



Coimisiún na Scrúduithe Stáit State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2014

ENGINEERING – MATERIALS AND TECHNOLOGY

(Ordinary Level – 200 marks)

THURSDAY, 5 JUNE

MORNING 9:30 – 12:00

Answer Question 1, Section A and Section B, and three other questions.

Question 1.

(65 marks)

SECTION A – 30 marks

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

(a) State **two** safety precautions to be observed when using a scroll saw to cut acrylic.

(b) Explain the term *permanent joint*.

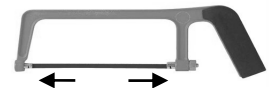
(c) Name **any two** computer input devices.

(d) Name the electronic component represented by the symbol shown and suggest **one** suitable application for it.

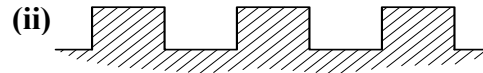
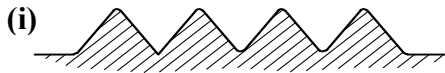


(e) Give **one** end-product of the *blow moulding* process.

(f) Name the type of force exerted on the hacksaw blade shown.



(g) Identify the **two** thread forms shown.



(h) Identify the measuring instrument shown and suggest **one** suitable application for it.



SECTION B – 35 marks

Answer **any three** of the following:

(i) Describe the main operating features of **any one** of the following:



Pop riveting gun



Ratchet and pawl mechanism



Brazing hearth.

(j) Explain **any two** of the following:

Computer tablet,

Scanner,

Streaming media,

3D printer.

(k) Define the term *malleability* and name a material which is malleable.

(l) Explain **any two** of the following:

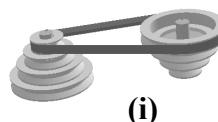
Light dependent resistor (LDR),

Compressor,

Engraving,

Self-locking nut.

(m) Name the **two** drive systems shown at (i) and (ii).



Question 2.

(45 marks)

- (a) Identify a suitable material for the manufacture of **each** component listed below:

(i) Twist drill,



(ii) Fuel burner,



(iii) Bicycle frame.



- (b) Describe **any three** of the following:

(i) Iron ore,

(ii) Galvanised steel,

(iii) Tuyere,

(iv) Tinplate.

- (c) (i) Select **any two** of the metals listed below, and in **each** case name a suitable furnace used in the production of the metal:

Cast iron,

High carbon steel,

Pig iron.

- (ii) With the aid of a suitable diagram, describe **one** of the furnaces named at 2(c)(i) above.

- (d) Name **any two metal alloys** and state a suitable use for **each**.

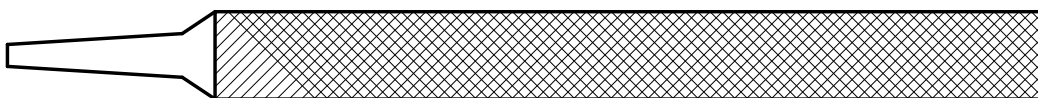
Question 3.

(45 marks)

- (a) (i) Outline **any two** reasons for the heat treatment of metals.

- (ii) Name **three** heat treatment processes that may be applied to steels.

- (b) Describe **two** heat treatment processes that are carried out on the file shown.



- (c) State **two** reasons why it is essential to wear safety goggles when heat treating metals.



- (d) Explain **any two** of the following metal properties:

(i) Elasticity,

(ii) Toughness,

(iii) Conductivity.

OR

- (d) State **two** advantages of using robotics in the manufacturing industry.



Question 4.**(45 marks)**

- (a) Describe, with the aid of suitable diagrams, the make-up of the following oxy-acetylene flames:
- (i) Oxidising flame, (ii) Neutral flame, (iii) Carburising flame.

