



دوره ی آموزشی ABAQUS

مقدماتی

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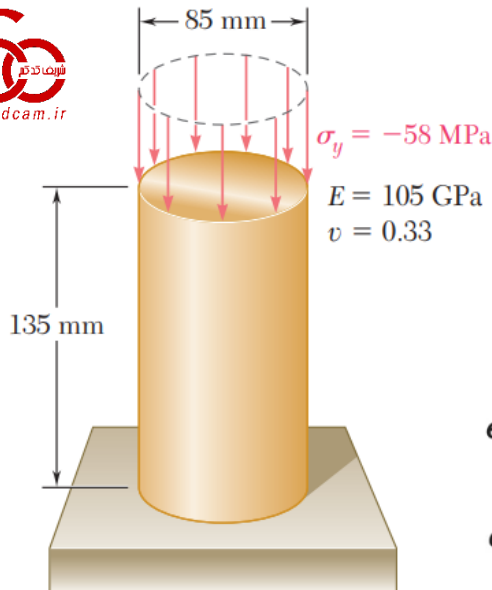
021-66980854

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این جزوه متعلق به موسسه شریف کد کم می باشد. کپی و نشر تمام و یا بخشی از آن غیر قانونی است.

تنها افرادی مجاز به استفاده از این جزوه هستند که دوره آموزشی آباکوس مقدماتی را از سایت sharifcadcam.ir خریداری کرده اند.

جزوه جلسه سوم



$$\epsilon = \frac{\Delta L}{L}$$

$$\sigma = E\epsilon$$

$$\epsilon_x = +\frac{\sigma_x}{E} - \frac{\nu\sigma_y}{E} - \frac{\nu\sigma_z}{E}$$

$$\epsilon_y = -\frac{\nu\sigma_x}{E} + \frac{\sigma_y}{E} - \frac{\nu\sigma_z}{E}$$

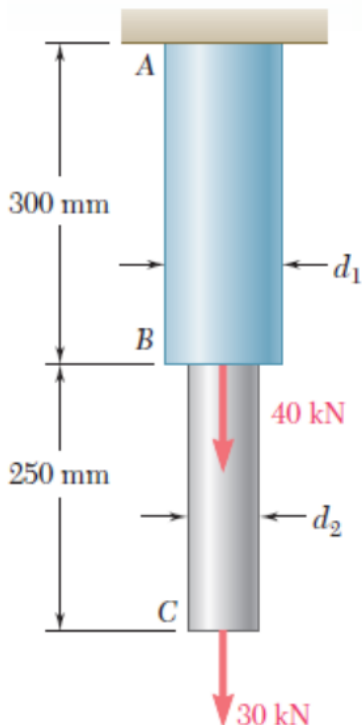
$$\epsilon_z = -\frac{\nu\sigma_x}{E} - \frac{\nu\sigma_y}{E} + \frac{\sigma_z}{E}$$

$$\sigma_x = \sigma_y = 0$$

$$\epsilon_z = \frac{\sigma_z}{E} \rightarrow \Delta L = -0.0746 \text{ mm}$$

$$\Delta L = \epsilon_x L$$

$\nu=0.3$, $E=200 \text{ Gpa}$, $d_2=30\text{mm}$, $d_1=50\text{mm}$

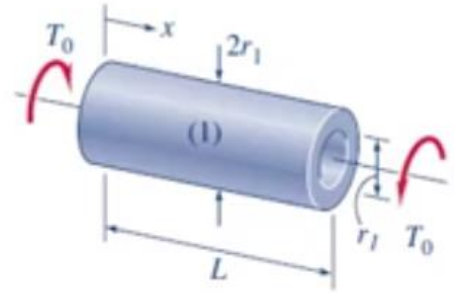


$$\sigma_{AB} = \frac{P_{AB}}{A_{AB}} = \frac{(40 + 30) \times 10^3}{\frac{\pi}{4} (0.05)^2} = 35.668 \text{ MPa}$$

