



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2020

METALWORK

TECHNIQUES AND DESIGN – PROJECT – ORDINARY LEVEL

300 marks

PROJECT MUST BE COMPLETED BY Friday 3<sup>rd</sup> April, 2020

PLEASE READ CAREFULLY

**General Instructions to candidates**

The project you make and submit for examination, including the design element, must be **your own individual work**, carried out in the school under the supervision of the teacher.

**Your own individual work** is intended to include the intellectual activity of design along with the practical activities of making the project.

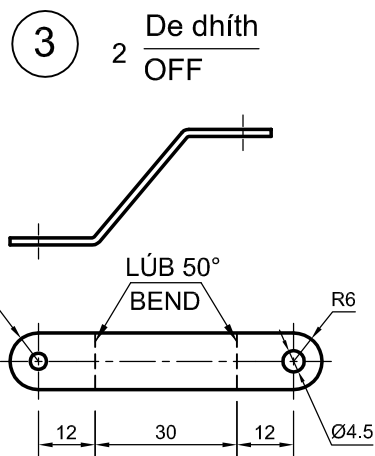
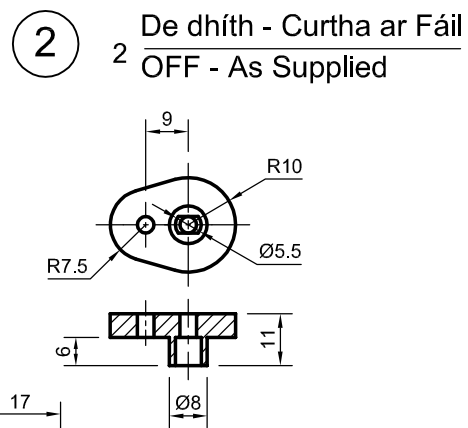
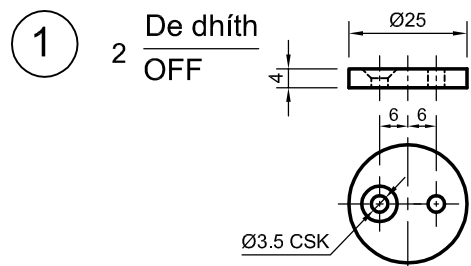
**Note - Design Element only:** If computer aided manufacture (CAM) is used, supporting CAD files/drawings must accompany your model to authenticate **your own individual work**.

