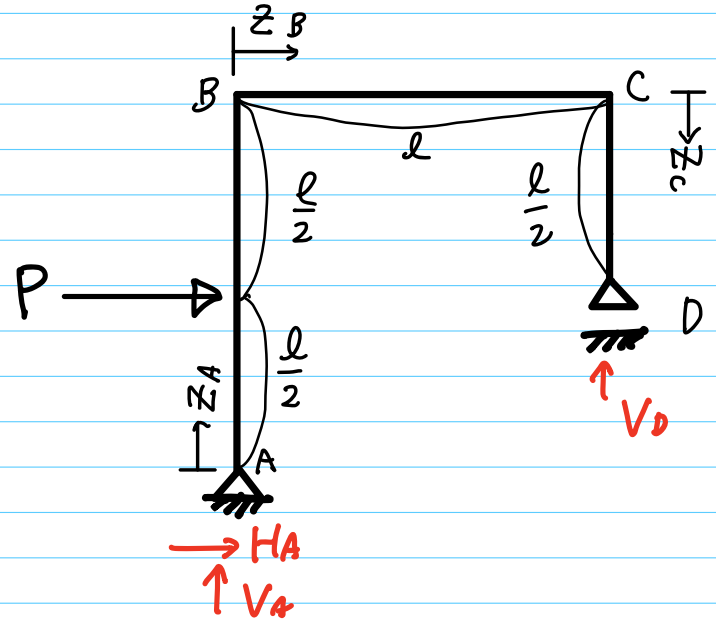
小テスト第11回 解答



反力を求める

$\uparrow\Sigma$: $V_A + V_D = 0$

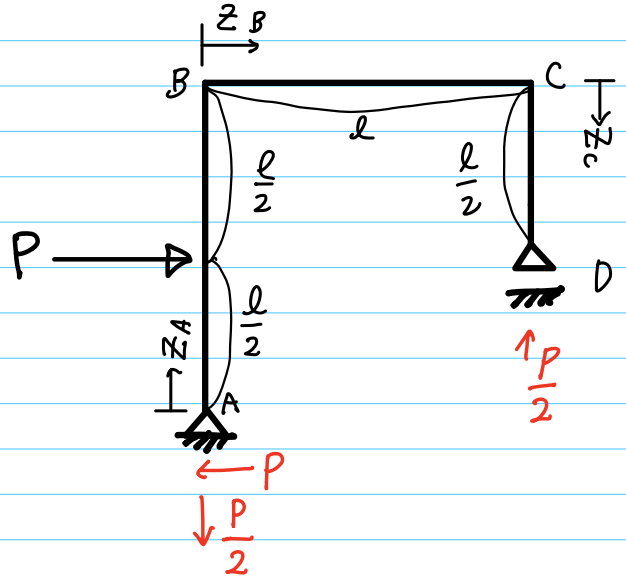
$\overrightarrow{\Sigma}$: $P + H_A = 0$ $\quad H_A = -P$

$\circlearrowleft M_A$: $V_D \cdot \ell - \frac{\ell}{2} \cdot P = 0$

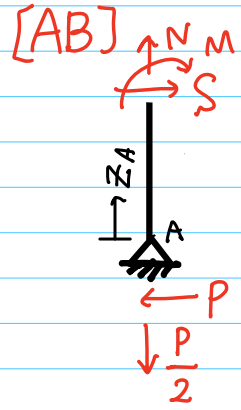
$V_D \ell = \frac{P}{2} \ell$

$V_D = \frac{P}{2}$

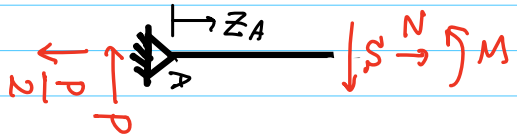
$\therefore$ $V_A = -V_D$ $\quad V_A = -\frac{P}{2}$



[AB]



横にする



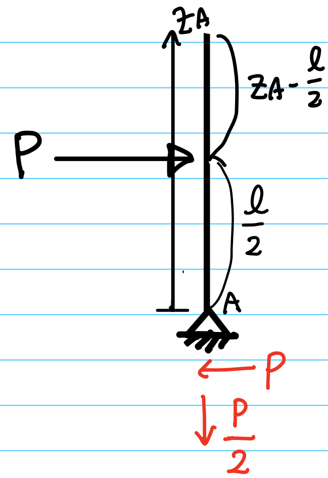
$\uparrow \Sigma : P - S = 0 \quad S_{(z_A)} = P$

$\rightarrow \Sigma : -\frac{P}{2} + N = 0 \quad N_{(z_A)} = \frac{P}{2}$

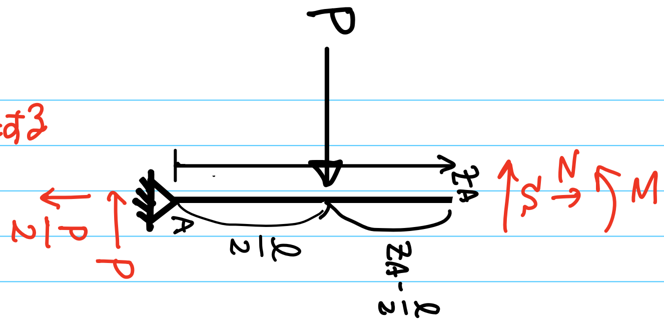
$\circlearrowleft M_{z_A} : M_{z_A} - P \cdot z_A = 0$