- (b) Explain **any three** of the following in relation to welding:

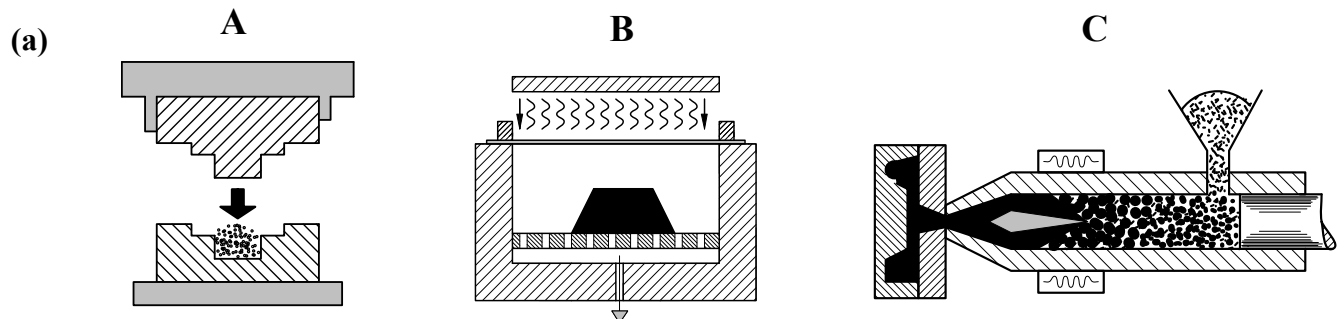
- (i) Earth clamp, (ii) Welding mask, (iii) Pressure gauge, (iv) Flashback arrestor.

- (c) Answer **any three** of the following:

- (i) State **two** reasons why flux is required when soldering.
(ii) Name the special machine screw shown and suggest a suitable application.
(iii) List **two** safety precautions to be observed when spot welding.
(iv) Name the type of washer shown and suggest a suitable application.



- (d) State **two** safety precautions to be observed when using an electrical soldering iron.

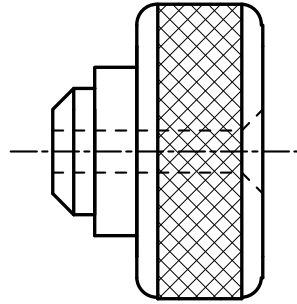
**Question 5.****(45 marks)**

- (i) Name the **three** plastic manufacturing processes shown at **A**, **B** and **C** above.
- (ii) Describe **any one** of the manufacturing processes **A**, **B** or **C** shown above and identify **one** component produced by this process.
- (b) Describe, with the aid of a diagram, the operation of **one** of the following **and** identify a suitable application:
- (i) Strip heater;
(ii) Plastic dip coating tank.
- (c) State **two** safety precautions to be observed when using adhesives to bond acrylic sheet.
- (d) Name a plastic used in the manufacture of **each** of the following:
- (i) Cavity wall insulation, (ii) Gear wheel.

Question 6.

(45 marks)

- (a) The wheel shown is to be turned on a lathe from a 30 mm diameter aluminium bar. Describe **any three** of the turning operations used to produce the wheel.



- (b) Explain **any three** of the following:

(i) Centre drill, (ii) Rake angle, (iii) Knurling, (iv) Clearance angle.

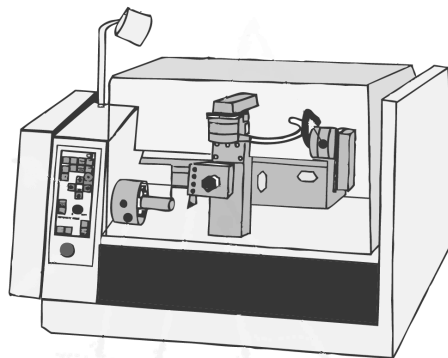
- (c) A part for a centre lathe is shown opposite.

- (i) Name this lathe part.
(ii) Describe **two** operations that can be performed on a centre lathe using the part shown.
(iii) State **one** safety precaution to be observed when using this lathe part.



OR

- (c) A CNC lathe is shown below.



- (i) What do the letters CNC stand for?
(ii) Describe **one** advantage of a CNC lathe over a manual lathe.
(iii) State **one** safety precaution to be observed when operating a CNC lathe.

Question 7.

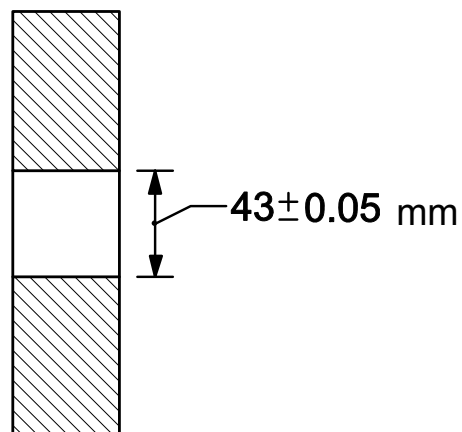
(45 marks)

- (a)** Using sketches, describe the difference between a clearance fit and an interference fit in a shaft and hole assembly.

