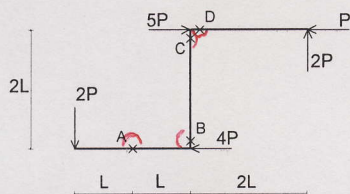


図中×印点での断面力(軸力N、せん断力Q、曲げモーメントM)を求めなさい。

なお、曲げモーメントにより部材が伸びる側に(+)を描きなさい。

↓ ⊕

(1)



A点

$$\sum X = N_A = 0$$

$$\sum Y = -2P - Q_A = 0$$

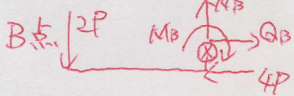
$$\sum M = M_A - 2P \times L = 0$$

$$N_A = 0$$

$$Q_A = -2P$$

$$M_A = 2PL$$

	N	Q	M
A	0	-2P	2PL
B	2P	4P	4PL
C	2P	4P	4PL
D	-P	-2P	4PL



$$\sum X = Q_B - 4P = 0$$

$$\sum Y = N_B - 2P = 0$$

$$\sum M = M_B - 2P \times 2L = 0$$

$$N_B = 2P, Q_B = 4P, M_B = 4PL$$

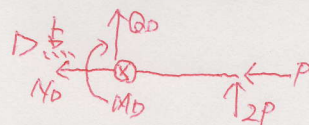


$$\sum X = -Q_C + 5P - P = 0$$

$$\sum Y = -N_C + 2P = 0$$

$$\sum M = M_C - 2P \times 2L = 0$$

$$N_C = 2P, Q_C = 4P, M_C = 4PL$$



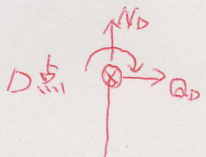
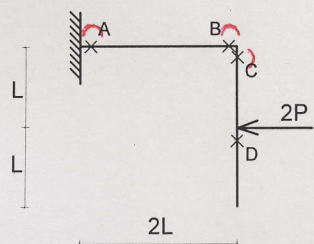
$$\sum X = -N_D - P = 0$$

$$\sum Y = Q_D + 2P = 0$$

$$\sum M = M_D - 2P \times 2L = 0$$

$$N_D = -P, Q_D = -2P, M_D = 4PL$$

(2)



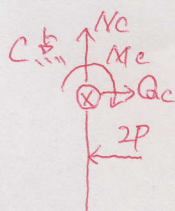
$$\sum X = Q_D = 0$$

$$\sum Y = N_D = 0$$

$$\sum M = M_D = 0$$

$$N_D = 0, Q_D = 0, M_D = 0$$

	N	Q	M
A	-2P	0	2PL
B	-2P	0	2PL
C	0	2P	2PL
D	0	0	0



$$\sum X = Q_C - 2P = 0$$

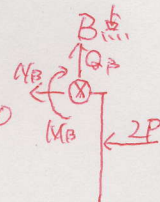
$$\sum Y = N_C = 0$$

$$\sum M = M_C + 2P \times L = 0$$

$$N_C = 0$$

$$Q_C = 2P$$

$$M_C = -2PL$$



$$\sum X = -N_B - 2P = 0$$

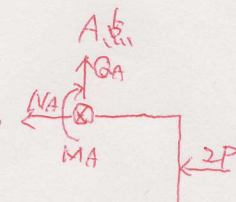
$$\sum Y = Q_B = 0$$

$$\sum M = M_B + 2P \times L = 0$$

$$N_B = -2P$$

$$Q_B = 0$$

$$M_B = -2PL$$



$$\sum X = -N_A - 2P = 0$$

$$\sum Y = Q_A = 0$$

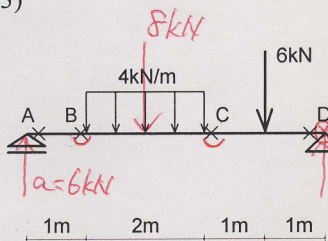
$$\sum M = M_A + 2P \times L = 0$$

$$N_A = -2P$$

$$Q_A = 0$$

$$M_A = -2PL$$

(3)



支点反力

$$\sum X = -C = 0$$

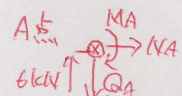
$$\sum Y = a + b - 8kN - 6kN = 0$$

$$\sum M = a \times 5m - 8kN \times 3m - 6kN \times 1m = 0$$

$$a = 6kN, b = 8kN, c = 0kN$$

(kN) (kN) (kNm)

	N	Q	M
A	0	6	0
B	0	6	6
C	0	-2	10
D	0	-8	0



$$\sum X = N_A = 0$$

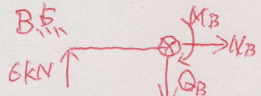
$$\sum Y = -Q_A + 6kN = 0$$

$$\sum M = M_A = 0$$

$$N_A = 0kN$$

$$Q_A = 6kN$$

$$M_A = 0kNm$$



$$\sum X = N_B = 0$$

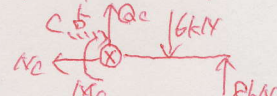
$$\sum Y = -Q_B + 6kN = 0$$

$$\sum M = M_B + 6kN \times 1m = 0$$

$$N_B = 0kN$$

$$Q_B = 6kN$$

$$M_B = -6kNm$$



$$\sum X = -N_C = 0$$

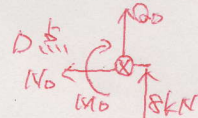
$$\sum Y = Q_C - 6kN + 8kN = 0$$

$$\sum M = M_C + 6kN \times 1m - 8kN \times 2m = 0$$

$$N_C = 0kN$$

$$Q_C = -2kN$$

$$M_C = 10kNm$$



$$\sum X = -N_D = 0$$

$$\sum Y = Q_D + 8kN = 0$$

$$\sum M = M_D = 0$$

$$N_D = 0kN$$

$$Q_D = -8kN$$

$$M_D = 0kNm$$