**Note:** For further information on this project please see the video at the URL shown below.

<https://www.examinations.ie/video/index.php/metalwork2020>

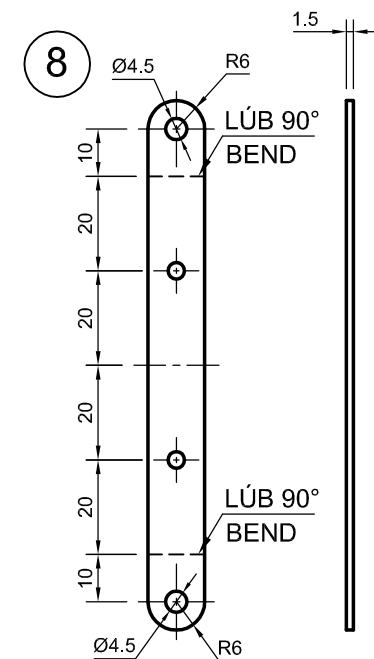
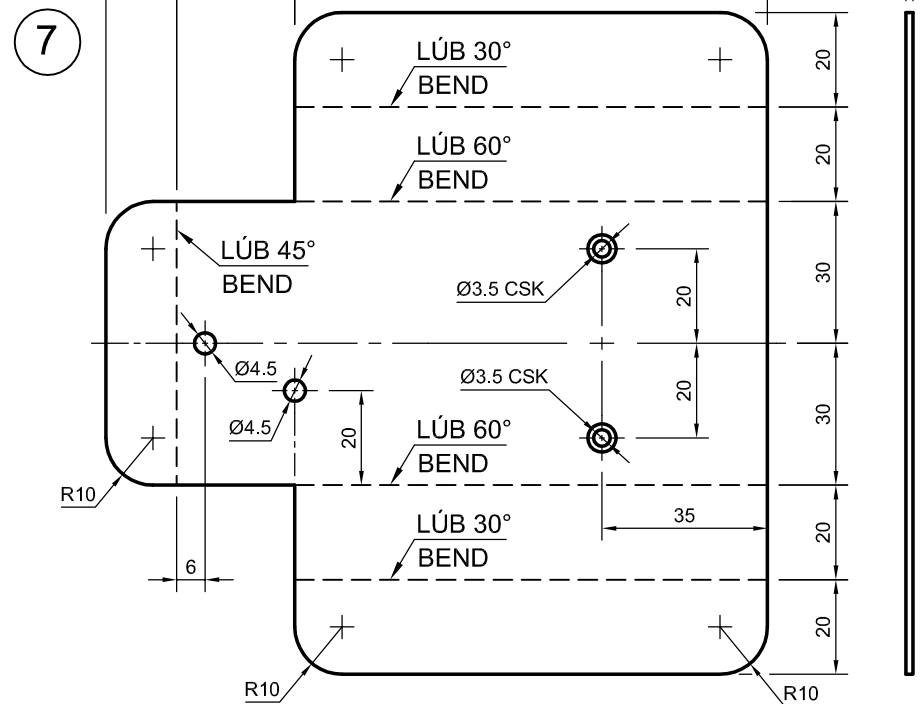
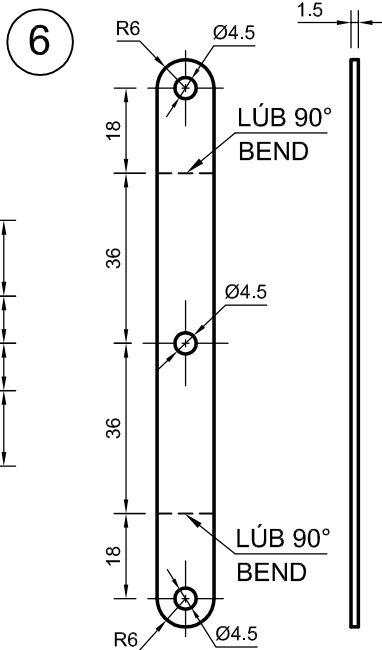
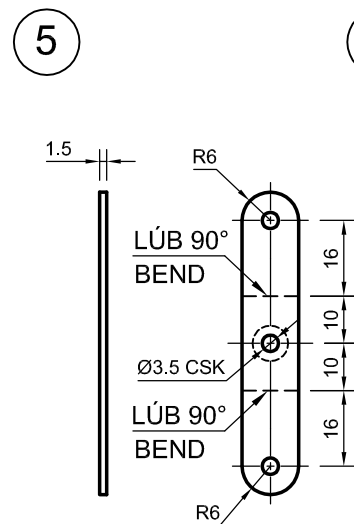
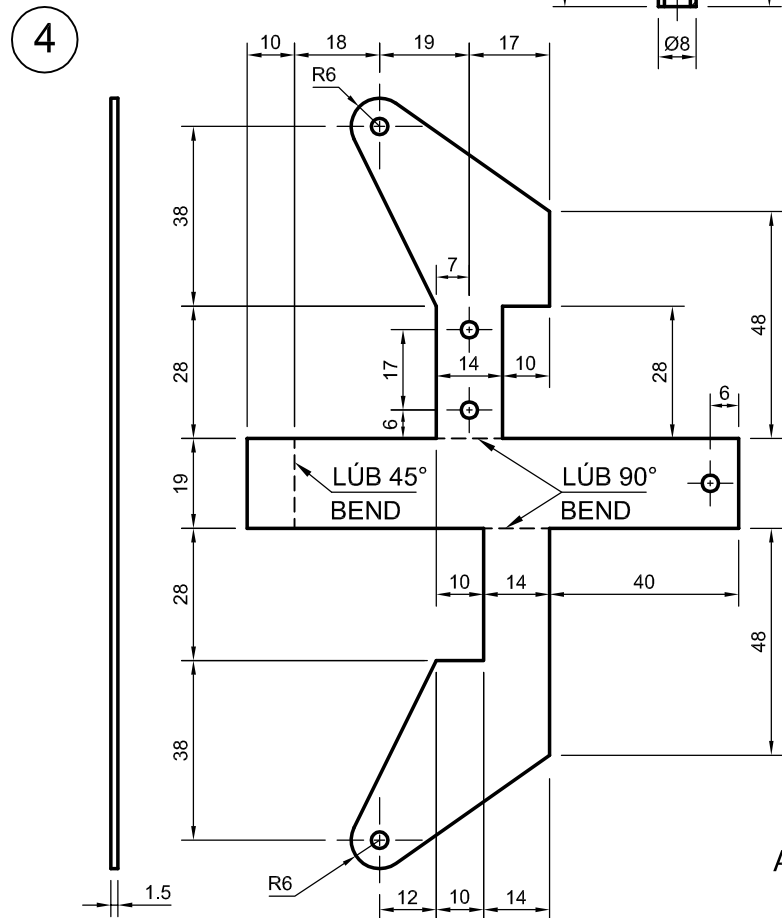
**Instructions for making the project**

