed sheet steel which are then seam welded together.

(i) Describe, with the aid of a diagram, the process of resistance seam welding.

(ii) Suggest **two** advantages for using seam welding to join fuel tank parts together.

motorbike fuel tank

OR

(c) The RobotLAB BellaBot is a delivery robot used in some restaurants. It uses SLAM (simultaneous localisation and mapping) technology to transport food and drinks to diners.

(i) Explain the basic difference between Visual SLAM and Laser SLAM for robot navigation.

(ii) Suggest **two** possible difficulties associated with the use of delivery robots in a restaurant.

Bellabot smart delivery robot

Question 7. **(50 marks)**

(a) Elastomers, such as polyurethane, are used in the running shoe soles shown below.

(i) Define the term *elastomer* and describe, with the aid of a diagram, the internal structure of elastomers.

(ii) Outline **two** essential properties of a polyurethane elastomer which makes it suitable for use in the manufacture of the soles for running shoes.

(iii) Identify **two** applications of elastomers in the automotive industry.

polyurethane sole

(b) The hull of a jet ski can be made from a range of plastic materials including fibre reinforced plastics and copolymers.

(i) Describe the term *copolymer* in relation to thermoplastics.

(ii) Identify and describe, with the aid of a diagram, a polymer manufacturing process capable of mass producing the yellow jet ski hull shown.

(iii) Explain the importance of using pigments and plasticisers in the manufacture of a jet ski.

yellow jet ski hull

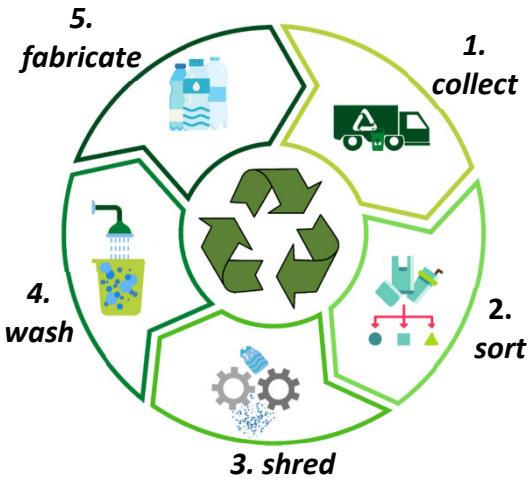
(c) In 2020, the Environmental Protection Agency (EPA) reported that Ireland has a recycling rate of 84% for glass, 71% for metal and 29% for plastic materials.

Answer **any two** of the following:

(i) Distinguish between the recyclability of thermoplastics and thermoset plastics.

(ii) Describe **each** of the stages in the polymer recycling process shown.

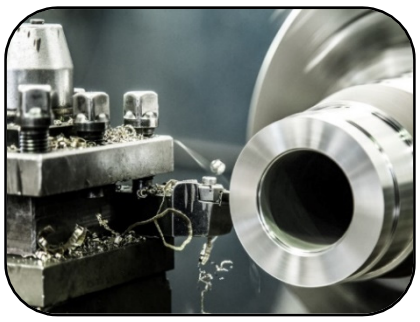
(iii) Outline **two** applications in the construction industry of recycled plastic.



Polymer recycling process

Question 8. **(50 marks)**

(a) Metal cutting is the process of removing unwanted material in the form of chips from a block of metal using cutting tools. One such chip formed is called a built-up edge.



(i) Describe, with the aid of a diagram, the term *built-up edge* and explain how it occurs.

(ii) Outline **two** methods of preventing a built-up edge when machining.

(iii) Identify **two** other machining chip types which can be produced when metal cutting.

(b) Answer **any three** of the following:

(i) Explain the process of tapping the blind hole on the component shown.

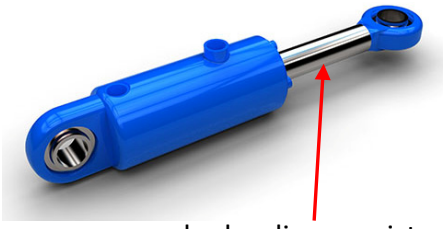
(ii) Identify **three** safety precautions to be observed when using a milling machine.

(iii) Describe the main difference between a milling machine and a drilling machine.

(iv) Describe the benefits of additive manufacture over subtractive manufacture.

(v) Outline **two** reasons for the use of tungsten carbide cutting tips in metal cutting.

(c) Precision cylindrical grinding is a finishing process used in the manufacture of hydraulic ram pistons prior to assembly.



(i) Explain, with the aid of a diagram(s), the precision cylindrical grinding process.

(ii) Outline **two** benefits of any precision grinding process.

OR

(c) CNC laser cutting machines use a focused, high-powered laser beam to mark, cut or engrave a material to form customised shapes.

(i) Explain the difference between CAD and CAM in CNC laser cutting.

(ii) Describe **two** integrated safety features in CNC laser cutting machines.

Question 9. **(50 marks)**

(a) The lifting platform shown is used for the repair of motorcycles.

(i) Describe, with the aid of a diagram(s), how the platform raises and lowers as the handle is turned.

(ii) Explain **one** other method of raising and lowering lifting platforms.

(b) Answer **any three** of the following:

(i) Explain, with the aid of a diagram, the difference between reciprocating motion and oscillating motion.

(ii) Name **one** force acting on the amusement ride shown.

(iii) Describe, with the aid of a diagram, the operation of a stepped cone pulley drive.

(iv) Outline **two** advantages of using a timing belt over a timing chain in modern car engines.

(v) Outline **one** advantage of a compound gear train over a simple gear train.

(c) The Dublin based 'Urban Movement' company manufactures a foldable electric scooter.

(i) Describe, with the aid of a diagram(s), a suitable mechanism for folding the scooter handle.

(ii) Outline **two** benefits of a foldable handle on an electric scooter.

OR

(c) The change from fluorescent and halogen street lighting to the solar-powered street lighting shown is a costly and time-consuming process.

(i) Outline **two** advantages of using solar powered LED lights in an urban setting.

(ii) Describe how solar energy is used to power street lights at night.

Leaving Certificate – Higher Level

Engineering – *Materials and Technology*

Thursday 8 June
Morning 9:30 – 12:30

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination, 2023

Engineering - Practical

(150 marks)

Morning: 10:00 to 1:00 - Afternoon: 2:00 to 5:00

Please Read Carefully

Instructions

(a) The Examination Number must be clearly stamped or engraved, by the **teacher**, on the test-piece in the position indicated on the examination paper - 2023. M74A(L_2).
If the test-piece is not assembled, the Examination Number must be indicated on each separate part of the test-piece.

(b) Candidates are not permitted to communicate with or assist one another.

(c) Write your Examination Number in the box provided on the examination paper - 2023. M74A(L_1).

(d) Put the examination paper - 2023. M74A(L_1) and the test-piece into the candidate envelope supplied and hand up the envelope to the Superintendent at the end of the examination.

From the materials supplied, make the **Mechanism** shown on the drawings to the shape and dimensions specified.

PART	MATERIAL	PROCESS
3	Brass	Mark out, drill and shape.
6	U-Aluminium	Mark out, drill and shape.
8	Clear Polycarbonate	Mark out and shape.
9	Aluminium	Mark out, drill and shape.
10	Clear Polycarbonate	Mark out, drill and shape.

Note: **(i)** Parts 1, 2, 4, 5 and 7 have been made prior to examination day.
Using the threaded bar, screws and nuts supplied assemble the mechanism, as detailed on the assembly drawing.

(ii) Accuracy, finish and function are important.

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Scrúdú na hArdteistiméireachta, 2023

Innealtóireacht - Praiticiúil

(150 marc)

Maidin: 10:00 go dtí 1:00 - Tráthnóna: 2:00 go dtí 5:00

Léigh na Treoracha seo go cúramach le do thoil

Treoracha

(a) Ba chóir don **mhúinteoir** Scrúduimhir an Iarrthóra a stampáil nó a ghreanadh ar an triailphíosa san ionad a thaispeántar ar an scrúdpháipéar - 2023. M74A(L_2). Mura bhfuil an triailphíosa curtha le chéile, ní mór an Scrúduimhir a thaispeáint ar gach páirt ar leith den triailphíosa.

