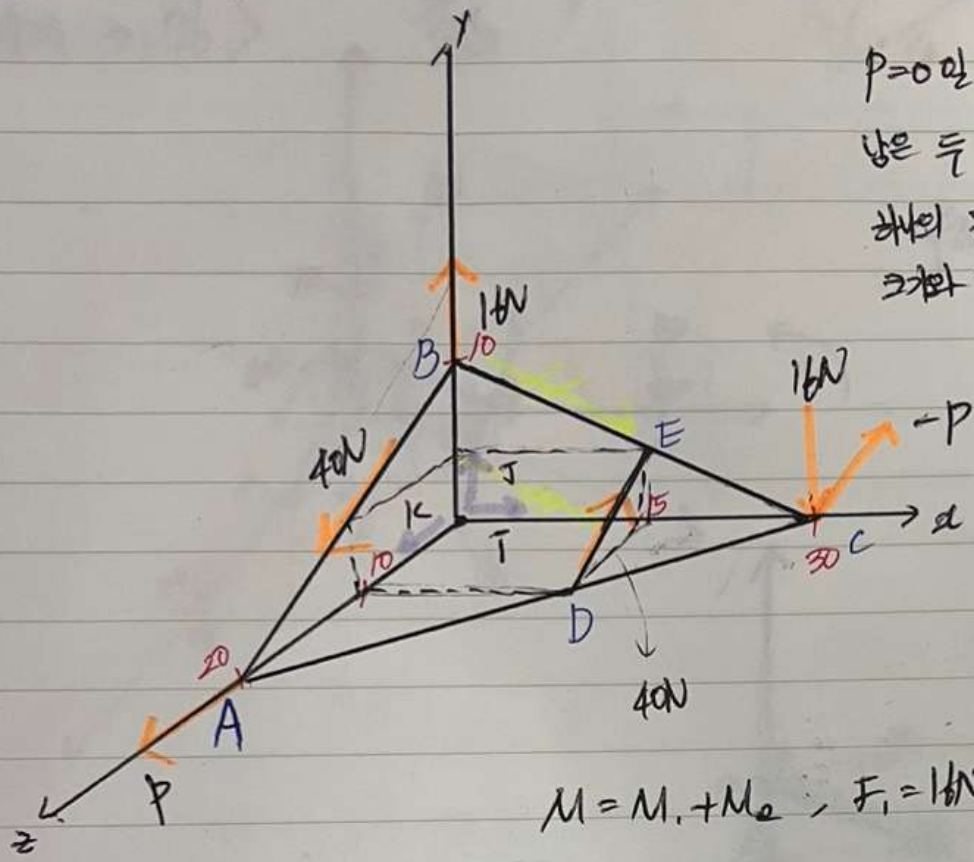
<예제 3.7b>



P=0일 때,
남은 두 개의 우력을
하나의 등가한 우력으로 바꾸고
크기와 방향(각도)을 구하시오.

$M = M_1 + M_2$, $F_1 = 16N$, $F_2 = 40N$

① $M_1 = r_C \times F_1 = (30cm)\bar{i} \times [-(16N)\bar{j}] = -(480cm)k$

② $M_2 = r_{E/B} \times F_2 \rightarrow r_{E/B} = (15cm)\bar{i} - (5cm)\bar{j}$

$d_{DE} = \sqrt{(10)^2 + (5)^2 + (10)^2} = 5\sqrt{5}\,cm$

$F_2 = \frac{40N}{5\sqrt{5}}(5\bar{j} - 10k) = 8\sqrt{5}[(1N)\bar{j} - (2N)k]$

$M_2 = 8\sqrt{5}\begin{vmatrix} \bar{i} & \bar{j} & k \\ 15 & -5 & 0 \\ 0 & 1 & -2 \end{vmatrix} = 8\sqrt{5}[(10Ncm)\bar{i} + (30Ncm)\bar{j} + (15Ncm)k]$

③ $M = M_1 + M_2 = -(178.885\,Ncm)\bar{i} + (536.66Ncm)\bar{j} - (211.67Ncm)k$

$|M| = 603.99\,Ncm$

④ $\lambda_{axis} = \frac{M}{|M|} = 0.29617\bar{i} + 0.88852\bar{j} - 0.35045k$

⑤ $\cos\theta_x = 0.29617$, $\cos\theta_y = 0.88852$, $\cos\theta_z = -0.35045$

$\therefore \theta_x = 72.8°$, $\theta_y = 27.3°$, $\theta_z = 110.5°$