$$\delta_{AB} = \frac{P_{AB} L_{AB}}{A_{AB} E_{AB}} = \frac{(40 + 30) \times 10^3 \times 0.3}{\frac{\pi}{4} (0.05)^2 \times 200 \times 10^9} = 0.053 \text{ mm}$$

$$\sigma_{BC} = \frac{P_{BC}}{A_{BC}} = \frac{30 \times 10^3}{\frac{\pi}{4} (0.03)^2} = 42.462 \text{ MPa}$$

$$\delta_{BC} = \frac{P_{BC} L_{BC}}{A_{BC} E_{BC}} = \frac{30 \times 10^3 \times 0.25}{\frac{\pi}{4} (0.03)^2 \times 200 \times 10^9} = 0.052 \text{ mm}$$



$$L = 1 \text{ m} \quad \tau_{max} = ?$$

$$r_1 = 0.1 \text{ m} \quad \phi = ?$$

$$T_0 = 1000 \text{ N.m}$$

$$E = 200 \text{ GPa}$$

$$\nu = 0.25$$

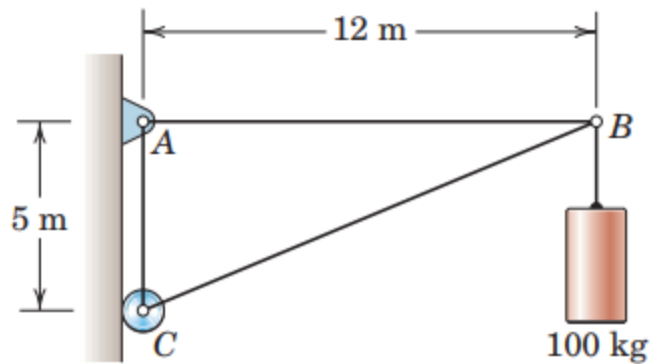
$$G = \frac{E}{2(1 + \nu)} = 80 \text{ GPa}$$

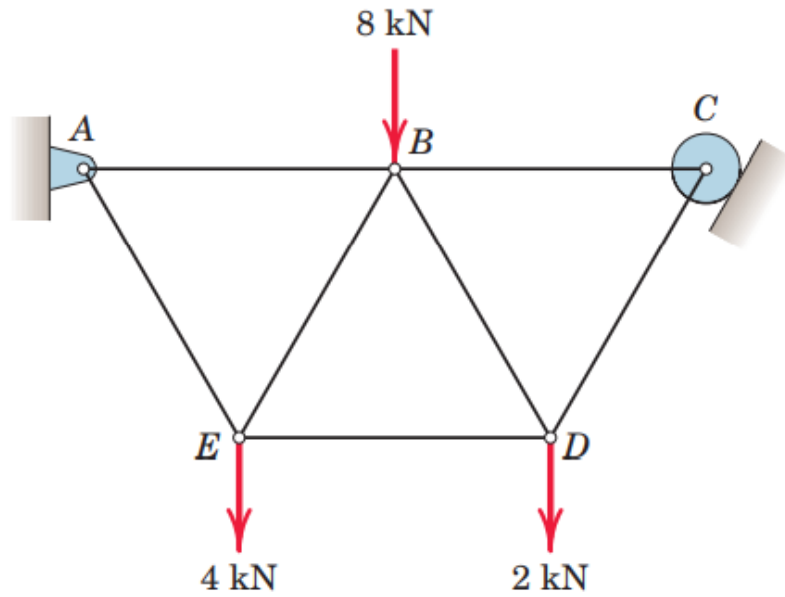
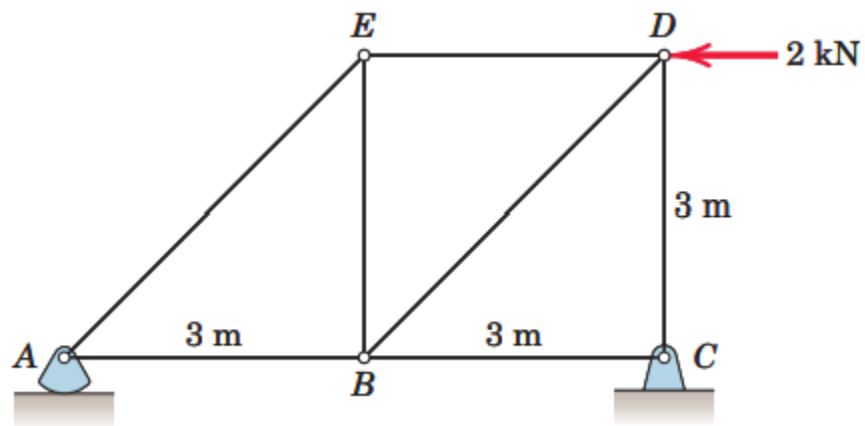
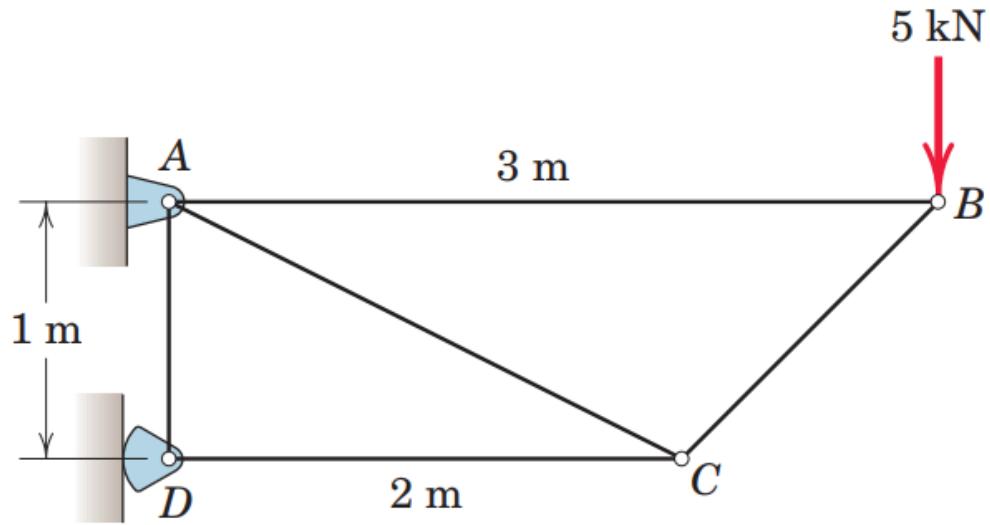
$$\tau = \frac{Tr}{J}$$

