

Nama: \_\_\_\_\_

Tandatangan: \_\_\_\_\_

Tidak diperlukan kertas tambahan, tuliskan semua jawaban pada tempatnya, gunakan halaman kosong di sebalik.

1. As a field of study, there are 2 (two) areas of Robotics. What are those two areas? Explain so that the differences of the two areas become apparent.

*Answer (10 points):*

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2. Write down the definition of **industrial robots** according to **RIA** in **Bahasa Indonesia**, underline some important keywords! (10 points)

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3. There are 4 (four) configurations of industrial robots based on their motion patterns and degrees of freedom, i.e. (10 points):

1. \_\_\_\_\_ configuration
2. \_\_\_\_\_ configuration
3. \_\_\_\_\_ configuration, and
4. \_\_\_\_\_ configuration

4. There are 3 (three) kinds of drive system used in manufacturing industries (10 points) :

- (1) \_\_\_\_\_ drive
- (2) \_\_\_\_\_ drive, and
- (3) \_\_\_\_\_ drive

5. There are 4 (four) types of robot control system, from the simplest to the most complicated, as follows: (20 points)

<i>Control Types</i>	<i>Characteristics</i>

6. What is the "end effector" of an industrial robot arm?

*Answer (10 points):*

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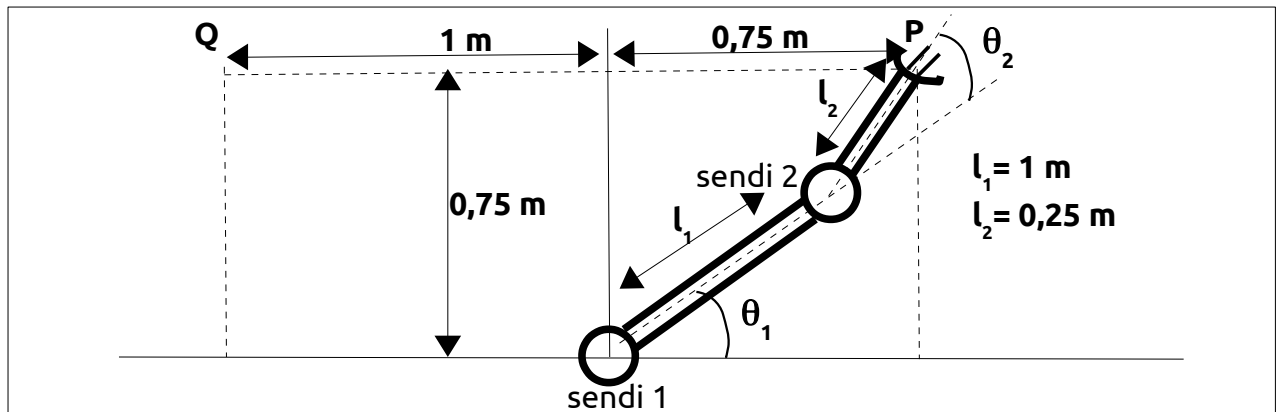
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Tidak diperlukan kertas tambahan, tuliskan semua jawaban pada tempatnya, gunakan halaman kosong di sebalik.

8. Write down your answers on the space below, use the back pages if necessary (30 points):



- Calculate  $\theta_1$  and  $\theta_2$  (10 points) !
- If the *end effector* is moved from P to Q, what are the rotational angles of joint 1 and joint 2, and in what direction (CW or CCW) ? (10 points)
- Describe your idea to use the kinematic calculation of robot arm motion above in the robot control systems ? (10 points)

Answers: