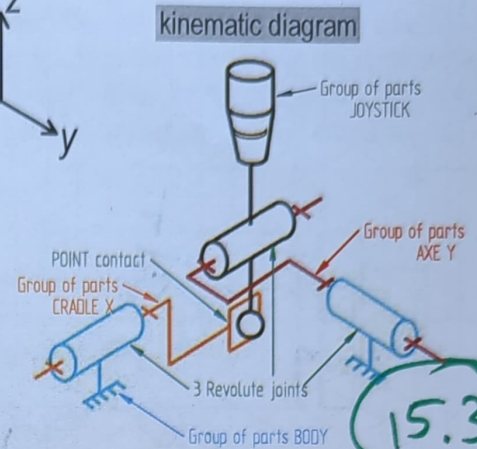
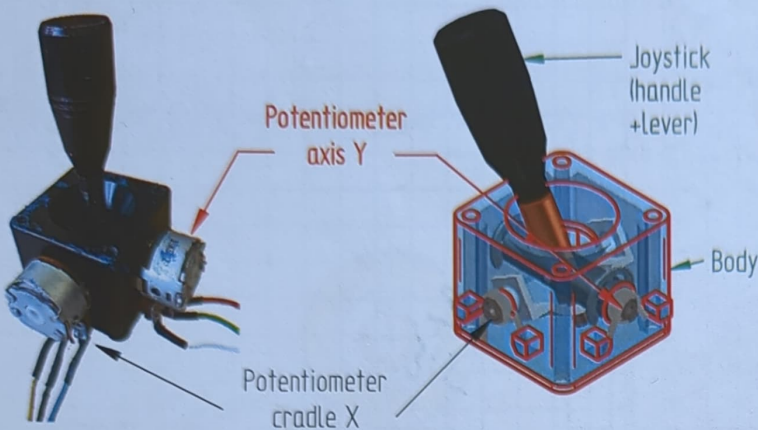


Mechanical design - Drawing exam S1 (1h)

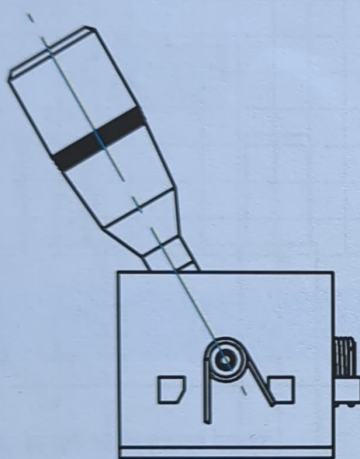
Product: JOYSTICK

LAST NAME: HIDEUX
First name: Léopold
Group: 62

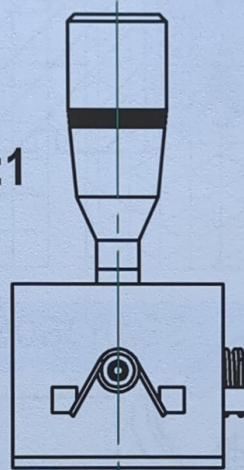


cradle X in tilted position

cradle X in standby position



Scale 1:1



Nota bene :

- ☐ You answer directly on the sheet for questions A to P
- ☐ You will need: ruler, pencil and colours
- ☐ Approx. rating: ~0,5pt / answer if not specified (P : 4pts)

41	2	torsion spring $\phi 6-0.65-3.25$	Steel	Standard part
31	1	cradle X	<u>Plastic ABS</u>	3D print
24	2	snap ring	Steel	Standard part
23	1	pin 2x8	Steel	Standard part
22	1	potentiometer axle	Steel	Usinage (tournage)
21	1	axle Y	<u>steel</u>	Machining (lathe+milling machine)
12	1	handle	<u>steel</u>	Machining (lathe)
11	1	lever	<u>steel</u>	Machining (lathe+milling machine)
02	1	lid	Plastic ABS	Injection moulding
01	1	body	Plastic ABS	Injection moulding
N°	Qty	Name	Material	Comments