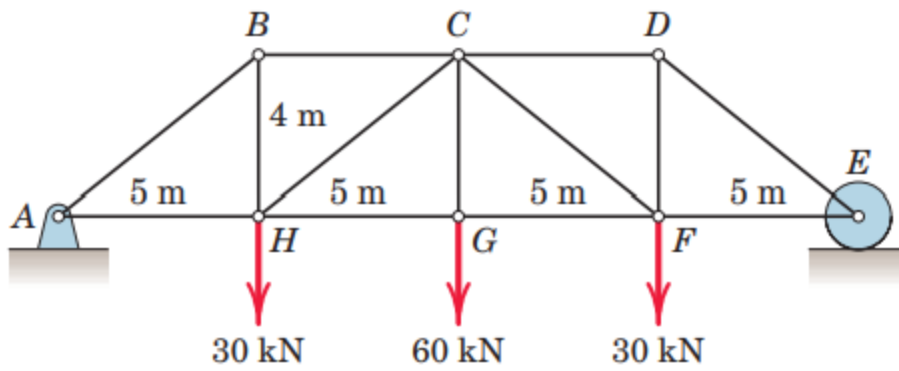
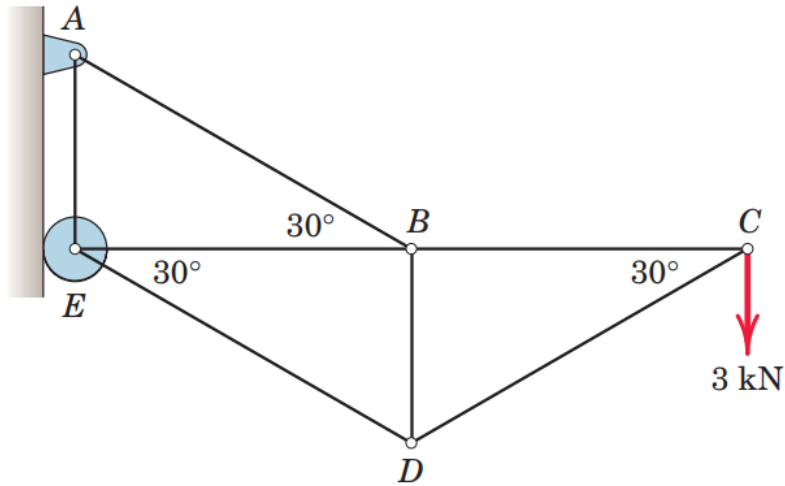
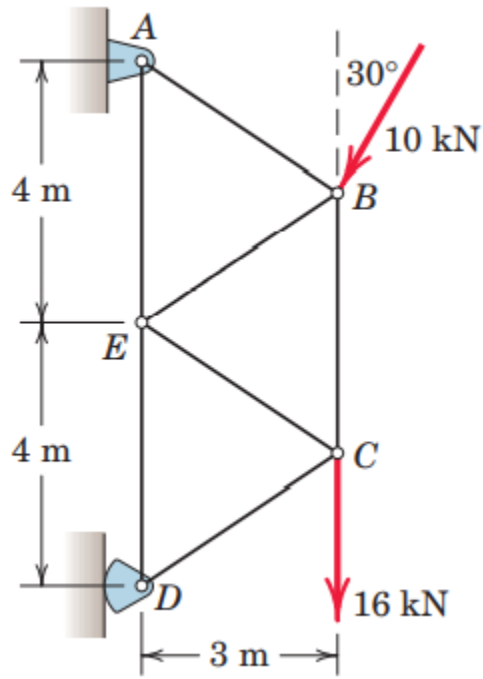
$$J = \frac{\pi}{2} \left(r_1^4 - \left(\frac{r_1}{2} \right)^4 \right) \quad \tau_{max} = \frac{32T_0}{15\pi r_1^3} = 6.7906 \cdot 10^5$$