(b) Níl cead ag iarrthóirí a bheith i gcumarsáid le chéile ná cúnamh a thabhairt dá chéile.

(c) Scríobh do Scrúduimhir sa bhosca atá ann di ar an scrúdpháipéar - 2023. M74A(L_1).

(d) Cuir an scrúdpháipéar - 2023. M74A(L_1) agus an triailphíosa isteach i gclúdach an iarrthóra atá curtha ar fáil agus tabhair an clúdach don Fheitheoir ag deireadh an scrúdaithe.

As na hábhair a sholáthraítear, déan an **Mheicníocht** a thaispeántar sna líníochtaí sa chruth agus sna toisí a shonraítear.

PÁIRT	ÁBHAR	PRÓISEAS
3	Prás	A mharcáil amach, a dhruileáil agus a dheilbhiú.
6	U-Alúmanam	A mharcáil amach, a dhruileáil agus a dheilbhiú.
8	Polacarbónáit thrédhearcach	A mharcáil amach agus a dheilbhiú.
9	Alúmanam	A mharcáil amach, a dhruileáil agus a dheilbhiú.
10	Polacarbónáit thrédhearcach	A mharcáil amach, a dhruileáil agus a dheilbhiú.

Nóta: **(i)** Rinneadh na páirteanna 1, 2, 4, 5 agus 7 roimh lá an scrúdaithe.
Agus tú ag baint úsáide as an barra snáithe, na scriúnna agus na cnónna a sholáthraítear, cóimeáil an mheicníocht faoi mar atá sa líníocht chóimeála.

(ii) Tá tábhacht ag baint le cruinneas, le bailchríoch agus le hoibriú an triailphíosa.

Lá 1
Day 1

SCRÚDÚ ARDTEISTIMÉIREACHTA - INNEALTÓIREACHT PRAITICIÚIL
LEAVING CERTIFICATE - ENGINEERING PRACTICAL

2023. M74A(L 1)

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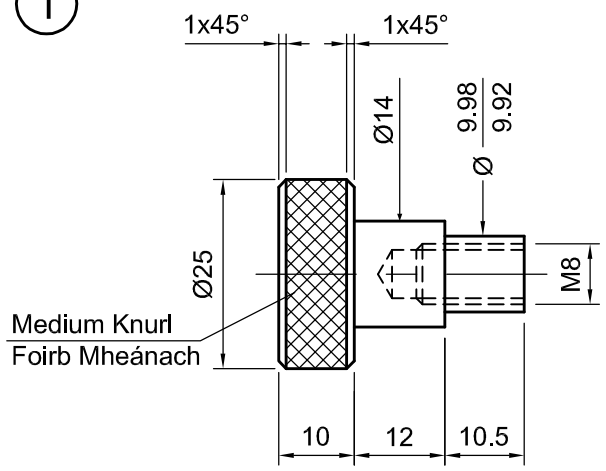

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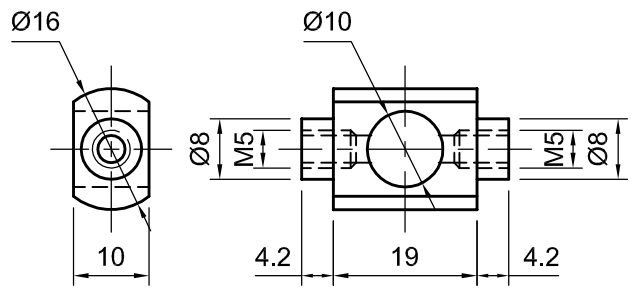

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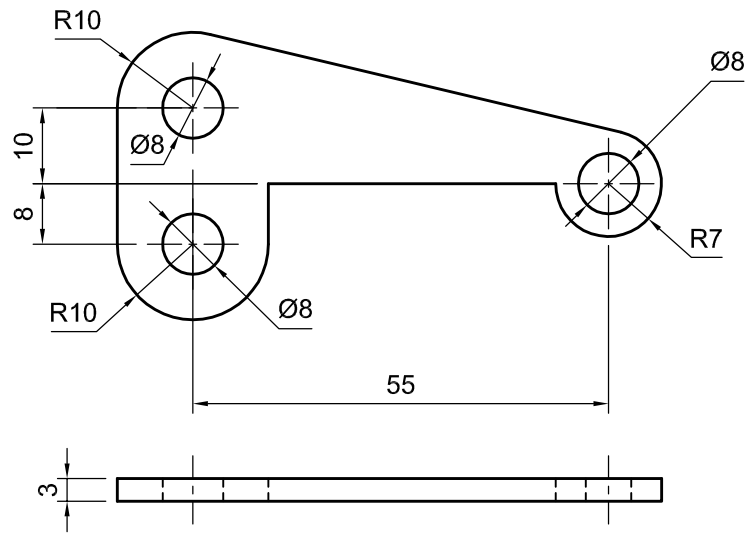

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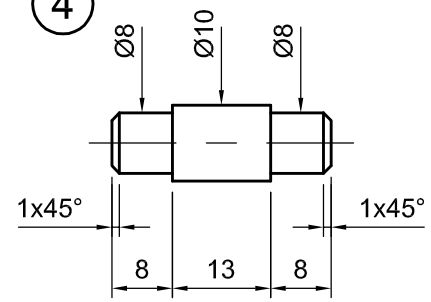

Cuir an scrúdpháipéar seo agus an triailphíosa isteach i gclúdach an iarrthóra
atá curtha ar fáil, agus tabhair an clúdach don Fheitheoir ag deireadh an scrúdaithe.

Put this examination paper and the test-piece into the candidate envelope supplied,
and hand up the envelope to the Superintendent at the end of the examination.

Scríobh do Scrúduimhir sa bhosca seo:
Write your Examination Number in this box:

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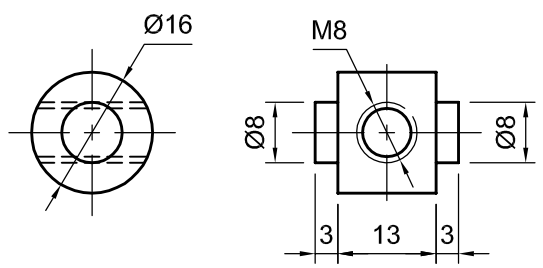

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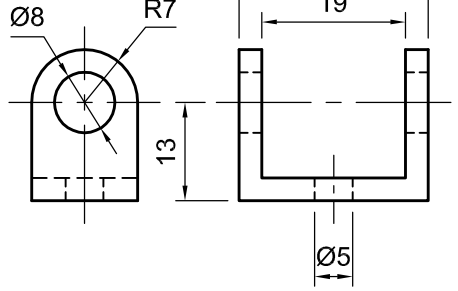

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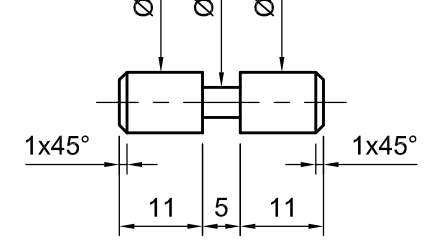

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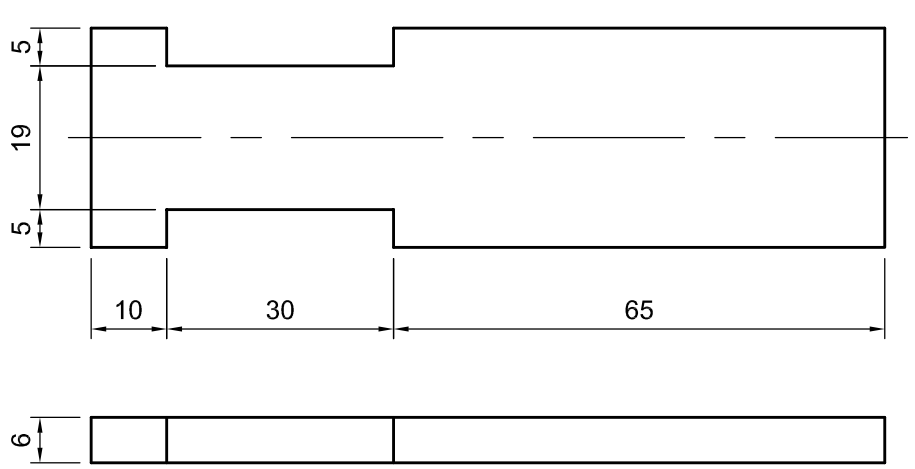

