

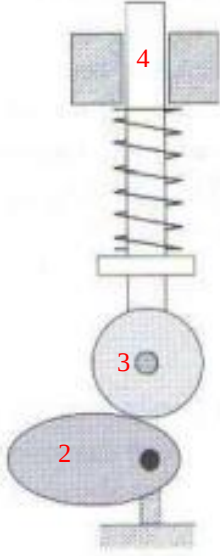
NO	
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1	2	3	TOPLAM

14.01.2020

SORULAR

1. a) Şekilde verilen kam mekanizmasının serbestlik derecesini belirleyiniz. (15 puan)



n	2(e ₁ , e ₂)
1	12 14 [∞]
2	21 (23)
3	(32) [34]
4	41 [∞] [43]

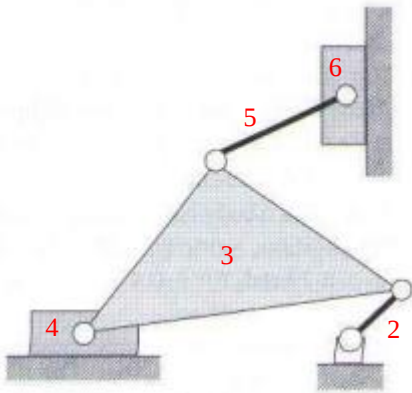
$$n = 4, e_1 = 3, e_2 = 1$$

$$F = 3 \cdot n - (2 \cdot e_1 + e_2) - 3 - f_t$$

$$F = 3 \cdot 4 - (2 \cdot 3 + 1) - 3 - 1$$

$$\underline{F=1}$$

- b) Aşağıda verilen mekanizmanın mecburi hareketliliğini araştırınız.



n	2(e ₁ , e ₂)
1	12 14 [∞] 16 [∞]
2	21 23
3	32 34 35
4	41 [∞] 43
5	53 56
6	61 [∞] 65

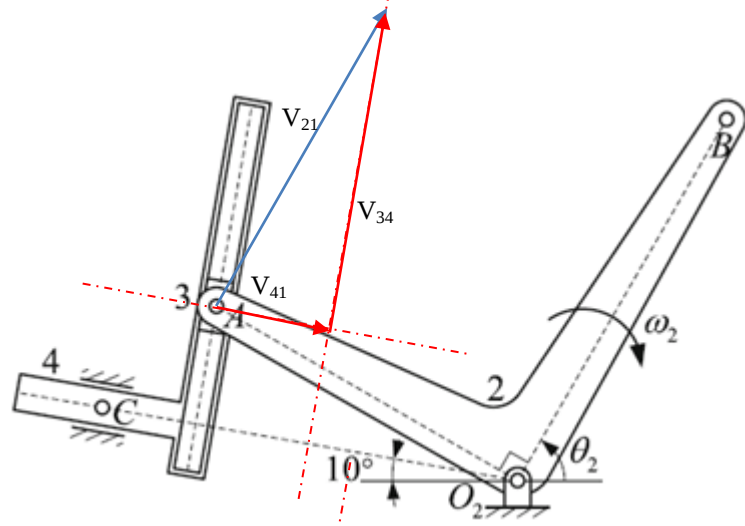
$$n = 6, e_1 = 7$$

$$F = 3 \cdot n - (2 \cdot e_1 + e_2) - 3$$

$$F = 3 \cdot 6 - (2 \cdot 7) - 3$$

$$\underline{F=1}$$

3. Şekilde verilen mekanizmada 2 nolu uzuv gösterilen yönde 100 d/d'lık hızla düzgün döndüğüne göre 4 nolu uzvun hızını ve ivmesini bulunuz. $k_s=1/10$ (35 puan)



