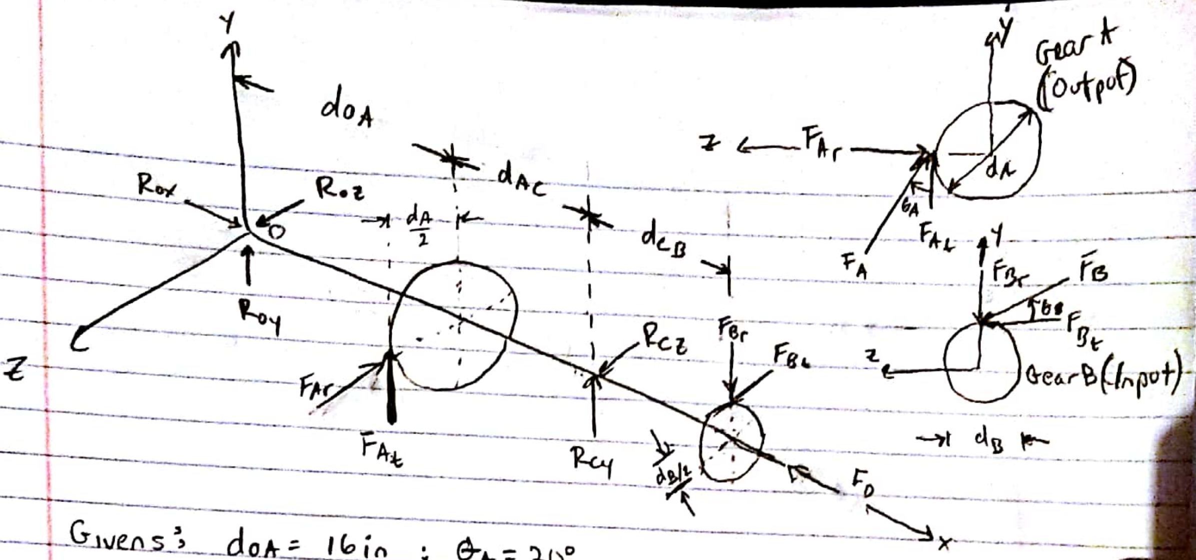

Givens: $d_{OA} = 16\,in$; $\theta_A = 20°$
$d_{AC} = 14\,in$; $\theta_B = 20°$
$d_{CB} = 9\,in$; $F_D = 2000\,lb$
Input power $P = 0.75\,hp$, $\omega = 600\,rpm$
$d_A = 20\,in$, $d_B = 8\,in$

$F_{Bt} = F_B \cos\theta_B$
$F_{Br} = F_B \sin\theta_B$
$F_{At} = F_A \cos\theta_A$
$F_{Ar} = F_A \sin\theta_A$

① Determine force F_B

$P = T\omega$

$$T = Fd = F_B \frac{d_B}{2} = \frac{P}{\omega} \Rightarrow F_B = \frac{2P}{d_B\omega} = \frac{(2)(0.75\,hp \cdot 550\,lb\cdot ft/s \cdot \frac{12\,in}{ft})}{(8\,in)(600\,\frac{rev}{min} \cdot \frac{2\pi}{60} \cdot \frac{rad}{rev} \cdot \frac{min}{s})}$$

$F_B = 19.69542421\ lb$

$\boxed{F_B \simeq 19.7\,lb}$

② Solve for bearing reactions $R_{ox}, R_{oy}, R_{oz}, R_{cy}, R_{cz}$

(2a) $\sum F_x = 0 = R_{ox} - F_D \Rightarrow \boxed{R_{ox} = 2000\,lb}$

(2b) $\sum F_y = 0 = R_{oy} + F_{At} + R_{cy} - F_{Br} = 0$

(2c) $\sum F_z = 0 = R_{oz} - F_{Ar} + R_{cz} + F_{Bt} = 0$

$$\sum \vec{M}_o = \vec{0} = R_{cy}(d_{OA} + d_{AC})\hat{j} + R_{cz}(d_{OA} + d_{AC})\hat{k} + \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ d_{OA} & \frac{d_A}{2} & 0 \\ 0 & F_{At} & -F_{Ar} \end{vmatrix} + \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ (d_{OA}+d_{AC}+d_{CB}) & \frac{d_B}{2} & 0 \\ 0 & -F_{Br} & F_{Bt} \end{vmatrix}$$

$$= R_{cy}(d_{OA} + d_{AC})\hat{j} + R_{cz}(d_{OA} + d_{AC})\hat{k} - (F_{Ar} \cdot \frac{d_A}{2})\hat{i} - (-F_{Ar} \cdot d_{OA})\hat{j}$$
$$+ (F_{At} \cdot d_{OA})\hat{k} + (F_{Bt} \cdot \frac{d_B}{2})\hat{i} - (F_{Bt} \cdot (d_{OA} + d_{AC} + d_{CB}))\hat{j} - (F_{Br}(d_{OA} + d_{AC} + d_{CB}))\hat{k}$$