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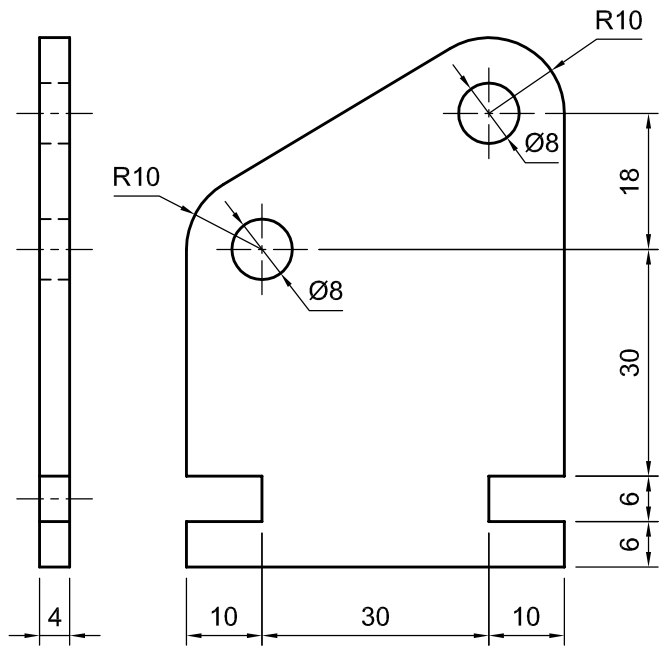

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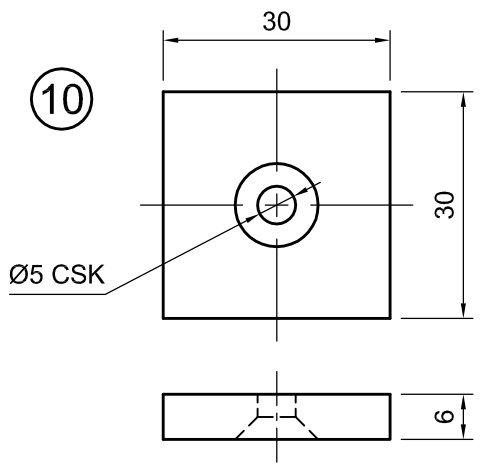

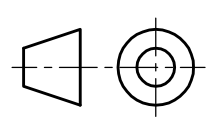

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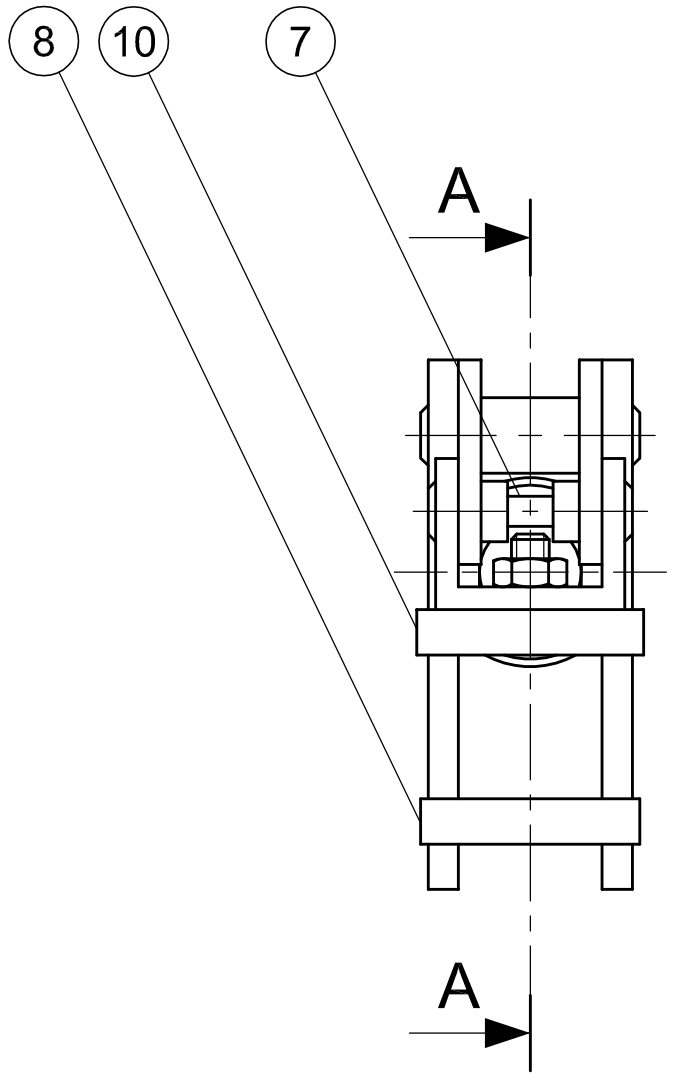
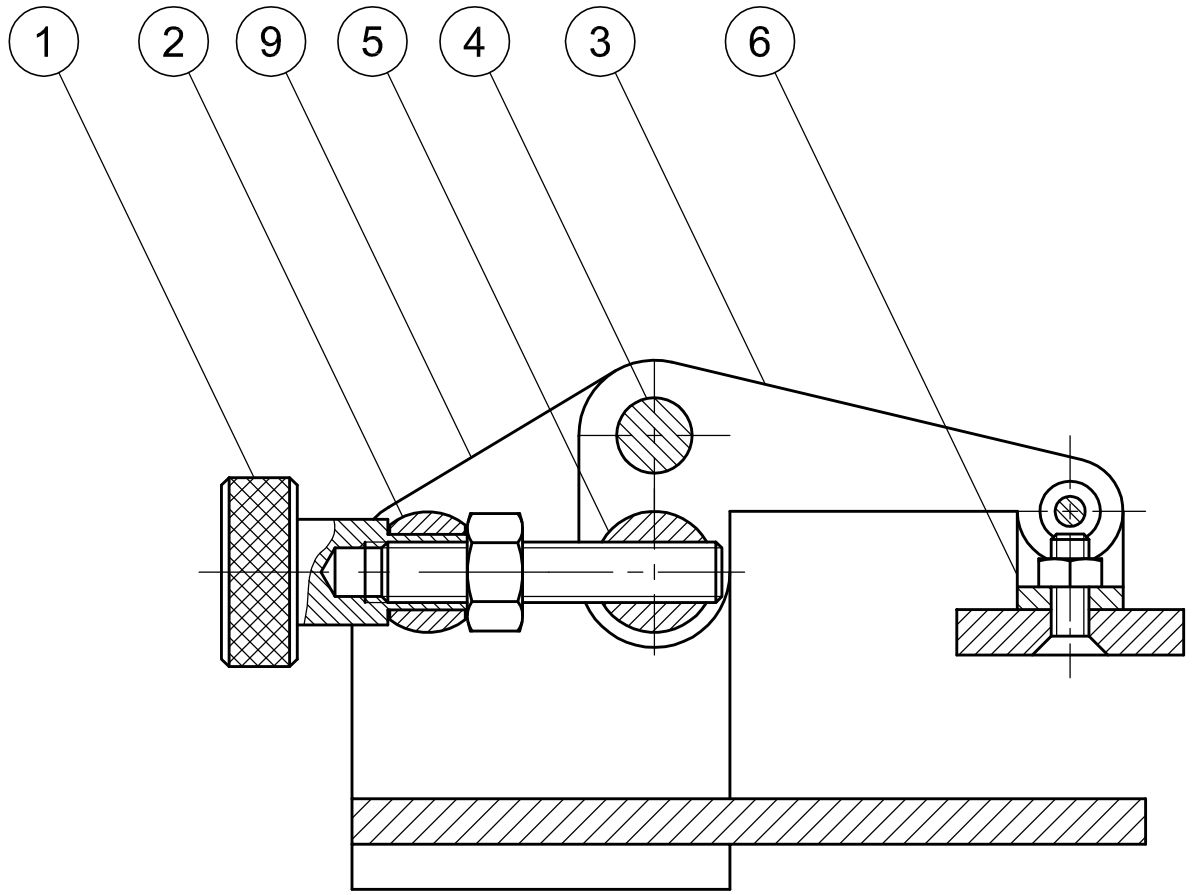
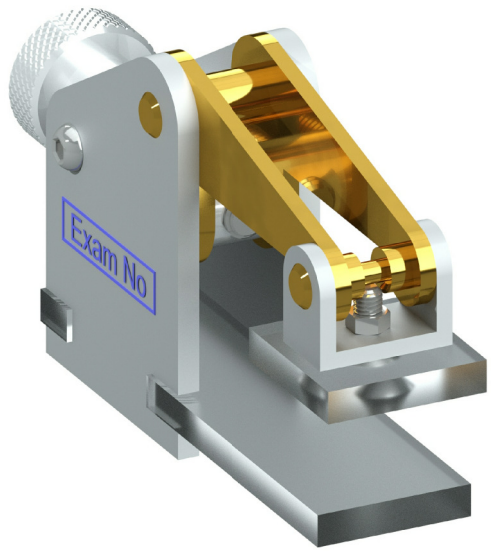
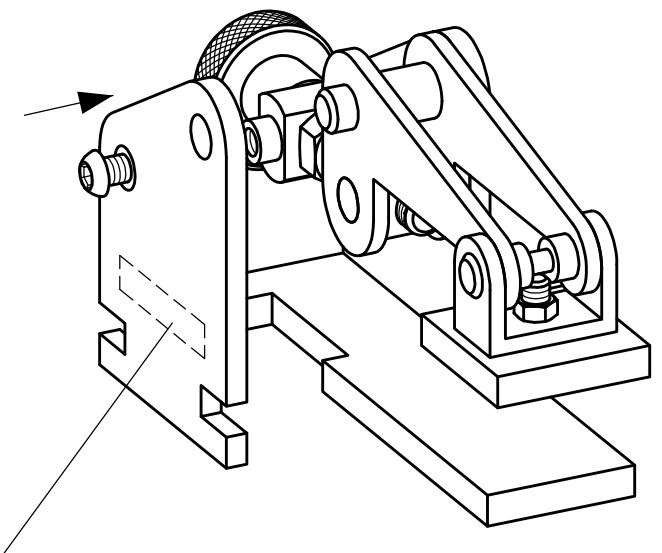
SCRÚDÚ ARDTEISTIMÉIREACHTA - INNEALTÓIREACHT PRAITICIÚIL
LEAVING CERTIFICATE - ENGINEERING PRACTICAL