- (b)** A hole is produced in a brass plate to the dimensions shown.

State the:

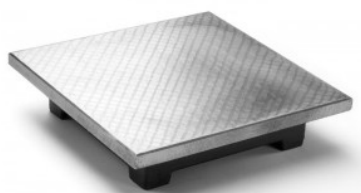
- (i)** Nominal diameter of the hole;
- (ii)** Smallest diameter of the hole;
- (iii)** Largest diameter of the hole;
- (iv)** Tolerance of the hole.



- (c)** Name **any three** of the instruments shown and give **one** application of **each** instrument named.



(i)



(ii)



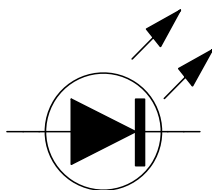
(iii)



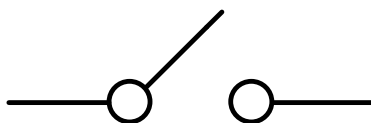
(iv)

OR

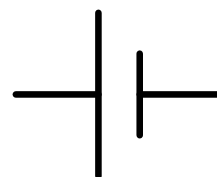
- (c)** Name **each** of the electronic components represented by the circuit symbols shown and outline the function of **each** component named.



(i)



(ii)



(iii)

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Coimisiún na Scrúdaithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2014

ENGINEERING - PRACTICAL
HIGHER and ORDINARY LEVELS

150 marks

28th APRIL - 9th MAY - 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 drawing 2014. M74A(L₂). 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) Completed **mild steel** parts **only** must be sprayed with a clear rust preventive aerosol.

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

PART	MATERIAL	PROCESS
1	Clear Polycarbonate	Mark out, drill, tap and shape.
3	Brass	Mark out, drill and shape.
4	Aluminium	Mark out, drill and shape.
5	Aluminium	Mark out, drill and shape.
6	Aluminium	Mark out, drill and shape.

Note: (i) Parts 2 and 7 have been made prior to examination day. Using the screws supplied assemble the Mechanism, as detailed on the assembly drawing.
(ii) **Accuracy, finish and function are important.**



Coimisiún na Scrúdaithe Stáit

SCRÚDÚ ARDTEISTIMÉIREACHTA, 2014

INNEALTÓIREACHT - PRAITICIÚIL
ARDLEIBHÉAL agus GNÁTHLEIBHÉAL

150 marc

28 AIBREÁN - 9 BEALTAINÉ

- MAIDIN:

10:00 go dtí 1:00

TRÁTHNÓNA:

2:00 go dtí 5:00

LÉIGH NA TREORACHA SEO GO CÚRAMACH IAD LE DO THOIL

TREORACHA

- (a) Ba chóir don **mhúinteoir** Scrúduimhir an Iarrthóra a ghreanadh nó a scríobadh san ionad a thaispeántar ar an líníocht 2014. M74A(L₂). Mura bhfuil an triailphíosa curtha le chéile, ní mór an Scrúduimhir a thaispeáint ar gach páirt ar leith den triailphíosa.
- (b) Níl sé de chead ag iarrthóirí caidreamh a bheith acu lena chéile ná cúnamh a thabhairt dá chéile.
- (c) Ní mór sprae trédhearcadh aersol chun meirg a chosc a chur ar na páirteanna déanta as **cruach bhog amháin** agus iad críochnaithe.