$$\omega_{21} = 100 \times \pi / 30$$

$$\omega_{21} = 10.47 \text{ rad/s}$$

$$V_A = \omega_{21} \times AA_0$$

$$V_A = 10.47 \times 0.043 \times 10$$

$$V_A = 4.5 \text{ m/s}$$

$$k_v = 4.5 / 450$$

$$k_v = (1/100) \text{ s}$$

$$(V_{32})_s = 4.29 \text{ cm}$$

$$(V_{32})_g = 4.29 \text{ m/s}$$

$$(V_{41})_s = 1.52 \text{ cm}$$

$$(V_{41})_g = 1.52 \text{ m/s}$$

$$V_{21} = V_{34} + V_{41}$$

$$a_{21} = a_{34} + a_{41}$$

$$(a_{21})_n + (a_{21})_t = (a_{34})_n + (a_{34})_t +$$

$$(a_{41})_n + (a_{41})_t + (a_{cor})$$

$$k_a = (1/1000) \text{ s}^2$$

$$a_{cor} = 2(\omega_{41} \cdot V_{34})$$

$$a_{cor} = 0 \text{ m/s}^2$$

$$a_{21}^n = \omega_{21}^2 \cdot AA_0$$

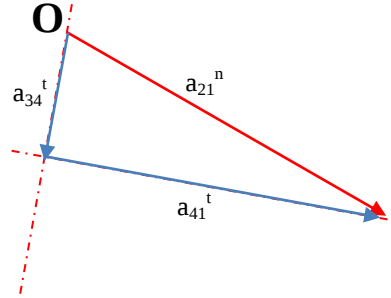
$$a_{21}^n = 10.47^2 \cdot 0.43$$

$$(a_{21}^n)_g = 47.13 \text{ m/s}^2 \quad (a_{21}^n)_s = 4713/1000 =$$

$$4.71 \text{ cm}$$

$$(a_{41}^t)_s = 4.51 \text{ cm}$$

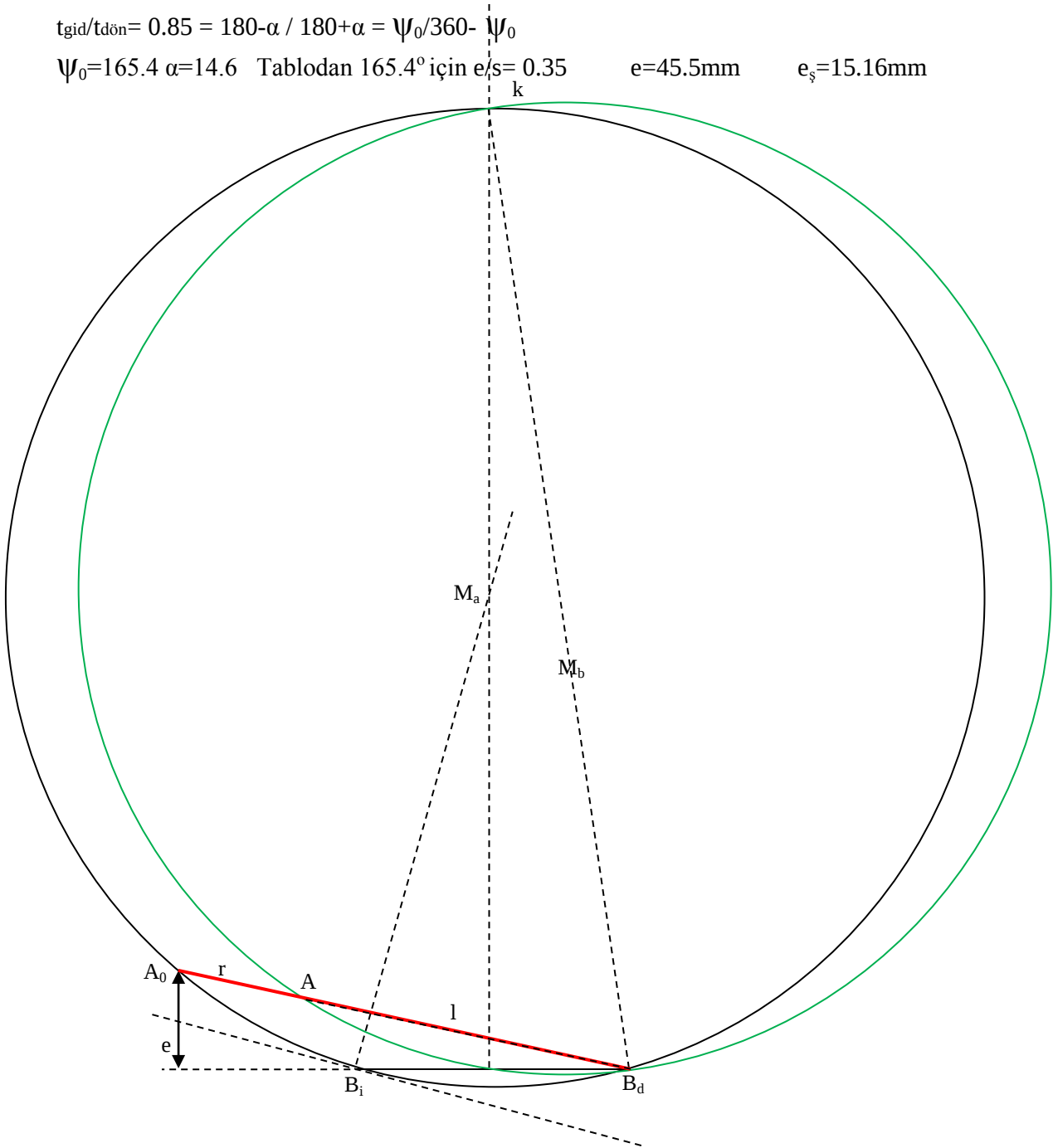
$$(a_{41}^t)_g = 45.1 \text{ m/s}^2$$



4. 130 mm strok ve $t_{gid}/t_{dön} = 0.85$ şartını sağlayan eksantrik krank-biyel mekanizmasının dış sınır konumunu geometrik yolla belirleyerek, krank yarıçapı ve biyel boyunu bulunuz. $k_s=1/3$ (15 puan)

$$t_{\text{gid}}/t_{\text{dön}} = 0.85 = 180 - \alpha / 180 + \alpha = \psi_0/360 - \psi_0$$

$\Psi_0=165.4$ $\alpha=14.6$ Tablodan 165.4° için $e/s=0.35$ $e=45.5\text{mm}$ $e_s=15.16\text{mm}$



$$r_s = 1.94 \text{ cm}$$

r=5.82 cm

$$l_s = 5.33 \text{ cm}$$

l=16.01 cm