SECTION A-A





SCRÚDUIMHIR
EXAM NO.

ASSEMBLY DETAILS
SONRAÍ CÓIMEÁLA

THALL
OVER

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination, 2023

Engineering - Practical

(150 marks)

Morning: 10:00 to 1:00 - Afternoon: 2:00 to 5:00

Please Read Carefully

Instructions

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(c) Write your Examination Number in the box provided on the examination paper - 2023. M74A(L_1).

(d) Put the examination paper - 2023. M74A(L_1) and the test-piece into the candidate envelope supplied and hand up the envelope to the Superintendent at the end of the examination.

From the materials supplied, make the **Mechanism** shown on the drawings to the shape and dimensions specified.

PART	MATERIAL	PROCESS
3	Brass	Mark out, drill and shape.
6	U-Aluminium	Mark out, drill and shape.
8	Clear Polycarbonate	Mark out and shape.
9	Aluminium	Mark out, drill and shape.
10	Clear Polycarbonate	Mark out, drill and shape.

Note: **(i)** Parts 1, 2, 4, 5 and 7 have been made prior to examination day.
Using the threaded bar, screws and nuts supplied assemble the mechanism, as detailed on the assembly drawing.

(ii) Accuracy, finish and function are important.

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Scrúdú na hArdteistiméireachta, 2023

Innealtóireacht - Praiticiúil

(150 marc)

Maidin: 10:00 go dtí 1:00 - Tráthnóna: 2:00 go dtí 5:00

Léigh na Treoracha seo go cúramach le do thoil

Treoracha

(a) Ba chóir don **mhúinteoir** Scrúduimhir an Iarrthóra a stampáil nó a ghreanadh ar an triailphíosa san ionad a thaispeántar ar an scrúdpháipéar - 2023. M74A(L_2). Mura bhfuil an triailphíosa curtha le chéile, ní mór an Scrúduimhir a thaispeáint ar gach páirt ar leith den triailphíosa.

(b) Níl cead ag iarrthóirí a bheith i gcumarsáid le chéile ná cúnamh a thabhairt dá chéile.

(c) Scríobh do Scrúduimhir sa bhosca atá ann di ar an scrúdpháipéar - 2023. M74A(L_1).

(d) Cuir an scrúdpháipéar - 2023. M74A(L_1) agus an triailphíosa isteach i gclúdach an iarrthóra atá curtha ar fáil agus tabhair an clúdach don Fheitheoir ag deireadh an scrúdaithe.

As na hábhair a sholáthraítear, déan an **Mheicníocht** a thaispeántar sna líníochtaí sa chruth agus sna toisí a shonraítear.

PÁIRT	ÁBHAR	PRÓISEAS
3	Prás	A mharcáil amach, a dhruileáil agus a dheilbhiú.
6	U-Alúmanam	A mharcáil amach, a dhruileáil agus a dheilbhiú.
8	Polacarbónáit thrédhearcach	A mharcáil amach agus a dheilbhiú.
9	Alúmanam	A mharcáil amach, a dhruileáil agus a dheilbhiú.
10	Polacarbónáit thrédhearcach	A mharcáil amach, a dhruileáil agus a dheilbhiú.

Nóta: **(i)** Rinneadh na páirteanna 1, 2, 4, 5 agus 7 roimh lá an scrúdaithe.
Agus tú ag baint úsáide as an barra snáithe, na scriúnna agus na cnónna a sholáthraítear, cóimeáil an mheicníocht faoi mar atá sa líníocht chóimeála.

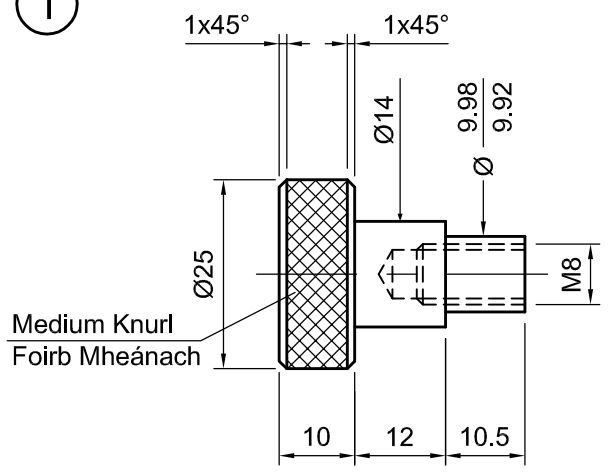
(ii) Tá tábhacht ag baint le cruinneas, le bailchríoch agus le hoibriú an triailphíosa.