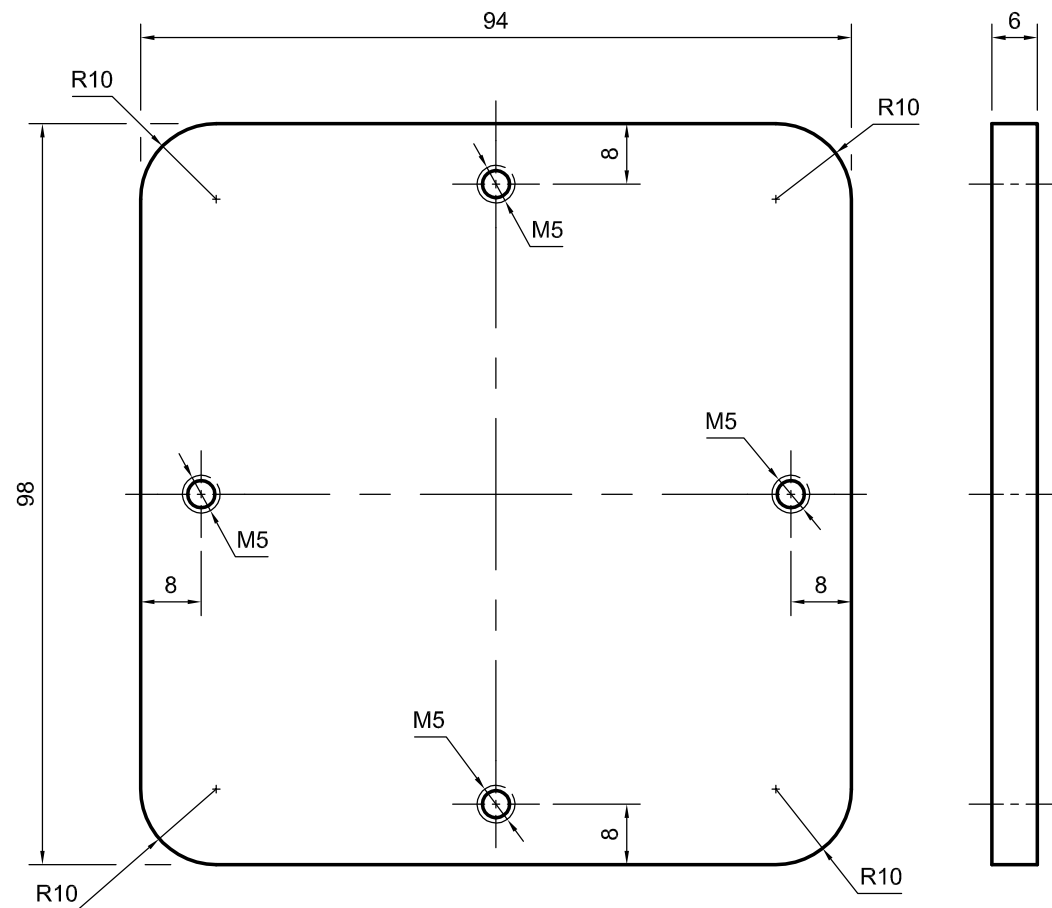
As na hábhair a sholáthraítear, an **Mheicníocht** a thaispeántar sna líníochtaí a dhéanamh sa chruth agus de réir na dtoisí a shonraítear.

PÁIRT	ÁBHAR	PRÓISEAS
1	Polacharbónáit thrédhearcach	A mharcáil amach, a dhruileáil, a tapa agus a dheilbhiú.
3	Prás	A mharcáil amach, a dhruileáil agus a dheilbhiú.
4	Alúmanam	A mharcáil amach, a dhruileáil agus a dheilbhiú.
5	Alúmanam	A mharcáil amach, a dhruileáil agus a dheilbhiú.
6	Alúmanam	A mharcáil amach, a dhruileáil agus a dheilbhiú.

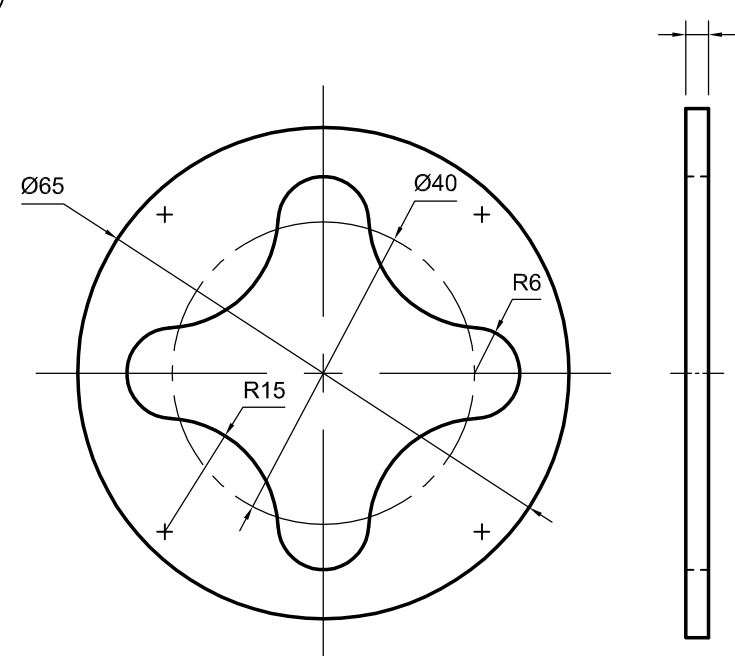
Nóta: (i) Rinneadh páirteanna 2 agus 7 roimh lá an scrúdaithe. Ag baint úsáide as na scriúnná a sholáthraítear, déan an Mheicníocht faoi mar atá sa líníocht cóimeála.