1. Details of a **Model Robo Carriage** are shown on the accompanying drawing.
2. Make and assemble the Project using the materials specified in the **Parts List**.  
**Note:** Pop rivets may be used for assembly.
3. Design, make and attach **two simple figures of your choice** to pull the carriage.  
It is essential that your design be attached as shown on the *Assembly Details* using the two  $\varnothing 3.5$  mm holes as dimensioned in **Part 9**.  
**(Note: 20% of the marks will be awarded for this section.)**
4. You must bond the **Battery Box (Part 24)** to the **Carriage (Part 7)**.
5. Complete, **test** and **solder** the **Electric Circuit**.
6. Your **Examination Number** must be clearly shown in the position indicated on the drawing.
7. Your completed project, clearly identified with your **Examination Number**, must be available to the visiting examiner **along with the necessary testing equipment**.

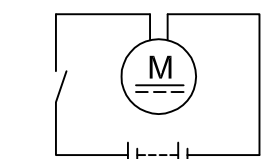
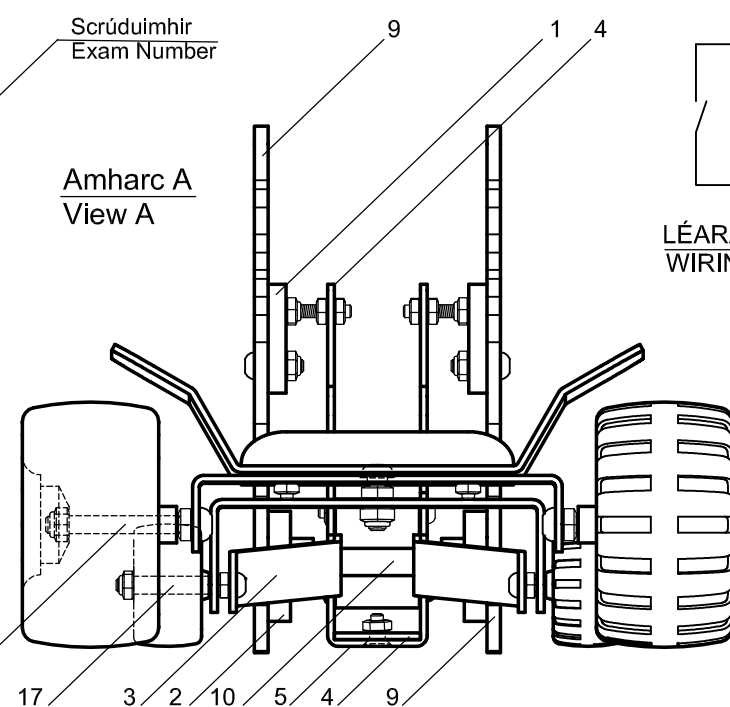
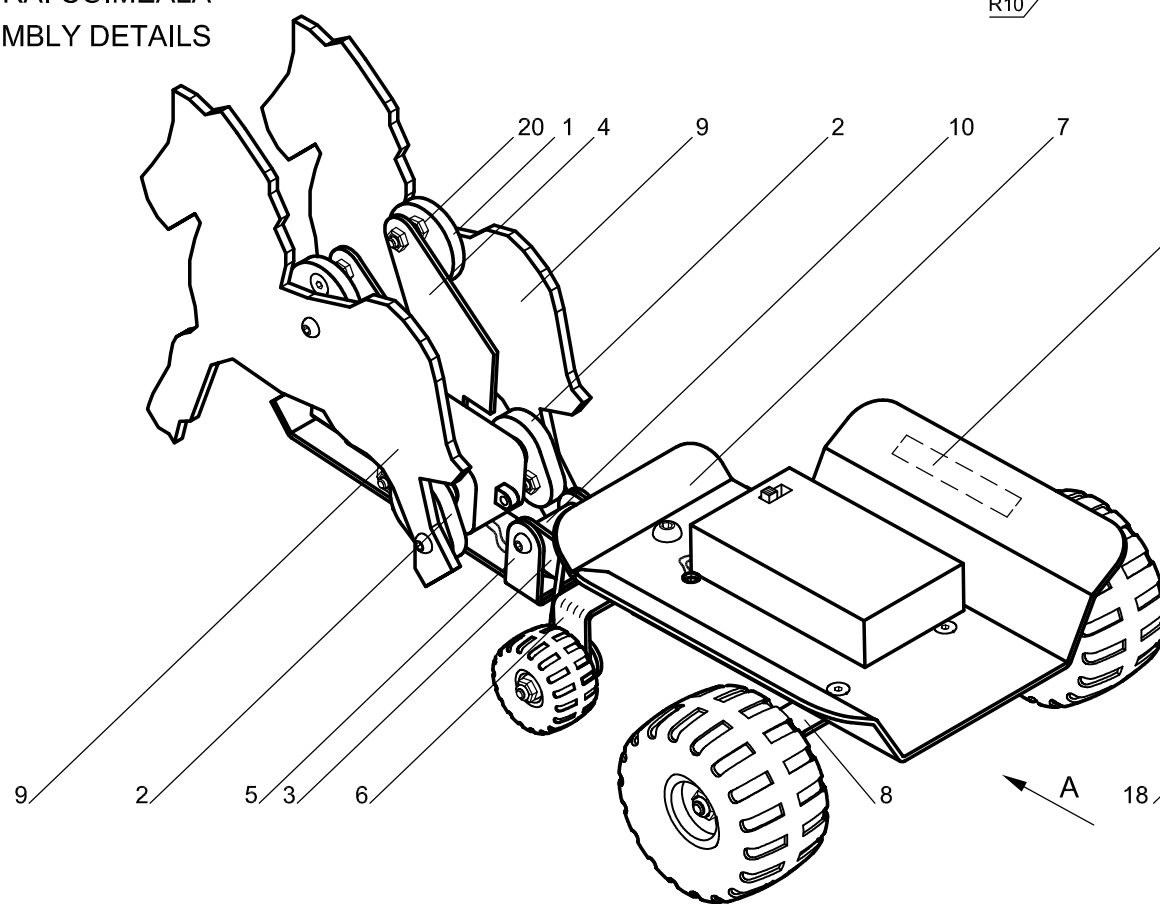
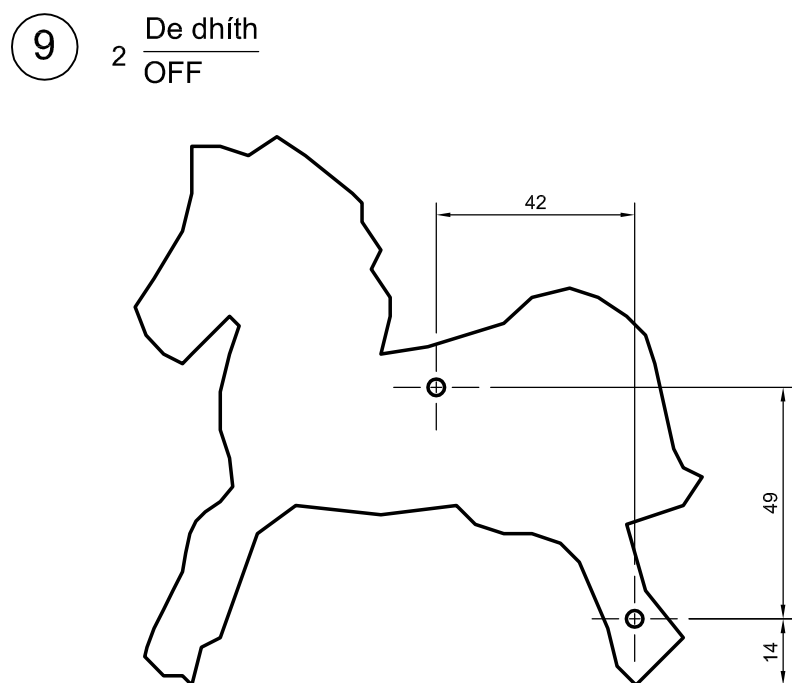


