Question	1	2	3	Total
Grade				
MUDEK Criteria	1,2,8	1,2,8	1,2,8	

YILDIZ TECHNICAL UNIVERSITY
FACULTY OF MECHANICAL ENGINEERING / DEPARTMENT OF MECHANICAL ENGINEERING
2020/2021 FALL SEMESTER

Name-Surname:	Student ID:	Signature:
Course Name: **MAK2071 DYNAMICS 1**	Date/Time: 20.01.2021 / 13.00	Duration: 90 min
Exam Type: **Final (Group.5)**		
Title, Full Name: (Course Lecturer) Prof. Dr. H. Volkan Ersoy		

Note.1: g=9.81 m/s^2 (acceleration of gravity)

Note.2: $I_G = \frac{1}{12} mL^2$ (centroidal moment of inertia of a uniform slender rod)

QUESTIONS

(Q.1. *35 pts***)** The crankshaft *OA* rotates clockwise with a constant angular velocity $\omega_{OA} =$ 200 rpm about the fixed point *O* in plane. For the angular position $\theta = 90^{\circ}$ (*OA*: vertical), determine

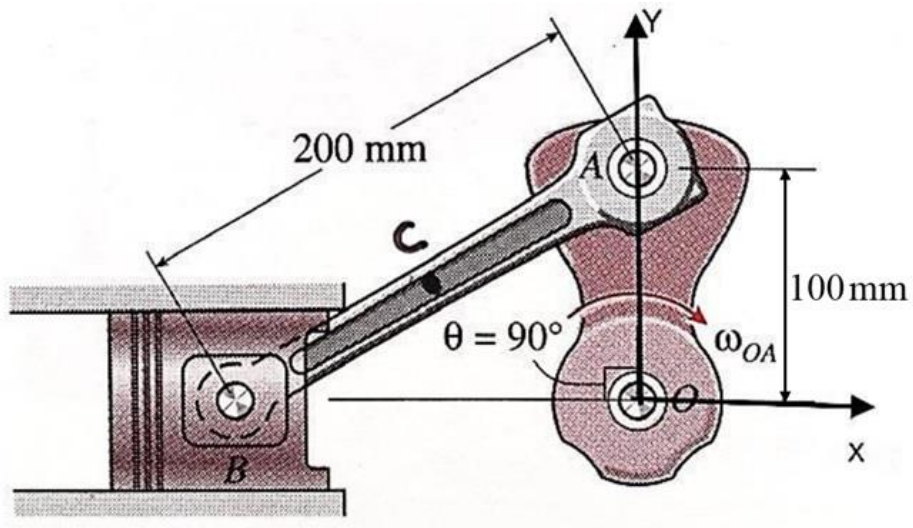
(*a*) the angular velocity vector of rod *AB* ($\boldsymbol{\omega}_{AB} = ?$),

(*b*) the velocity vector of point *A* of the crankshaft *OA* ($\mathbf{v}_A = ?$),

(*c*) the velocity vector of piston *B* ($\mathbf{v}_B = ?$),

(*d*) the velocity vector of the midpoint *C* of rod *AB* ($\mathbf{v}_C = ?$),

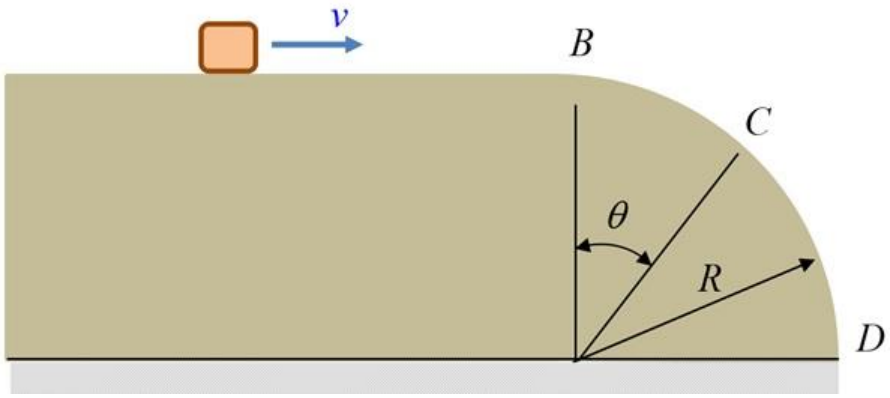
(*e*) the acceleration vector of point *A* of the crankshaft *OA* ($\mathbf{a}_A = ?$).



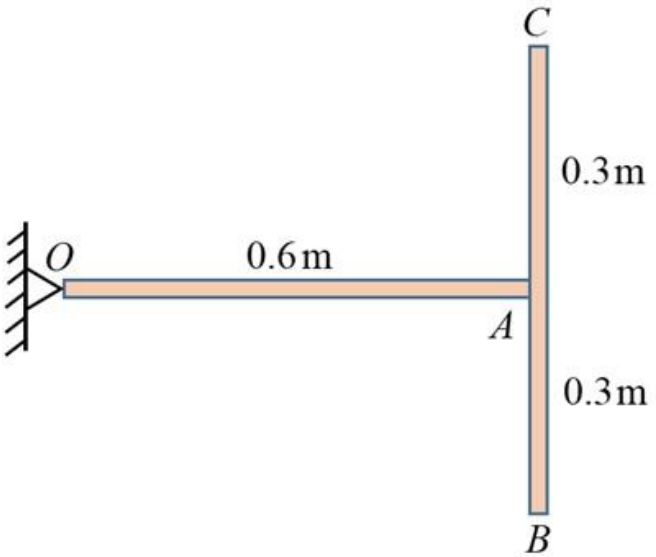
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Question	1	2	3	Total
Grade				
MUDEK Criteria	1,2,8	1,2,8	1,2,8	

(Q.2. *35 pts***)** A small block slides at a speed v on a horizontal surface. Knowing that $R = 1.4\,\text{m}$, determine the speed v of the block if it is to leave the cylindrical surface BCD when $\theta = 25^{\circ}$. Neglect the friction.



(Q.3. *30 pts***)** Each of the two uniform slender bars OA and BC has a mass of 18 kg. The bars are welded at A to form a T-shaped member and are rotating freely about a fixed axis through point O. If the bars have an angular velocity of 2 rad/s as OA passes the horizontal position shown, calculate the total force R supported by the bearing at O.



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