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

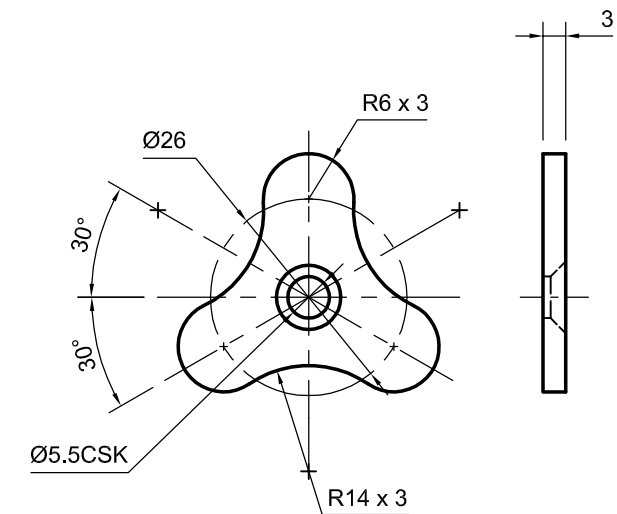
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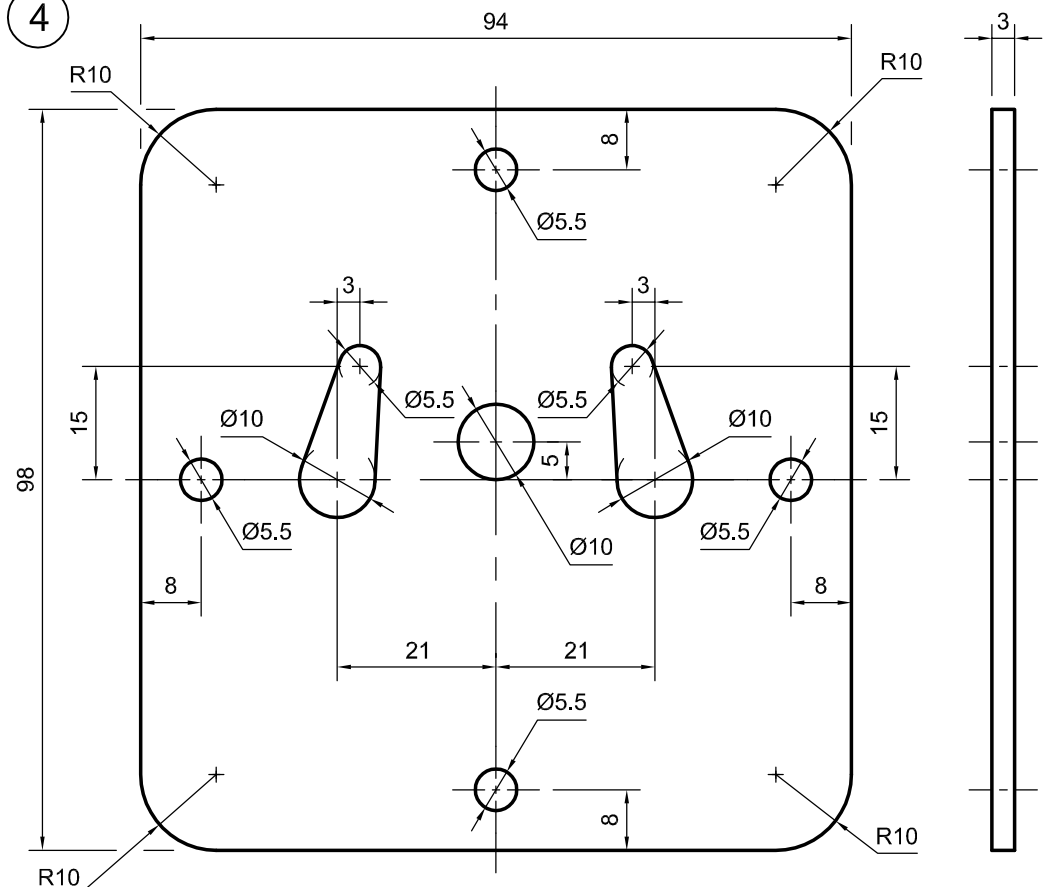
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3