Nóta: Gabhann 20% de na marcanna le Cóimeáil, Bailchríoch agus Feidhmiú.  
 Note: 20% of the marks will be awarded for Assembly, Finish and Function.

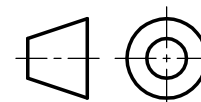
Poill gan toisí Ø3.5  
 Undimensioned holes



SONRAÍ CÓIMEÁLA  
 ASSEMBLY DETAILS



LÉARÁID LEICTREACH  
 WIRING DIAGRAM



PARTS LIST			
Part No.	Part Name	Req.	Material and Description
1	Link	2	Ø25 mm Acetal or Aluminium (polished)
2	In-Line Motor Cam	2	Plastic Cam - As supplied
3	Shaft	2	1.5 mm, Aluminium (polished)
4	Motor Support	1	1.5 mm, Aluminium (polished or painted)
5	Shaft Support	1	1.5 mm, Aluminium (polished)
6	Front Axle Support	1	1.5 mm, Aluminium (polished)
7	Carriage	1	1.5 mm, Aluminium (polished or painted)
8	Rear Axle Support	1	1.5 mm, Aluminium (polished)
9	Dimensioned Figure	2	As Designed
As Supplied			
10	Spacer	1	Ø6 × 16 mm, Aluminium, with 4 mm hole
11	Screw (Part 5 to 4) (Part 7 to 8)	3	M3 × 8, Allen CSK Head, Steel
12	Screw (Parts 1 & 2 to Part 9)	4	M3 × 16, Allen Button Head or Pan Head, Steel
13	Screw (Part 1 to Part 4)	2	M3 × 20, Allen CSK Head, Steel
14	Screw (Part 23 to Part 4)	2	M3 × 25, Allen Button Head or Pan Head, Steel
15	Screw (Part 5, Parts 3 & Part 10)	1	M3 × 30, Allen Button Head or Pan Head, Steel
16	Screw (Part 6 to Part 7)	1	M4 × 12, Allen Button Head or Pan Head, Steel
17	Screw (Front Axle)	2	M4 × 30, Allen Button Head or Pan Head, Steel
18	Screw (Rear Axle)	2	M4 × 35, Allen Button Head or Pan Head, Steel
19	Nut	9	M3, Steel
20	Nylock Nut	7	M3, Steel
21	Nut	5	M4, Steel
22	Nylock Nut	5	M4, Steel
23	3V Motorised Gearbox	1	In-Line Motor, Twin Shaft - Ratio 120:1
24	Battery Box	1	3 x AAA, Switched with Leads
25	Front Wheel	2	Ø28 mm x 15 mm, with 4 mm axle hole
26	Rear Wheel	2	Ø54 mm x 30 mm, with 4 mm axle hole
27	Insulated Wire		As Required

**Note: 20%** of the marks will be awarded for **Assembly, Finish and Function**.

**Note:** Pop rivets may be used for assembly.

**Note - Design Element only:** If computer aided manufacture (CAM) is used, supporting CAD files/drawings must accompany your model to authenticate **your own individual work**.