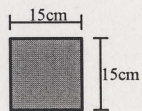


問1 断面種別 I ~ VI の断面積 A、断面 2 次モーメント I、断面係数 Z を求めなさい。
単位は cm を用い、有効数字 3 桁で求めよ。

I



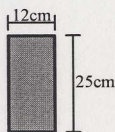
$$A = 15 \times 15 = 225$$

$$I = \frac{15 \times 15^3}{12} = 4218.75$$

$$Z = \frac{4218.75}{7.5} = 562.5$$

A	225 cm ²
I	4220 cm ⁴
Z	563 cm ³

II



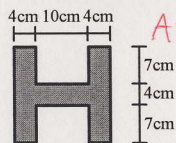
$$A = 12 \times 25 = 300$$

$$I = \frac{12 \times 25^3}{12} = 15625$$

$$Z = \frac{15625}{12.5} = 1250$$

A	300 cm ²
I	15600 cm ⁴
Z	1250 cm ³

III



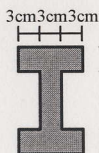
$$A = 4 \times (18 \times 2) + 10 \times 4 = 184$$

$$I = \frac{4 \times 18^3}{12} \times 2 + \frac{10 \times 4^3}{12} = 3941.33$$

$$Z = \frac{3941.33}{9} = 437.92$$

A	184 cm ²
I	3940 cm ⁴
Z	438 cm ³

IV



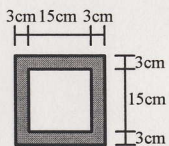
$$A = 9 \times 22 - 3 \times 12 \times 2 = 126$$

$$I = \frac{9 \times 22^3}{12} - \frac{3 \times 12^3}{12} \times 2 = 7122$$

$$Z = \frac{7122}{11} = 647.45$$

A	126 cm ²
I	7120 cm ⁴
Z	647 cm ³

V



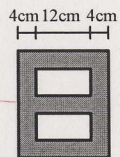
$$A = 21 \times 21 - 15 \times 15 = 216$$

$$I = \frac{21 \times 21^3}{12} - \frac{15 \times 15^3}{12} = 11988$$

$$Z = \frac{11988}{10.5} = 1141.7$$

A	216 cm ²
I	12000 cm ⁴
Z	1140 cm ³

VI



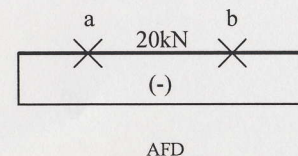
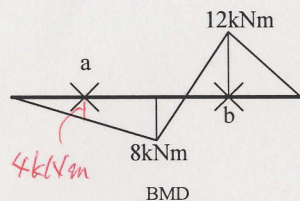
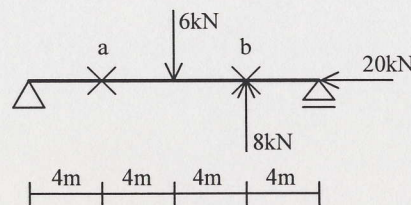
$$A = 20 \times 24 - 12 \times 6 \times 2 = 336$$

$$I = \frac{20 \times 24^3}{12} - \frac{12 \times 6^3}{12} \times 2 = 19008$$

$$Z = \frac{19008}{12} = 1584$$

A	336 cm ²
I	19000 cm ⁴
Z	1580 cm ³

問2 a 点と b 点の上下端に生じる応力度を、断面種別が III と V の時で求めなさい。
単位は N、mm を用い、有効数字 3 桁で答えよ。



III

a 点

$$\frac{-20 \times 10^3}{184 \times 100} \pm \frac{4 \times 10^3 \times 10^3}{437.92 \times 10^3}$$

$$= 8.045, -10.21$$

b 点

$$\frac{-20 \times 10^3}{184 \times 100} \pm \frac{12 \times 10^3 \times 10^3}{437.92 \times 10^3}$$

$$= 26.31, -28.48$$

断面種別 III	
	σ_{\pm}
a	-10.2, 8.05
b	26.3, -28.5

N/mm²

V

a 点

$$\frac{-20 \times 10^3}{216 \times 100} \pm \frac{4 \times 10^3 \times 10^3}{1141.7 \times 10^3}$$

$$= 2.576, -4.428$$

b 点

$$\frac{-20 \times 10^3}{216 \times 100} \pm \frac{12 \times 10^3 \times 10^3}{1141.7 \times 10^3}$$

$$= 9.581, -11.43$$

断面種別 V	
	σ_{\pm}
a	-4.43, 2.58
b	9.58, -11.4

N/mm²