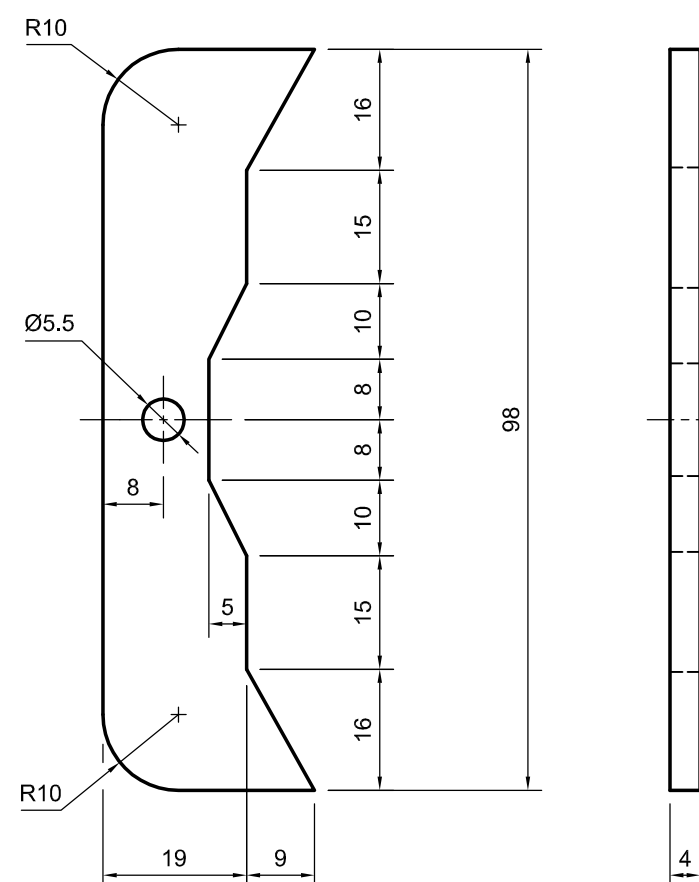


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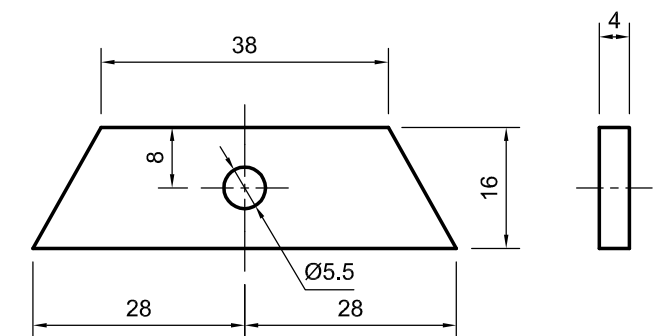
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2 De dhíth
OFF