INSA
LYON
PREMIER CYCLE

Format
A3H

Projet :

Interro Conception papier S1 - 2021

Titre (Nom de pièce) :

Joystick

Echelle : 1:1,33

Pièce n° :

Qté :

Matière :

Rév. :

Assembly drawing

Scale 2:1

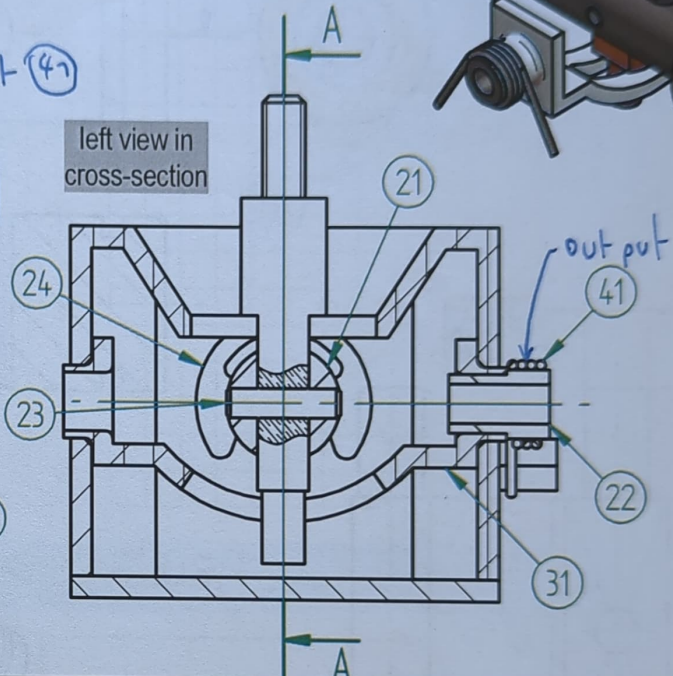
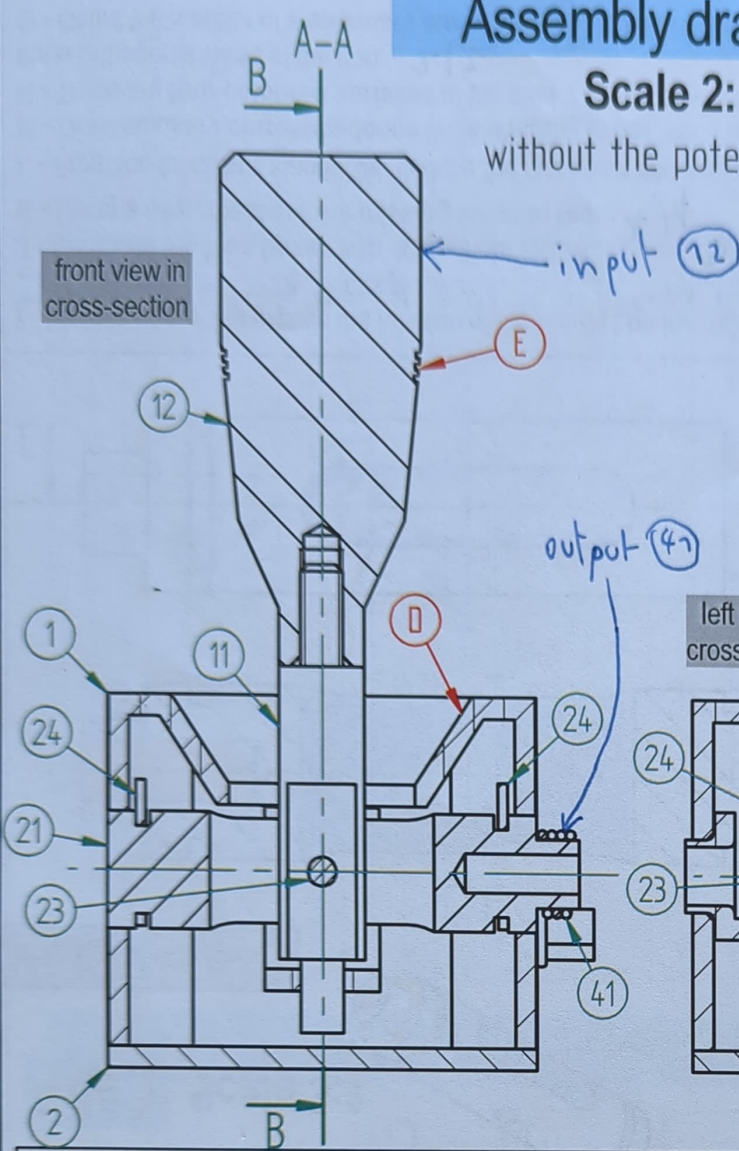
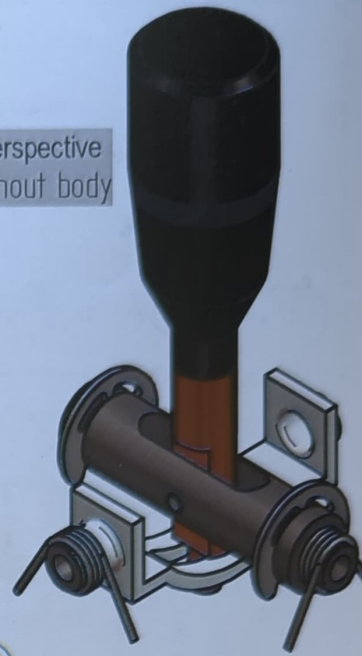
without the potentiometers