Lá 2
Day 2

SCRÚDÚ ARDTEISTIMÉIREACHTA - INNEALTÓIREACHT PRAITICIÚIL
LEAVING CERTIFICATE - ENGINEERING PRACTICAL

2023. M74A(L 1)

1



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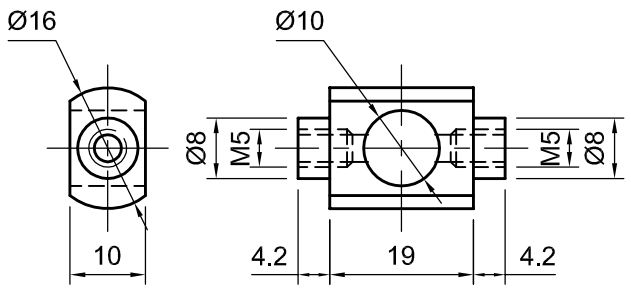
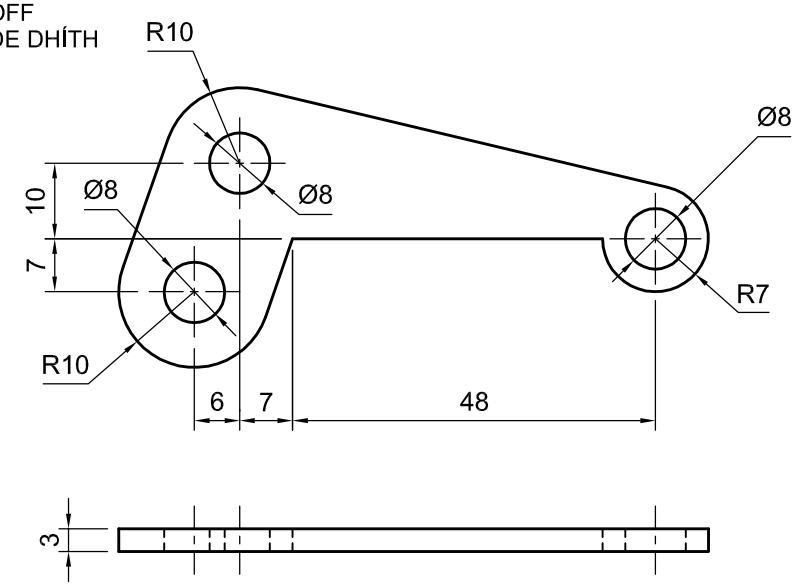


3 2 OFF DE DHÍTH



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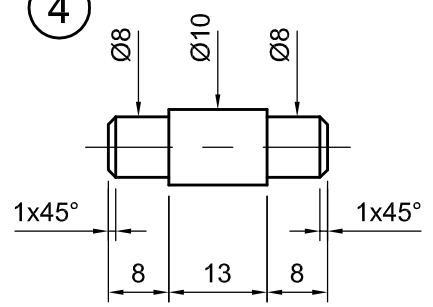
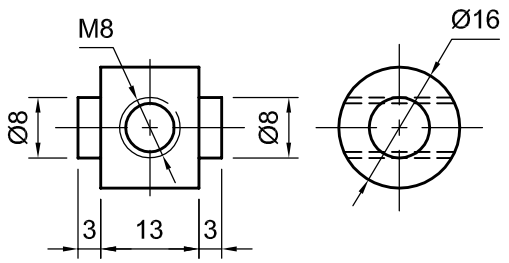


Cuir an scrúdpháipéar seo agus an triailphíosa isteach i gclúdach an iarrthóra atá curtha ar fáil, agus tabhair an clúdach don Fheitheoir ag deireadh an scrúdaithe.

Put this examination paper and the test-piece into the candidate envelope supplied, and hand up the envelope to the Superintendent at the end of the examination.

Scríobh do Scrúduimhir sa bhosca seo:
Write your Examination Number in this box:

5



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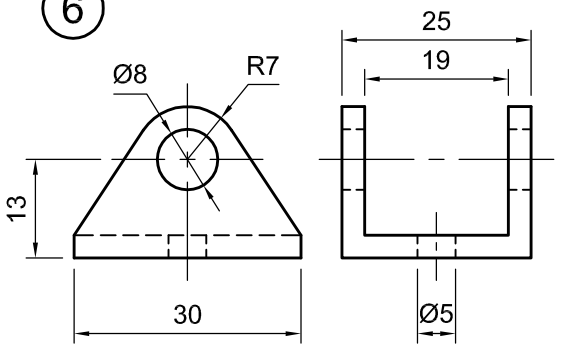

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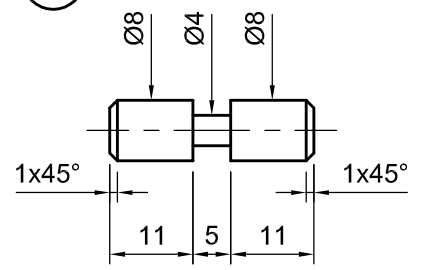

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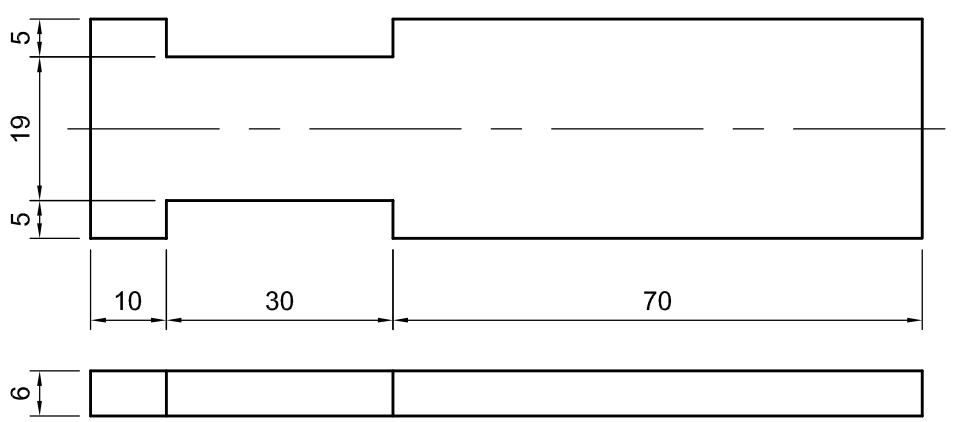
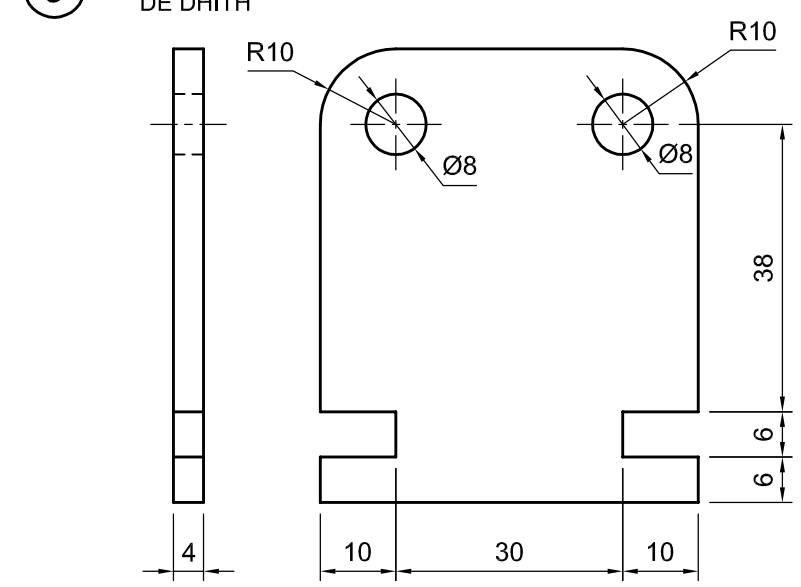