$M_{z_A} = P \cdot z_A$

[AB part2]



横にする ⇒



$\uparrow\Sigma$: $P - P + S = 0$ $S_{(z_A)} = 0$

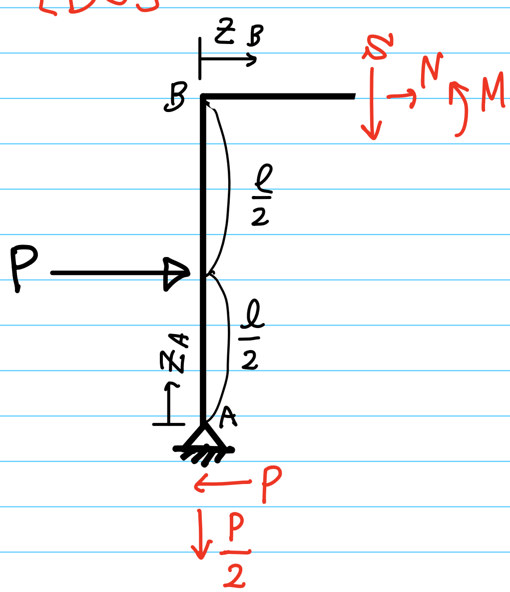
$\vec{\Sigma}$: $-\frac{P}{2} + N = 0$ $N_{(z_A)} = \frac{P}{2}$

$\circlearrowleft M_{z_A}$: $M_{z_A} + P\cdot(z_A - \frac{l}{2}) - P(z_A) = 0$

$$M_{z_A} = -Pz_A + \frac{Pl}{2} + Pz_A$$

$$M_{z_A} = \frac{Pl}{2}$$

[BC]



$\uparrow\Sigma$: $-\frac{P}{2} - S = 0$ $S_{(z_B)} = -\frac{P}{2}$

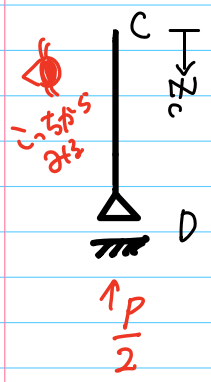
$\vec{\Sigma}$: $-P + P + N = 0$ $N_{(z_B)} = 0$

$\circlearrowleft M_{z_B}$: $M_{z_B} + P\cdot\frac{l}{2} - P\cdot l + \frac{P}{2}z_B = 0$

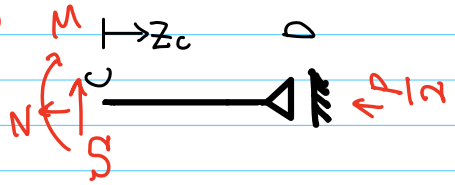
$$M_{z_B} = \frac{Pl}{2} - \frac{P}{2}z_B$$

$$= \frac{P}{2}(l - z_B)$$

[CD]



横にする ⇒



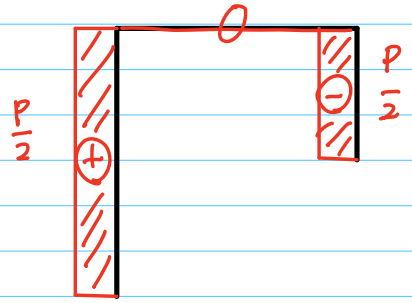
$\uparrow \Sigma S: \quad S_{(z_C)} = 0$

$\rightarrow \Sigma N: \quad -N_{(z_C)} - \frac{P}{2} = 0$

$N_{(z_C)} = -\frac{P}{2}$

$\curvearrowleft M: \quad M_{z_C} = 0$

N図



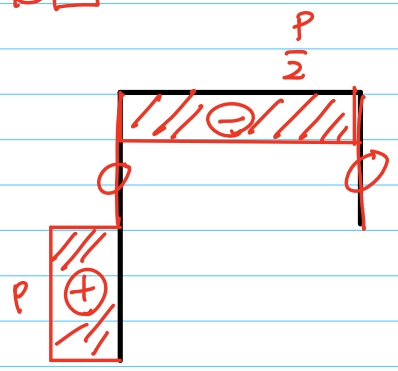
$N_{(z_A)} = \frac{P}{2} \quad 0 < z_A < \frac{l}{2}$

$N_{(z_A)} = \frac{P}{2} \quad \frac{l}{2} < z_A < l$

$N_{(z_B)} = 0$

$N_{(z_C)} = -\frac{P}{2}$

S図



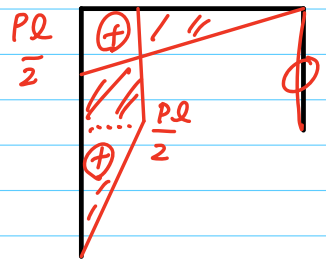
$S_{(z_A)} = P \quad 0 < z_A < \frac{l}{2}$

$S_{(z_A)} = 0 \quad \frac{l}{2} < z_A < l$

$S_{(z_B)} = -\frac{P}{2}$

$S_{(z_C)} = 0$

M 图



$M_{(z_A)} = P \cdot z_A \quad (0 \le z_A \le \frac{l}{2})$

$M_{(z_A)} = \frac{Pl}{2} \quad (\frac{l}{2} \le z_A \le l)$

$M_{(z_B)} = \frac{P}{2}(l - z_B)$

$M_{(z_C)} = 0$