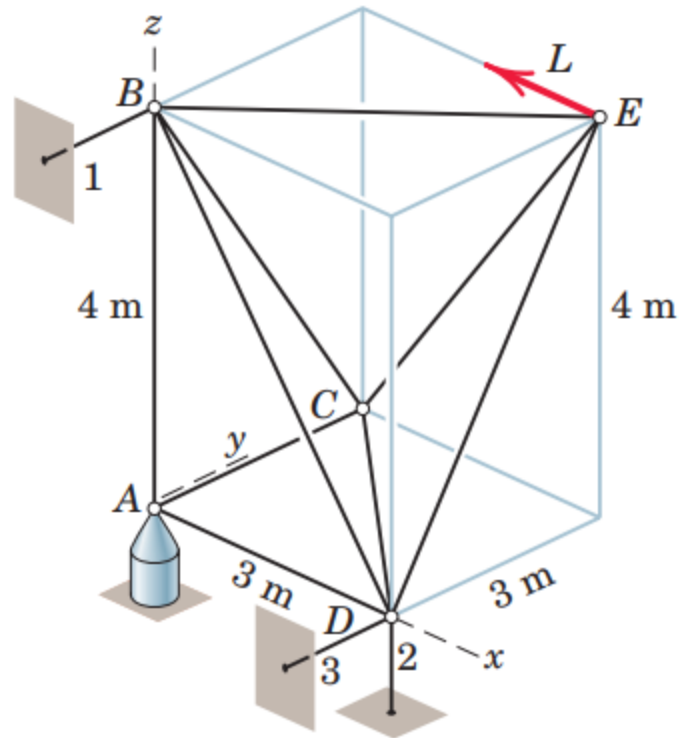
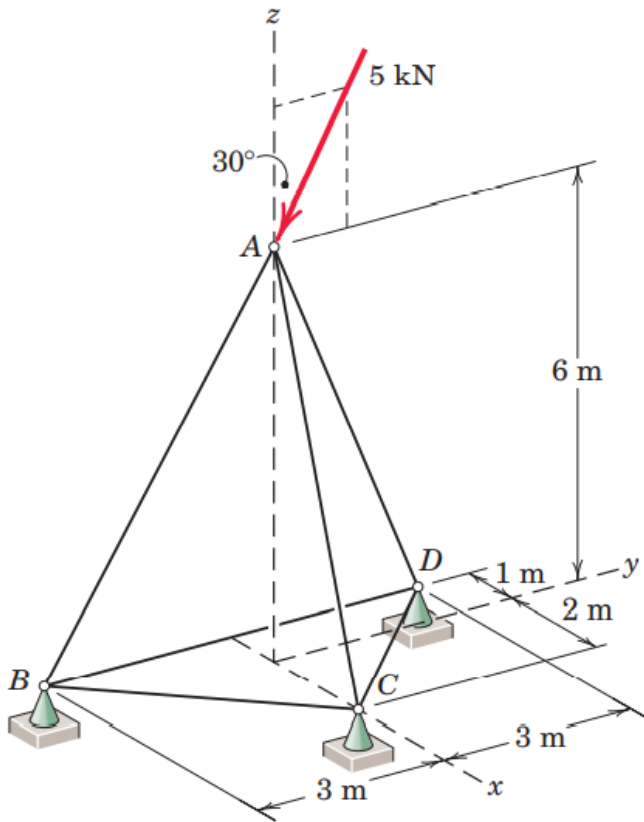
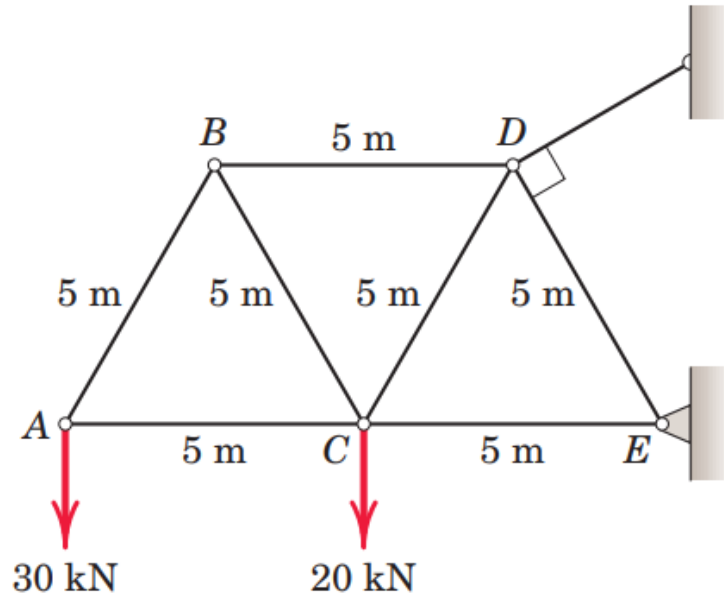
$$\phi = \frac{T_0 L}{GJ} = \frac{32T_0 L}{15\pi G r_1^4}$$

