	Academic Year:	2020/2021	Term Exam:	First Term
	Department:	MDP	Course Code:	MDP491
	Date:	22/12/2020	Course Title:	Comp. Dyn.
	Time:	1 hour	Full Mark:	10

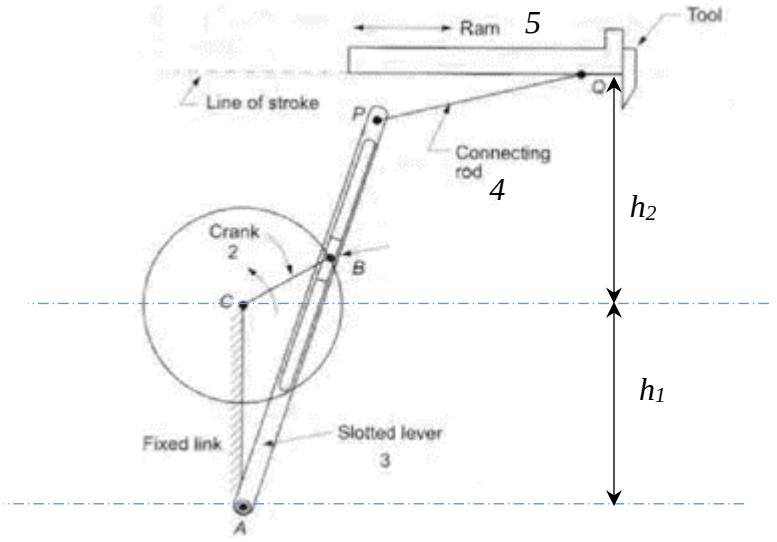
For the following mechanism; use the provided table for links' lengths and initial value of generalized coordinates in order to solve this system as a kinematical driven system.

Requirements:

1. The components of the vectors and matrices ($\mathbf{C}, \mathbf{C_q}, \mathbf{C}_t, \mathbf{Q}_d$)
2. Fill the values in table 4 for positions, velocity and accelerations after 0.5 seconds.

Note that:

- The frame of each pinned-pinned link is located in its middle. The length of the link i is l^i.
- Driving constraint $\dot{\theta}^2 = \omega^2$



Quick return mechanism

l^2	0.2 m	h_1	0.3 m
l^3	0.5 m	h_2	0.2 m
l^4	0.3 m	ω^2	1 rad/s
θ^2	90 °	θ^3	90 °
R_x^2	0	R_x^3	0
R_y^2	0.1 m	R_y^3	-0.05 m
θ^4	0 °	θ^5	0 °
R_x^4	0.2 m	R_x^5	0.3 m
R_y^4	0.15 m	R_y^5	0.2 m

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C

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$\mathbf{C_q}$

$\mathbf{C_t}$

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$\mathbf{Q}_d$

Solution after 0.5 seconds

$R_x^{\,2}$		$\dot{R}_x^{\,2}$		$\ddot{R}_x^{\,2}$	
$R_y^{\,2}$		$\dot{R}_y^{\,2}$		$\ddot{R}_y^{\,2}$	
θ^2		$\dot{\theta}^2$		$\ddot{\theta}^2$	
$R_x^{\,3}$		$\dot{R}_x^{\,3}$		$\ddot{R}_x^{\,3}$	
$R_y^{\,3}$		$\dot{R}_y^{\,3}$		$\ddot{R}_y^{\,3}$	
θ^3		$\dot{\theta}^3$		$\ddot{\theta}^3$	
$R_x^{\,4}$		$\dot{R}_x^{\,4}$		$\ddot{R}_x^{\,4}$	
$R_y^{\,4}$		$\dot{R}_y^{\,4}$		$\ddot{R}_y^{\,4}$	
θ^4		$\dot{\theta}^4$		$\ddot{\theta}^4$	
$R_x^{\,5}$		$\dot{R}_x^{\,5}$		$\ddot{R}_x^{\,5}$	

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