perspective
without body

front view in
cross-section

B-B
sans bouton (12)

left view in
cross-section



A - Who is the beneficiary (client) of the system?

The system is designed to be manipulated by the handle by humans.

What is the system acting upon? (answer given)

Electrical resistance of potentiometers.

What is the purpose of the system?

This system is a central mechanism offering precise control.

B - Which parts are involved in B1) input and B2) output motion in two dimensions.

Show these motions by arrows.

Input motion - Part : handle.

☒ Translation ☐ Rotation Displacement : ~30° (combined Rx Ry)
☒ Continuous ☐ Alternated

Output motion - Parts : torsion spring.

☐ Translation ☐ Rotation Displacement (in x and y dir.) : ~30° (on Rx and Ry)
☐ Continuous ☐ Alternated

Provide order in which parts transmit (mechanical) action from the input to the output :

handle + lever + cradle X + potentiometer axle (torsion spring) to potentiometer X

handle + lever + axle Y + potentiometer axle (torsion spring) to potentiometer Y

C - Complete the empty boxes in the bill of parts with appropriate material

D - Provide name and explain the function of the shape D situated in the body (01) :

This shape allows the handle to have a greater range of movement.

E - Provide name and explain the function of the shape E situated in the handle (12) :

This shape helps to improve the grip of the handle.

F - What is the function of the springs (41)? They transmit an amount of force that is proportional to the displacement of the handle.

G - What is the function of the pin (23)? It locks the lever on the required rotational axis Rx.