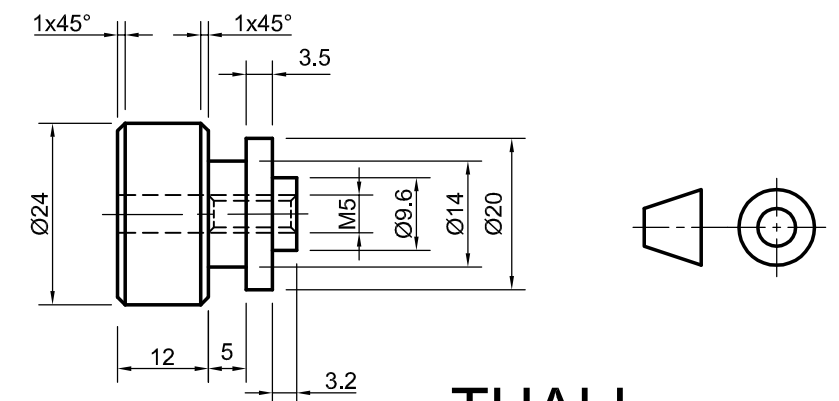


6

2 De dhíth
OFF

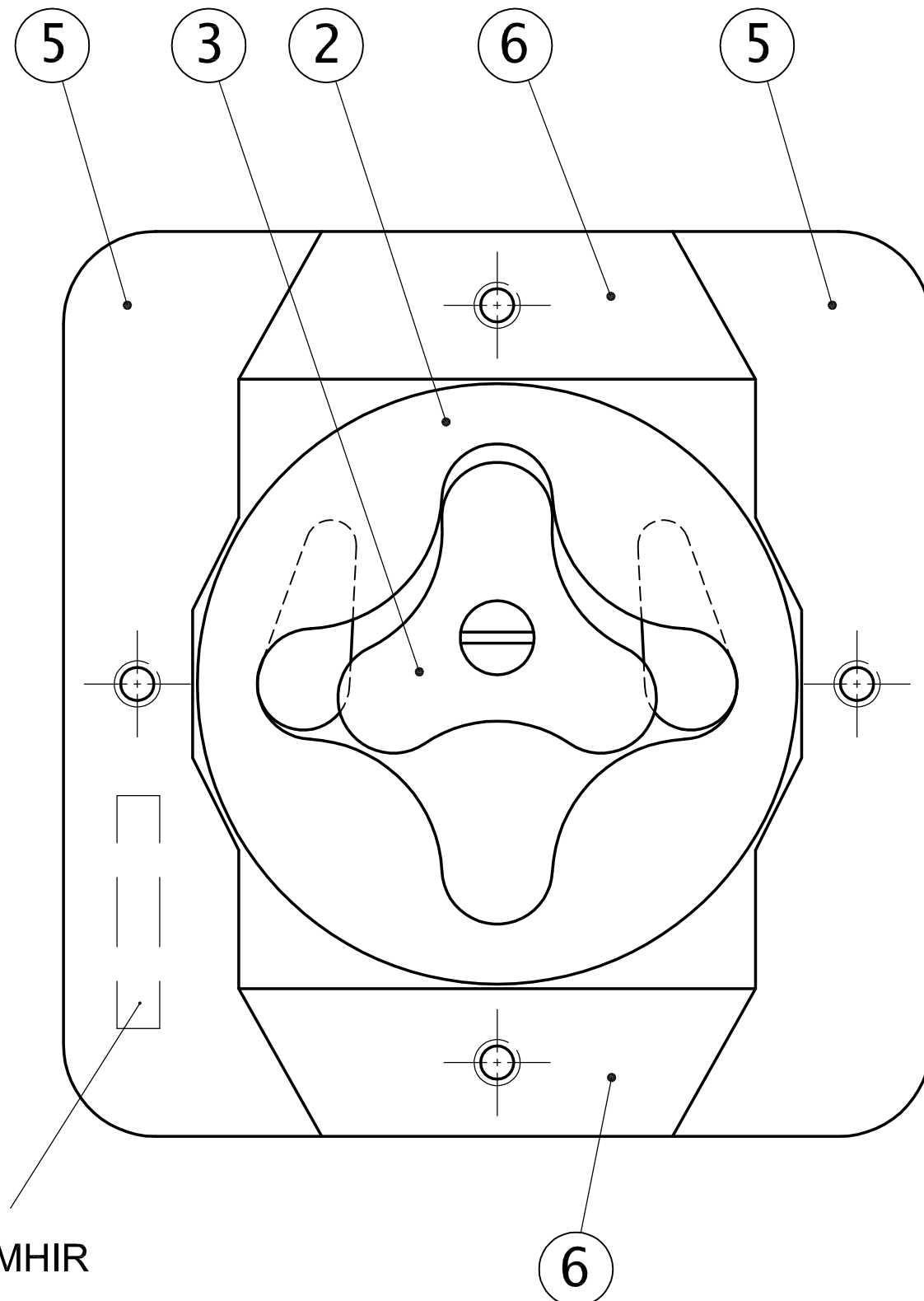


7



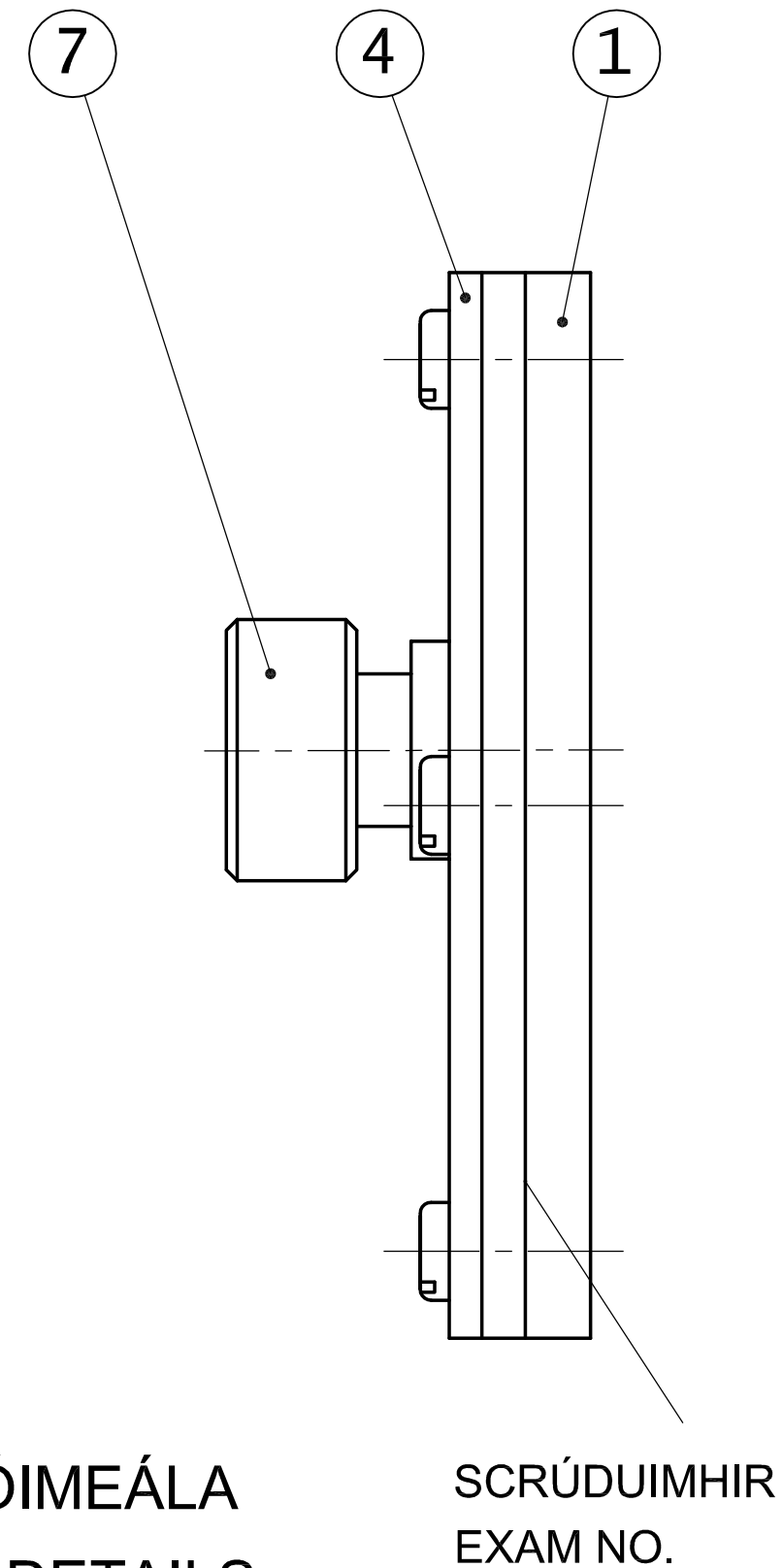
THALL
OVER →

SCRÚDÚ ARDTEISTIMÉIREACHTA INNEALTÓIREACHT - PRAITICIÚIL
LEAVING CERTIFICATE ENGINEERING - PRACTICAL



SCRÚDUIMHIR
EXAM NO.

SONRAÍ CÓIMEÁLA
ASSEMBLY DETAILS



SCRÚDUIMHIR
EXAM NO.