YILDIZ TECHNICAL UNIVERSITY

1) The link $A B$ has an angular velocity of $3 \mathrm{rad} / \mathrm{s}$. Determine the velocity of block C and the angular velocity of link $B C$ at the instant $\theta=45^{\circ}$. Also, sketch the position of link $B C$ when $\theta=60^{\circ}, 45^{\circ}$, and $30^{\circ}$ to show its general plane motion. (Answer: $\boldsymbol{v}_{C}=\mathbf{1 . 0 6} \mathbf{~ m} / \boldsymbol{s}, \boldsymbol{\omega}_{B C}=\mathbf{0 . 7 0 7} \mathbf{r a d} / \mathrm{s}$ )

2) A double pulley is attached to a slider block by a pin at A . The 30 -mm-radius inner pulley is rigidly attached to the $60-\mathrm{mm}$-radius outer pulley. Knowing that each of the two cords is pulled at a constant speed as shown, determine (a) the instantaneous center of rotation of the double pulley, (b) the velocity of the slider block, (c) the number of millimeters of cord wrapped or unwrapped on each pulley per second. (Answer: a) $\mathbf{1 0 ~ m m ~ b ) ~} v_{A}=\mathbf{4 0 ~ m m} / \mathrm{s}$, c) $\mathbf{2 4 0 ~ m m} / \mathrm{s}, \mathbf{1 2 0 ~ m m} / \mathrm{s}$ )

3) Knowing that at the instant shown rod AB has a constant angular velocity of $6 \mathrm{rad} / \mathrm{s}$ clockwise, determine the acceleration of point $D$. (Answer: $a_{D}=\mathbf{1 7 4 5} \mathbf{~ m m} / \mathrm{s}^{2}$ )

4) A uniform rectangular plate has a mass of 5 kg and is held in position by three ropes as shown. Knowing that $\theta=30^{\circ}$, determine, immediately after rope CF has been cut, (a) the acceleration of the plate, (b) the tension in ropes AD and BE . (Answer: a) $4.91 \mathrm{~m} / \mathrm{s}^{\mathbf{2}} \mathrm{b}$ ) $\mathrm{T}_{\mathrm{AD}}=\mathbf{3 1 . 0 4} \mathrm{N}, \mathrm{T}_{\mathrm{BE}}=\mathbf{1 1 . 4 3 \mathrm { N }}$ )

5) The motion of the uniform rod $A B$ of mass 5 kg and length $\mathrm{L}=750 \mathrm{~mm}$ is guided by small wheels of negligible mass that roll on the surface shown. If the rod is released from rest when $\theta=20^{\circ}$, determine immediately after release (a) the angular acceleration of the rod, (b) the reaction at A.
(Answer: a) $7.56 \mathrm{rad} / \mathrm{s}^{2}$ b) 23.3 N )


## HOMEWORK HOURS

Assist. Prof. Çağrı MOLLAMAHMUTOĞLU (GROUP: 3) 07.12.2017 11:00-17:00) $\Rightarrow$ Res. Assist. Yüşa Gökhan DURGUN $\left.\begin{array}{lllll}\text { Assist. Prof. Yıldırım Serhat ERDOĞAN (GROUP: 4) } & \mathbf{0 7 . 1 2 . 2 0 1 7} & 11: 00-17: 00\end{array}\right\} \rightarrow \quad$ Room: $2-030$
$\left.\begin{array}{cc}\text { Assist. Prof. Zeynep ALEMDAR (GROUP: 1) 08.12.2017 } & \mathbf{1 1 : 0 0}-\mathbf{1 7 : 0 0} \\ \text { Assoc. Prof. Murat ALTEKİN (GROUP: 2) 08.12.2017 } & \mathbf{1 1 : 0 0}-\mathbf{1 7 : 0 0}\end{array}\right\} \Rightarrow \begin{gathered}\text { Res. Assist. Yüşa Gökhan DURGUN } \\ \text { Room: } 2-030\end{gathered}$

NOTE: Homeworks will be delivered by hand.

