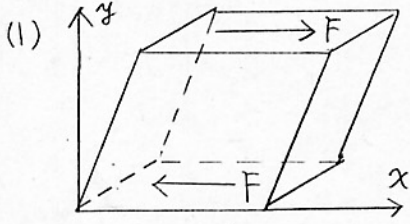


22.



上の図より反力は F //

(2) 上底面の面積は

$$l_x \times l_z = l_x l_z$$

$$\tau = F/A \text{ より}$$

$$\tau = \frac{F}{l_x l_z} //$$

(3) $\gamma = u/l_y$ なので

$$u/l_y = \tan \phi$$

$$u = l_y \tan \phi$$

$$\therefore \gamma = \tan \phi$$

$$\phi \ll 1 \text{ より}$$

$$\gamma \approx \phi //$$

23.

○ Al, $\nu = 0.33, E = 69$

$$G = \frac{69}{2 \times 1.33} = 25.9 \text{ GPa} //$$

○ 黄銅, $\nu = 0.32, E = 103 \sim 124$

$$G = \frac{103}{2 \times 1.32}, G = \frac{124}{2 \times 1.32} = 39.5 \sim 47.0 \text{ GPa} //$$

○ 低合金鋼, $\nu = 0.29, E = 200 \sim 207$

$$G = \frac{200}{2 \times 1.29}, G = \frac{207}{2 \times 1.29} = 77.5 \sim 80.2 \text{ GPa} //$$

○ ステンレス鋼, $\nu = 0.30, E = 190 \sim 200$

$$G = \frac{190}{2 \times 1.3}, G = \frac{200}{2 \times 1.3} = 73.1 \sim 79.9 \text{ GPa} //$$

○ シリカガラス, $\nu = 0.245, E = 94$

$$G = \frac{94}{2 \times 1.245} = 37.8 \text{ GPa} //$$

24. $\gamma = 0.05\%$

$$\gamma = \frac{u}{l_y} \text{ より}$$

$$0.05 \times 10^{-2} = \frac{u}{10 \times 10^{-3}}$$

$$u = 5.0 \mu\text{m} //$$

$$\tau = G \gamma \text{ より}$$

問題 23 よりアルミニウムの

横弾性係数は $G = 25.9 \text{ GPa}$

$$\tau = 25.9 \times 10^9 \times 0.05 \times 10^{-2}$$

$$= 1.295 \times 10^7$$

$$= 12.95 \text{ MPa} //$$

$$\tau = \frac{F}{l_x l_z} \text{ より}$$

$$F = \tau \cdot l_x \cdot l_z$$

$$= 12.95 \times 10^6 \times 0.1 \times 0.01$$

$$= 12.95 \times 10^3 [\text{Pa} \cdot \text{m}^2]$$

$$= 12950 \text{ N} //$$