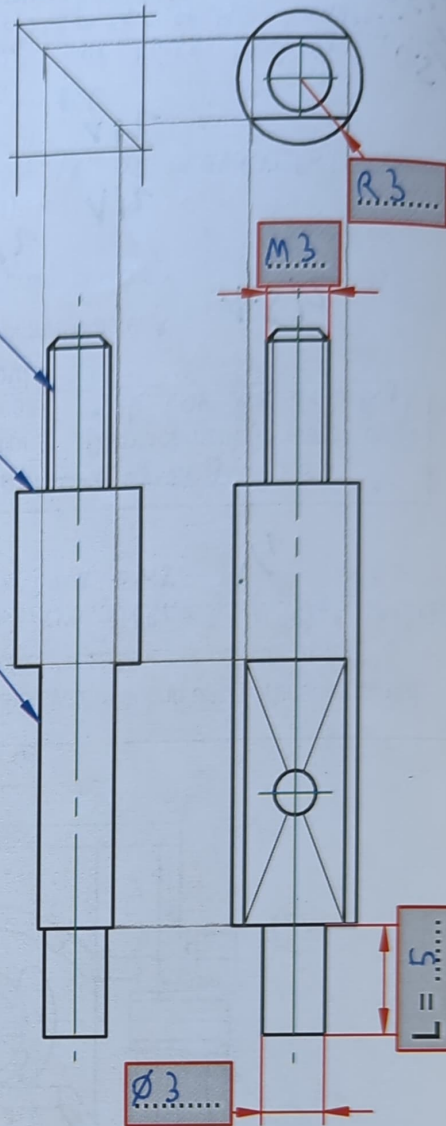
H - What is the function of parts (24)? It locks the axle axially, allowing it only to rotate and not translate.

Definition drawing

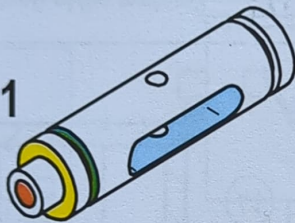
O - Number of elementary surfaces			
8	Plane	7	Helical
3	Cylindrical	0	Spherical
7	Conical	0	Toroidal

Lever

Scale 3:1

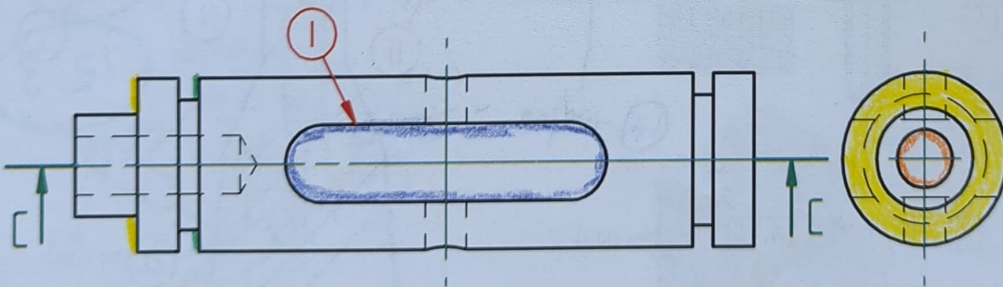
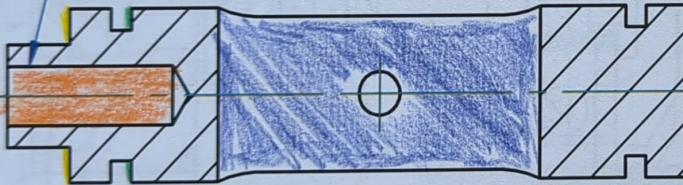


Axle Y Scale 3:1



blind hole

[-]