9 2 OFF DE DHÍTH



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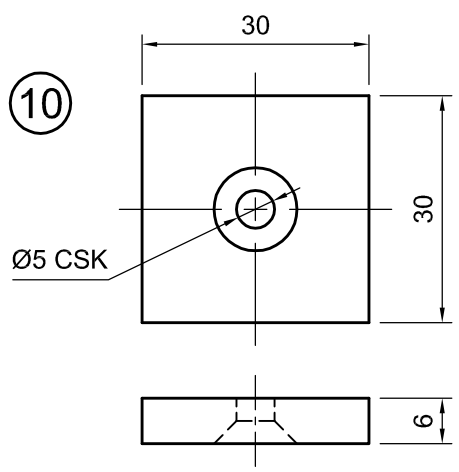
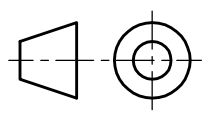
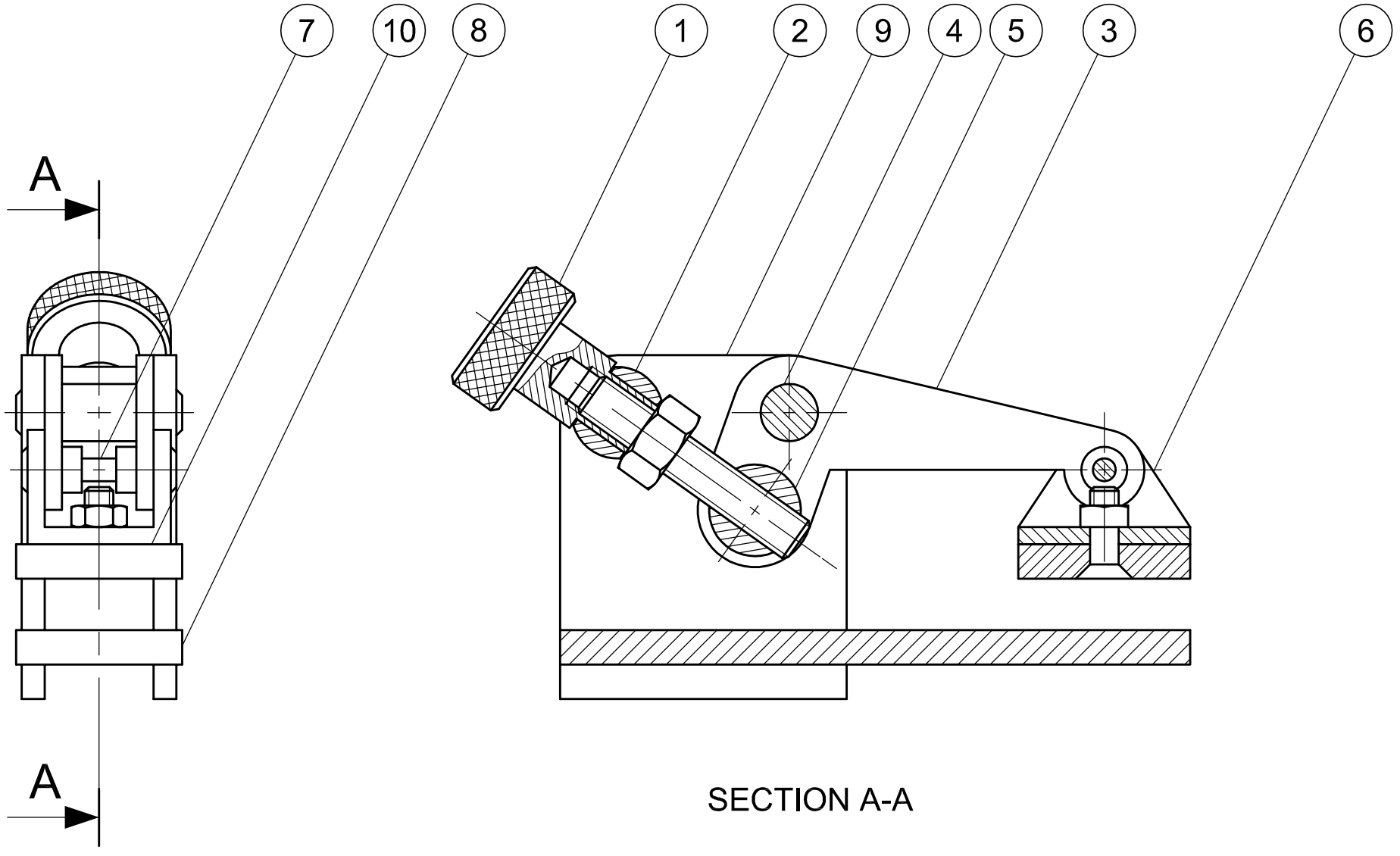


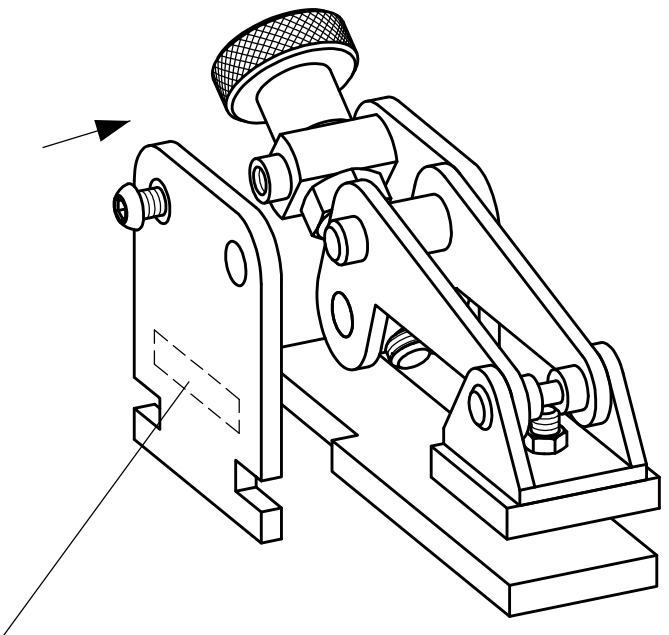


THALL OVER

SCRÚDÚ ARDTEISTIMÉIREACHTA - INNEALTÓIREACHT PRAITICIÚIL
LEAVING CERTIFICATE - ENGINEERING PRACTICAL



SECTION A-A



SCRÚDUIMHIR
EXAM NO.

ASSEMBLY DETAILS
SONRAÍ CÓIMEÁLA

THALL
OVER

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination, 2023

Engineering - Practical

(150 marks)

Morning: 10:00 to 1:00 - Afternoon: 2:00 to 5:00

Please Read Carefully

Instructions

(a) The Examination Number must be clearly stamped or engraved, by the **teacher**, on the test-piece in the position indicated on the examination paper - 2023. M74A(L_2).
If the test-piece is not assembled, the Examination Number must be indicated on each separate part of the test-piece.

(b) Candidates are not permitted to communicate with or assist one another.

(c) Write your Examination Number in the box provided on the examination paper - 2023. M74A(L_1).

(d) Put the examination paper - 2023. M74A(L_1) and the test-piece into the candidate envelope supplied and hand up the envelope to the Superintendent at the end of the examination.

From the materials supplied, make the **Mechanism** shown on the drawings to the shape and dimensions specified.

PART	MATERIAL	PROCESS
3	Brass	Mark out, drill and shape.
6	U-Aluminium	Mark out, drill and shape.
8	Clear Polycarbonate	Mark out and shape.
9	Aluminium	Mark out, drill and shape.
10	Clear Polycarbonate	Mark out, drill and shape.

Note: **(i)** Parts 1, 2, 4, 5 and 7 have been made prior to examination day.
Using the threaded bar, screws and nuts supplied assemble the mechanism, as detailed on the assembly drawing.

(ii) Accuracy, finish and function are important.

Coimisiún na Scrúduithe Stáit
State Examinations Commission

Scrúdú na hArdteistiméireachta, 2023

Innealtóireacht - Praiticiúil

(150 marc)

Maidin: 10:00 go dtí 1:00 - Tráthnóna: 2:00 go dtí 5:00

Léigh na Treoracha seo go cúramach le do thoil

Treoracha

(a) Ba chóir don **mhúinteoir** Scrúduimhir an Iarrthóra a stampáil nó a ghreanadh ar an triailphíosa san ionad a thaispeántar ar an scrúdpháipéar - 2023. M74A(L_2). Mura bhfuil an triailphíosa curtha le chéile, ní mór an Scrúduimhir a thaispeáint ar gach páirt ar leith den triailphíosa.

(b) Níl cead ag iarrthóirí a bheith i gcumarsáid le chéile ná cúnamh a thabhairt dá chéile.

(c) Scríobh do Scrúduimhir sa bhosca atá ann di ar an scrúdpháipéar - 2023. M74A(L_1).

(d) Cuir an scrúdpháipéar - 2023. M74A(L_1) agus an triailphíosa isteach i gclúdach an iarrthóra atá curtha ar fáil agus tabhair an clúdach don Fheitheoir ag deireadh an scrúdaithe.

As na hábhair a sholáthraítear, déan an **Mheicníocht** a thaispeántar sna líníochtaí sa chruth agus sna toisí a shonraítear.

