Mechanical design II: Kinematics Exam

13th March 2017
Duration 30min
No documents authorized

First name:
Last Name:
Group:

We will study the mechanical system shown on the other page in cross-section, left and top views. Its purpose is to position precisely the height of the piston no.4.

1. External analysis

Q1. What is the input and what is the output of the system? You can use appropriate symbols on the drawing.

Q2. What would happen, if output became input and the input output? Would the mechanism work?

NO, THE SYSTEM IS NOT REVERSIBLE
BY PUSHING THE OUTPUT, SCREW 5 WOULD NOT TURN

2. Internal analysis

Groups of parts

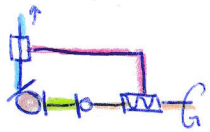
Q3. Create a list of all groups of parts in the system. Write down the numbers of parts for each group of parts. You can use capital letters as names for groups of parts.

SCREW (5)
CYLINDER (6)
BALL (7)
OUTPUT CYLINDER (4)
CASING (1, 2, 8, 3)

Q4. Color-in the cross-section A-A. Use different color for each group of parts.

Kinematic diagram

Q5. Create a kinematic diagram on the other side of the paper using the standard symbols for joints between groups of parts.



3. Additional questions

Q6. What is the reason for the shoulder on the part no.4?

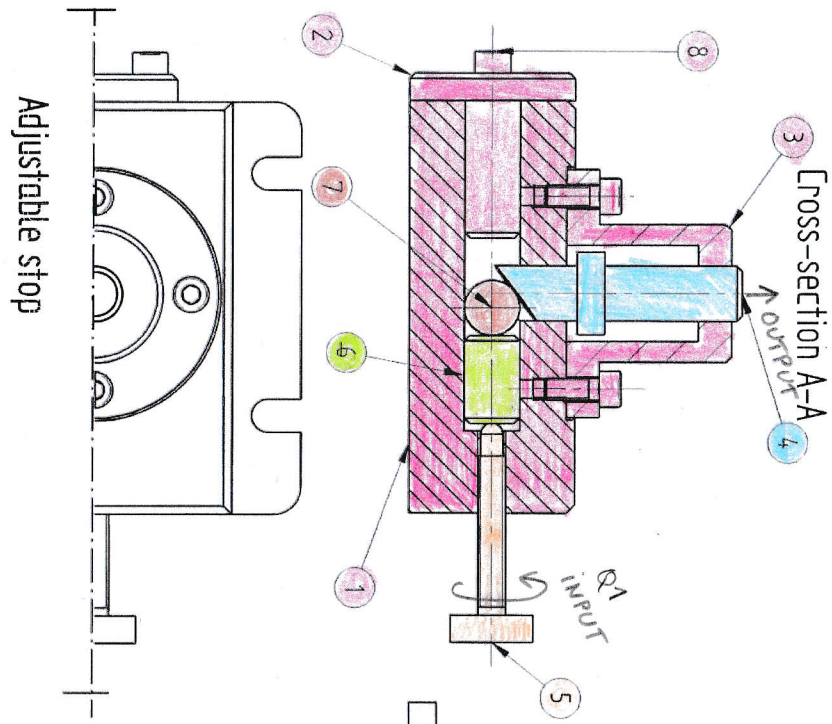
DEFINE THE "LOWEST" POINT

Q7. Why do we need part no.2?

IT LIMITS A DISPLACEMENT OF THE BALL 7

Q8. If you wanted the displacement of the part no.4 to be less sensitive to the revolution of the screw no.5, how would you modify the design?

BY MODIFYING THE ANGLE OF PART 4 WHICH TRANSFORMS HORIZONAL TO VERTICAL MOTION



N°	Qty	Description	Material
1	1	Body	Steel
2	1	Stop	Steel
3	1	Guiding cylinder	Steel
4	1	Piston	Steel
5	1	Positioning screw	Steel
6	1	Pusher	Steel
7	1	Ball	Steel
8	6	Screw CHc M8-20	Steel