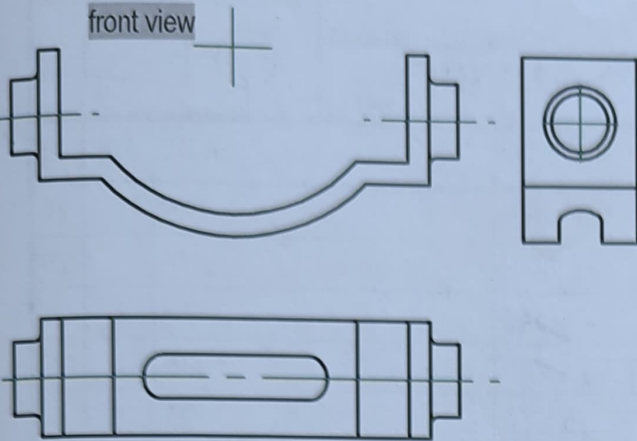


- I - Provide name and explain the function of the **shape I** on the axle Y (21): *2/2*
 This is an oblong through hole that allows the lever to pass through and (translate)
- J - Complete the blue boxes with appropriate technical terms. *3/4*
- K - Using a ruler, measure the missing cotes in red. *4/4*
- L - From the functional standpoint, deduce the maximum and minimum length L : $L_{min} = \dots 2 \dots$ mm, $L_{max} = \dots 6 \dots$ mm *2/2*
- M - Draw auxiliary correspondence lines enabling to position a flat in the three view of the lever (11) *1/1*
- N - There are four coloured surfaces of the axle Y (21). Color-in these surfaces as visible edges and/or surfaces in the three orthogonal views of the part. *2/2*
- O - Count the number of elementary surfaces of the lever (11) and fill-in the table. *152*

Cradle

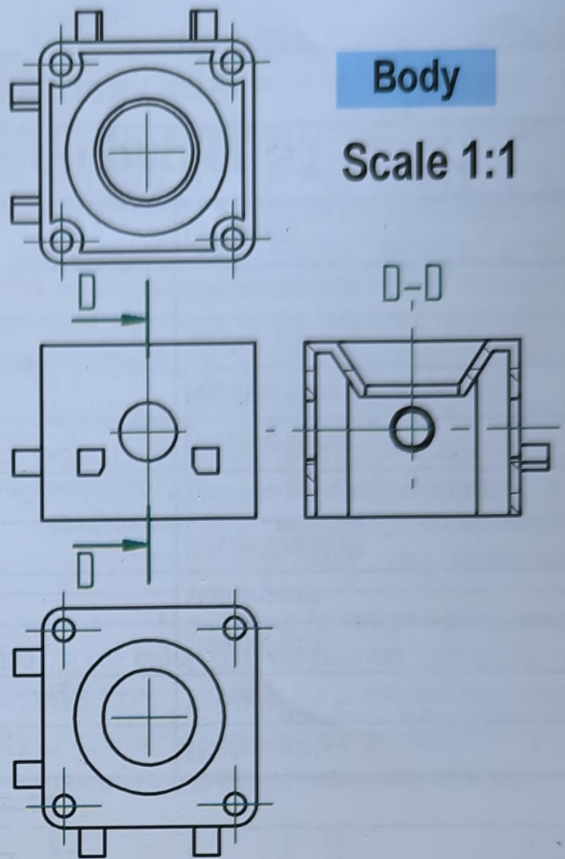
Scale 2:1

front view



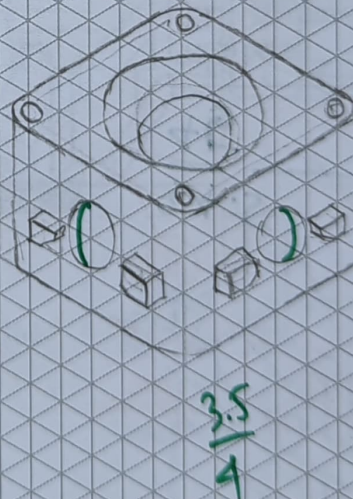
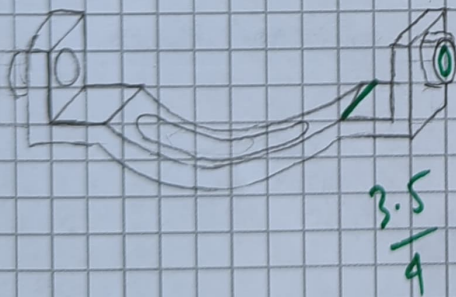
Body

Scale 1:1



P - Using the views above draw free-handedly : / 4pts
 - the cradle X (31) in Cavalier perspective, its front face should be oriented as the front view of the orthogonal projection.
 - the body (01) in isometric perspective.
 NB : You choose your own scale in order to properly represent the geometrical features of these parts.

Perspectives



bien!