PÁIRT	ÁBHAR	PRÓISEAS
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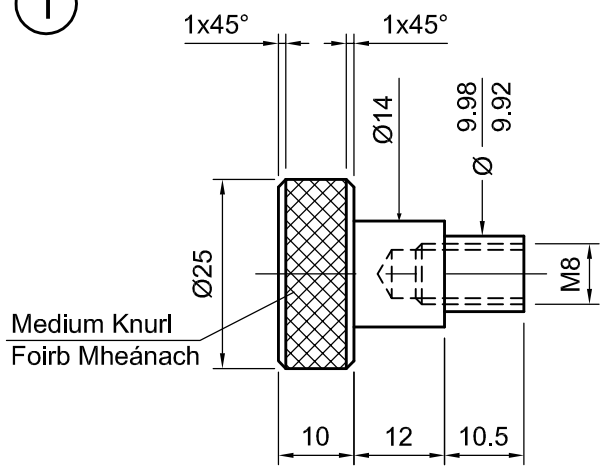
Nóta: **(i)** Rinneadh na páirteanna 1, 2, 4, 5 agus 7 roimh lá an scrúdaithe.
Agus tú ag baint úsáide as an barra snáithe, na scriúnna agus na cnónna a sholáthraítear, cóimeáil an mheicníocht faoi mar atá sa líníocht chóimeála.

(ii) Tá tábhacht ag baint le cruinneas, le bailchríoch agus le hoibriú an triailphíosa.

SCRÚDÚ ARDTEISTIMÉIREACHTA - INNEALTÓIREACHT PRAITICIÚIL
LEAVING CERTIFICATE - ENGINEERING PRACTICAL

1



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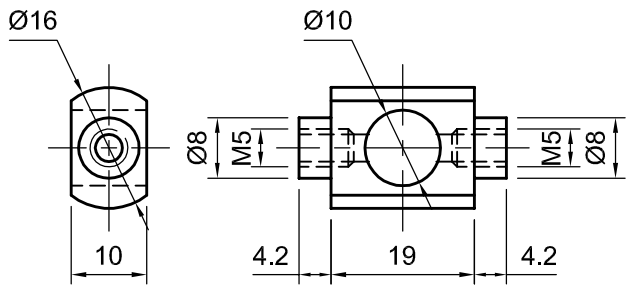
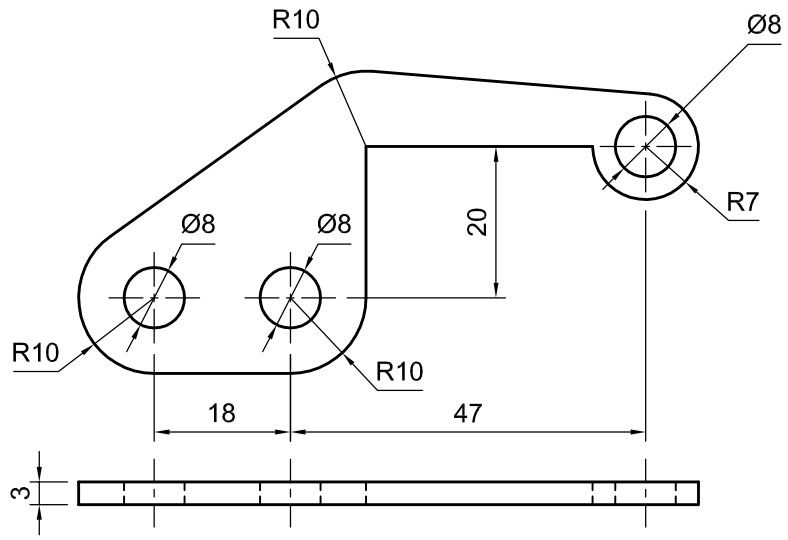


3 2 OFF
DE DHÍTH



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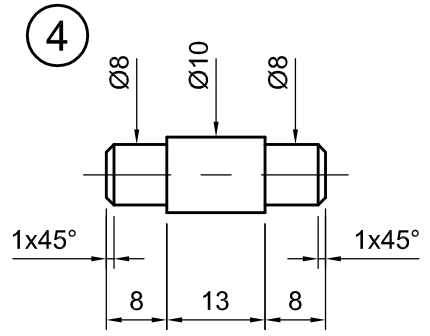

Cuir an scrúdpháipéar seo agus an triailphíosa isteach i gclúdach an iarrthóra atá curtha ar fáil, agus tabhair an clúdach don Fheitheoir ag deireadh an scrúdaithe.

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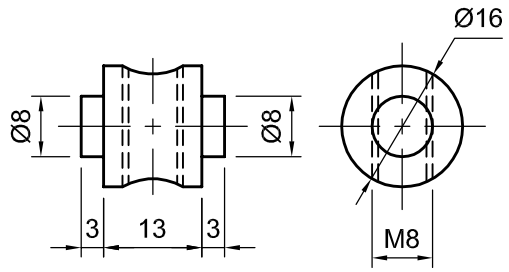
Scríobh do Scrúduimhir sa bhosca seo:
Write your Examination Number in this box:

5



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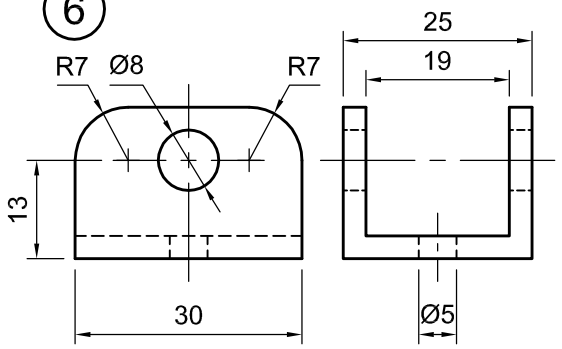

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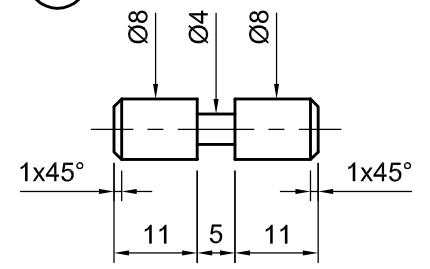

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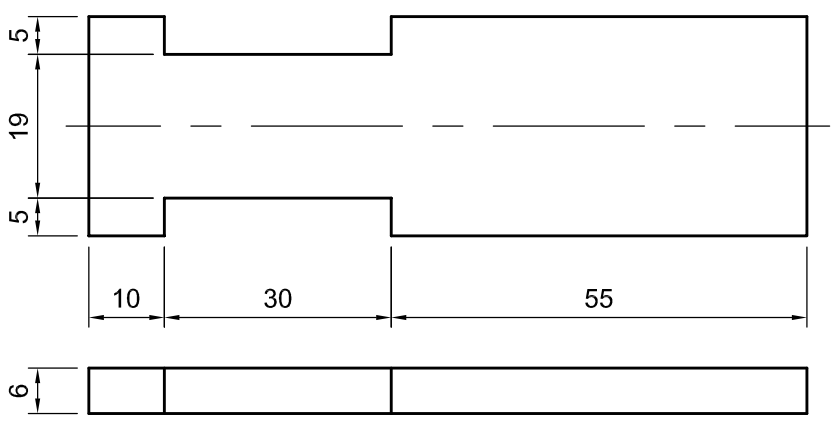
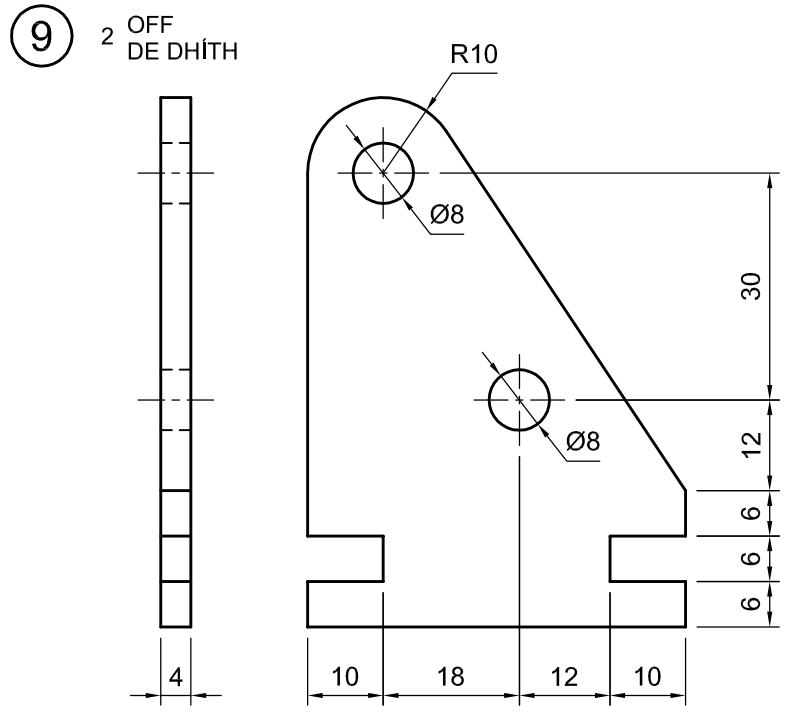


