

Eg. 11

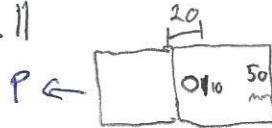
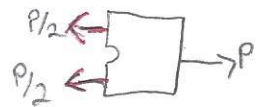



Plate
 $\tau_{allow} = 30 \text{ MPa}$, $\sigma_b = 80 \text{ MPa}$, $\sigma_t = 50 \text{ MPa}$
 Bolt
 $\tau_{allow} = 80 \text{ MPa}$

Plate
 Tension failure




$$50 = \frac{P/2}{2(20)(15)}, P = 30000 \text{ N}$$

Bearing failure



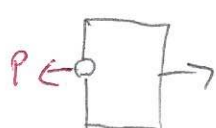
Projected area = $10 \cdot 15 = 150 \text{ mm}^2$, $P = 12000 \text{ N}$
 $80 = \frac{P}{150}$

Shear Failure



$V = P/2$, $30 = \frac{P/2}{20 \cdot 15}$
 $P = 18000 \text{ N}$

Bolt



$$80 = \frac{P}{\pi(5)^2}$$

$V_{bolt} = P$
 $P = 2000 \cdot \pi$
 $\underline{6283.18 \text{ N}}$

Since bolt shear is smallest, it governs