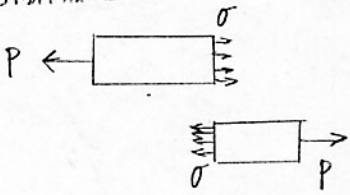


1.

自由物体线图



垂直应力 σ :

$$\sigma = \frac{P}{A}$$

7.



$$\tau = \frac{P}{A} \quad (s)$$

$$\tau = \frac{P}{\frac{1}{4}d^2\pi} = \frac{4P}{\pi d^2}$$

$$2. \sigma = \frac{P}{A} \quad (s)$$

$$\sigma = \frac{10}{5^2\pi} = 0.127323954$$

$$= 0.13 \text{ [kgf/mm}^2\text{]}$$

$$= 0.13 \times 10^6 = 130000 \text{ [kgf/m}^2\text{]}$$

$$= 130000 \times 9.8 = 1274000 \text{ [Pa]}$$

$$= 1.274 \times 10^6 = 1.274 \text{ [MPa]}$$

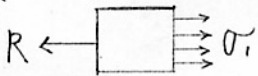
$$3. 20 \text{ [MPa]} = 20 \times 10^6 \text{ [Pa]} = \frac{20 \times 10^6}{9.8} = 2040816.327 \text{ [kgf/m}^2\text{]}$$

$$\therefore P = 2040816.327 \times 0.001 = 2040.816327 \text{ [kgf]}$$

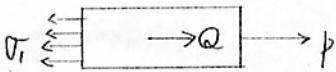
$$4. P = 20000 \text{ [N]}$$

$$4. R = P + Q$$

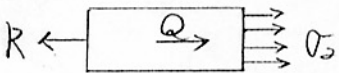
5.



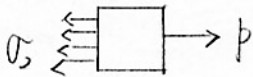
$$\sigma_1 = \frac{R}{A}$$



$$= \frac{P+Q}{A}$$

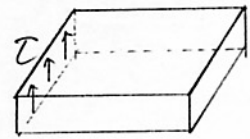
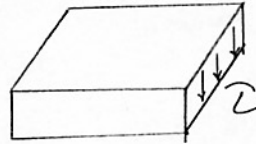


$$\sigma_2 = \frac{R-Q}{A}$$



$$= \frac{P}{A}$$

10.



$$11. \tau = \frac{10}{0.2 \times 1000} = 0.05 \text{ [kgf/mm}^2\text{]}$$

$$= 0.49 \times 10^6 \text{ [Pa]}$$

$$= 0.49 \text{ [MPa]}$$

$$12. \tau = \frac{P}{\frac{d^2}{4}\pi} = \frac{4P}{\pi d^2}$$

$$6. R = P + Q \quad (s)$$

$$R = 2 + 5 = 7 \text{ [kgf]}$$

$$\sigma_1 = \frac{7}{10} = 0.7 \text{ [kgf/mm}^2\text{]}$$

$$\sigma_2 = \frac{2}{10} = 0.2 \text{ [kgf/mm}^2\text{]}$$