9 2 OFF
DE DHÍTH



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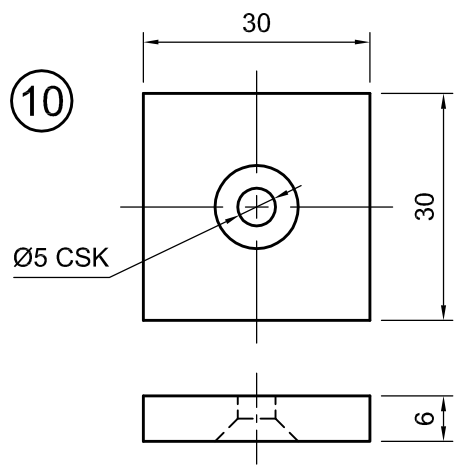
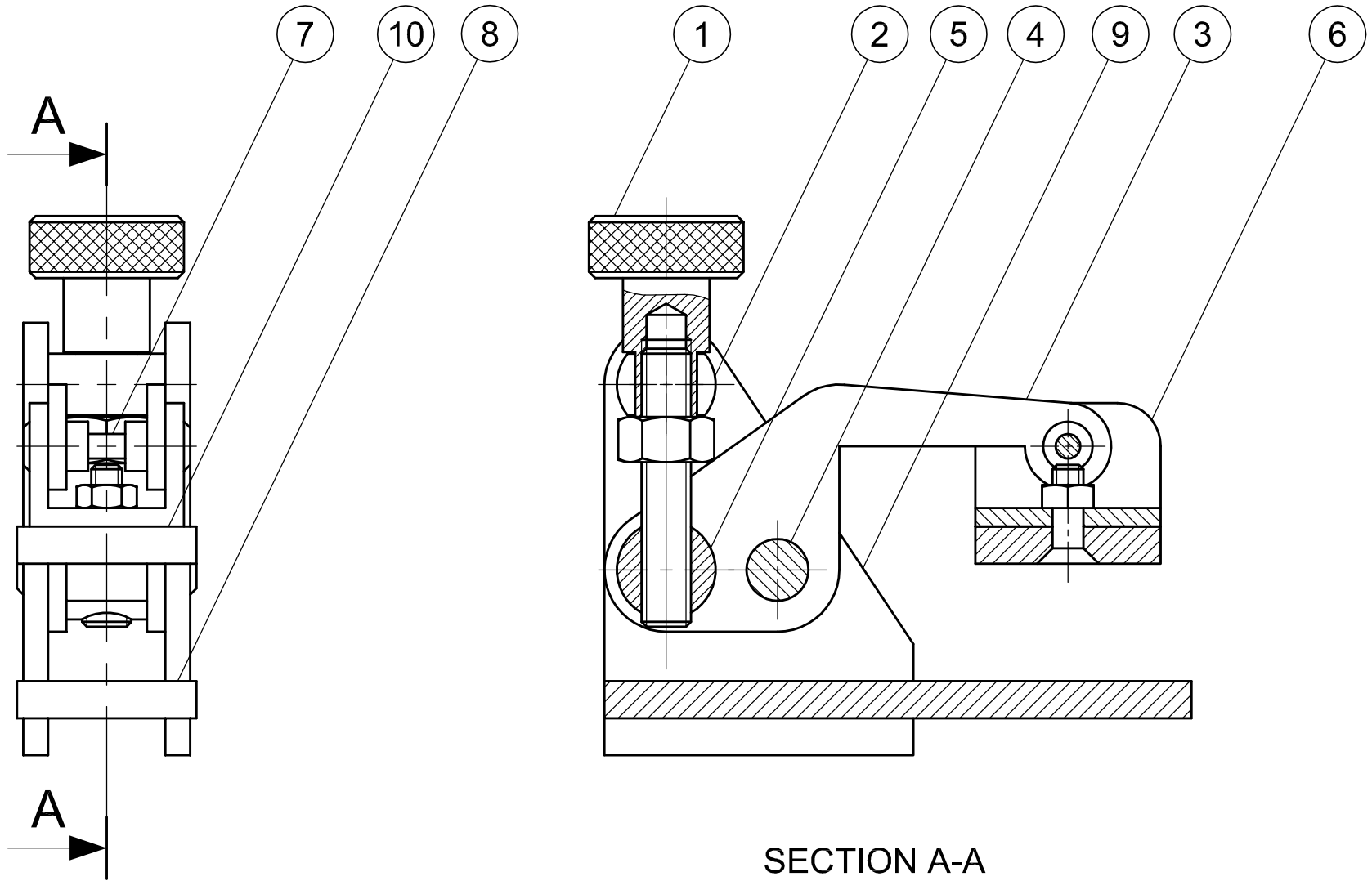
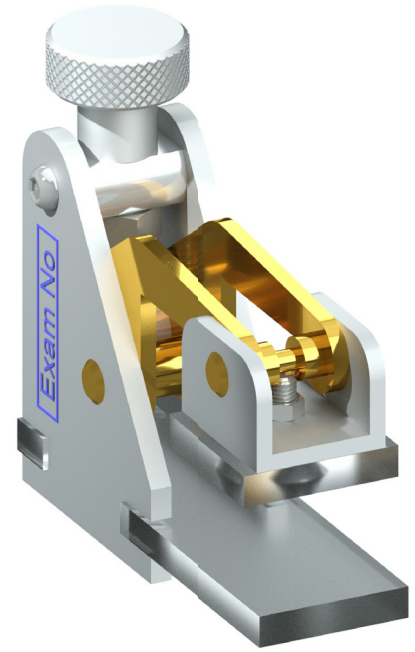


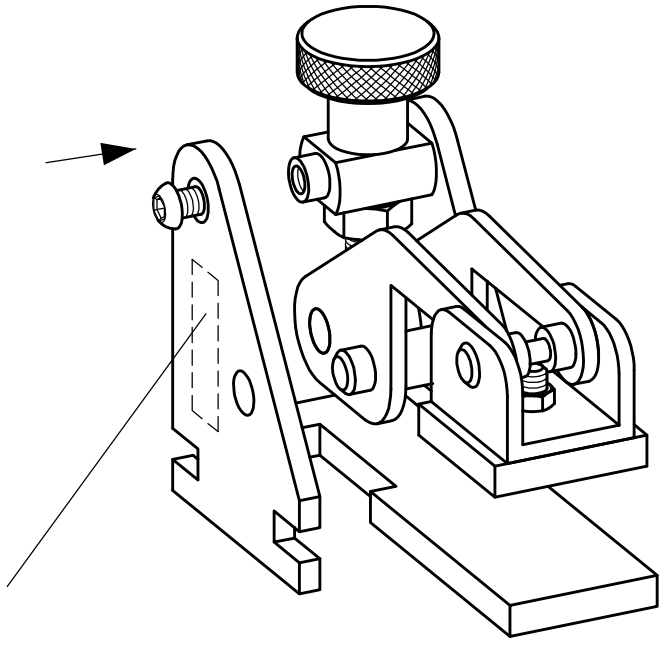
THALL OVER

SCRÚDÚ ARDTEISTIMÉIREACHTA - INNEALTÓIREACHT PRAITICIÚIL
LEAVING CERTIFICATE - ENGINEERING PRACTICAL



SECTION A-A





SCRÚDUIMHIR
EXAM NO.

ASSEMBLY DETAILS
SONRAÍ CÓIMEÁLA

THALL
OVER