$$= 8.488 \cdot 10^{-5}$$









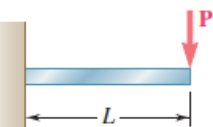
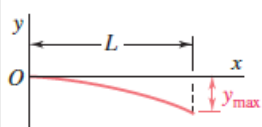
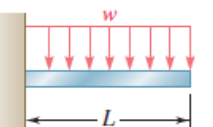
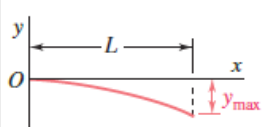
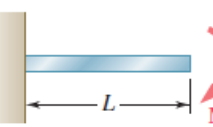
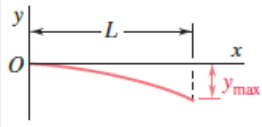
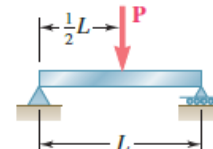
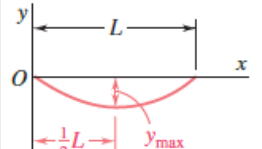
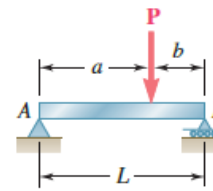
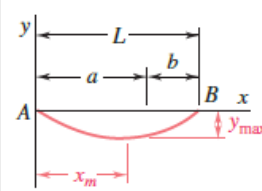
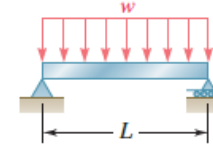
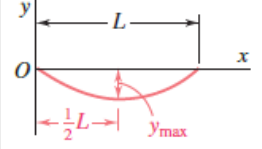
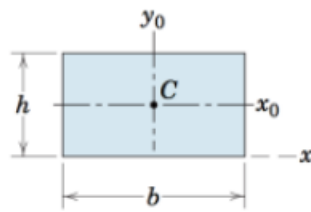
Beam and Loading	Elastic Curve	Maximum Deflection	Slope at End	Equation of Elastic Curve
<p>1</p> 		$-\frac{PL^3}{3EI}$	$-\frac{PL^2}{2EI}$	$y = \frac{P}{6EI}(x^3 - 3Lx^2)$
<p>2</p> 		$-\frac{wL^4}{8EI}$	$-\frac{wL^3}{6EI}$	$y = -\frac{w}{24EI}(x^4 - 4Lx^3 + 6L^2x^2)$
<p>3</p> 		$-\frac{ML^2}{2EI}$	$-\frac{ML}{EI}$	$y = -\frac{M}{2EI}x^2$
<p>4</p> 		$-\frac{PL^3}{48EI}$	$\pm \frac{PL^2}{16EI}$	For $x \leq \frac{1}{2}L$: $y = \frac{P}{48EI}(4x^3 - 3L^2x)$
<p>5</p> 		For $a > b$: $-\frac{Pb(L^2 - b^2)^{3/2}}{9\sqrt{3}EIL}$ at $x_m = \sqrt{\frac{L^2 - b^2}{3}}$	$\theta_A = -\frac{Pb(L^2 - b^2)}{6EIL}$ $\theta_B = +\frac{Pa(L^2 - a^2)}{6EIL}$	For $x < a$: $y = \frac{Pb}{6EIL}[x^3 - (L^2 - b^2)x]$ For $x = a$: $y = -\frac{Pa^2b^2}{3EIL}$
<p>6</p> 		$-\frac{5wL^4}{384EI}$	$\pm \frac{wL^3}{24EI}$	$y = -\frac{w}{24EI}(x^4 - 2Lx^3 + L^3x)$

FIGURE	CENTROID	AREA MOMENTS OF INERTIA
<p>Rectangular Area</p> 	—	$I_x = \frac{bh^3}{3}$ $\bar{I}_x = \frac{bh^3}{12}$ $\bar{I}_z = \frac{bh}{12}(b^2 + h^2)$

