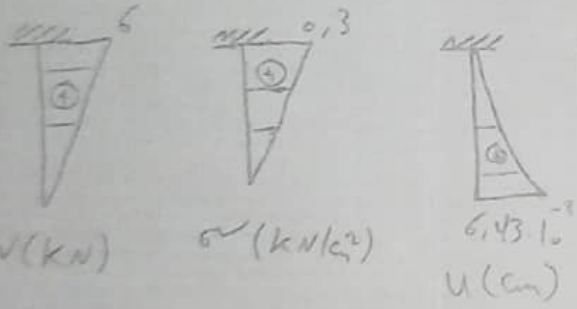
السؤال الأول :

$$\sigma = \frac{N}{A} = \frac{200}{20} = 10\ kN/cm^2$$

$$U_a = 0 \quad , \quad \Delta L_{ab} = \frac{N \cdot L_{ab}}{E\,A} = \frac{200 \times 200}{7000 \times 20} = 0,286\ cm$$

$$U_b = U_a + \Delta L_{ab} = 0 + 0,286 = 0,286\ cm$$

$$U_c = U_b + \Delta L_{bc} = 0,286 + 0 = 0,286\ cm$$



$$N_a = 2 \cdot 3 = 6\ kN$$

$$\sigma_a = \frac{6}{20} = 0,3\ kN/cm^2$$

$$U_a = 0 \quad , \quad \Delta L_{ac} = \frac{\gamma \cdot L^2}{2EA} = \frac{0,02 \times 300^2}{2 \times 7000 \times 20} = 6,43\ 10^{-3}\ cm$$

~~$U_b = 0 + 6,43\ 10^{-3} = 6,43\ 10^{-3}\ cm$~~

$$U_c = 6,43\ 10^{-3} + 0 = 6,43\ 10^{-3}\ cm$$

يمكن استخدام العلاقة التالية

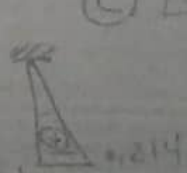
$$\Delta L_{ac} = \int_0^L \frac{N}{EA}\,dx$$

$$\Delta L_{ac} = \int_0^{300} \frac{0,02x}{EA}\,dx = \left[\frac{0,01x^2}{7000 \times 20}\right]_0^{300} = 6,43\ 10^{-3}\ cm$$

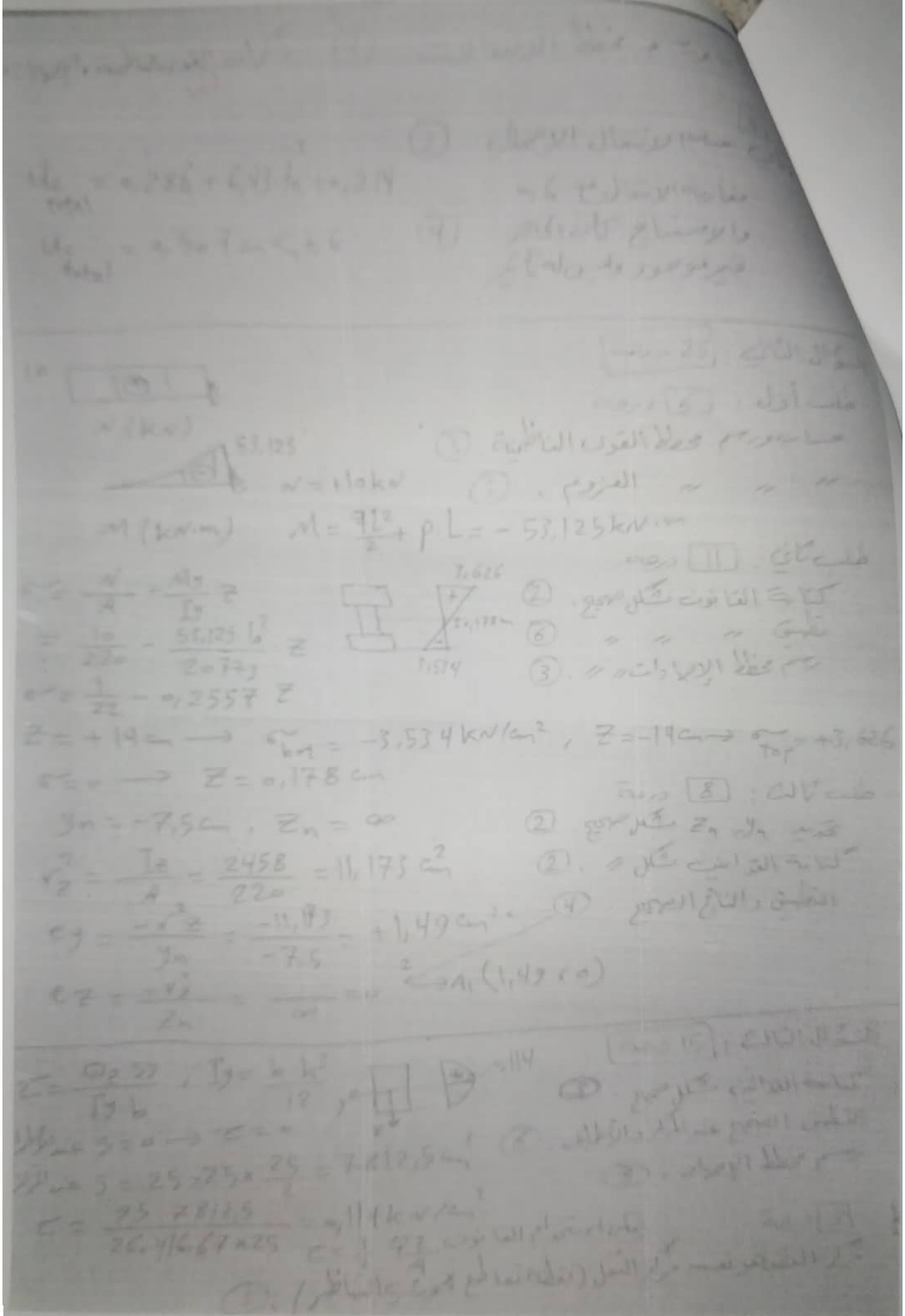
$$\Delta L_{ac} = \alpha_t \cdot \Delta t \cdot L_{ac} = 23,8\ 10^{-6} \times 30 \times 300 = 0,214\ cm$$

$$U_a = 0 \quad , \quad U_c = 0,214\ cm$$

القوة الناظمية والإجهاد معدومان



الممسوحة ضوئيا بـ CamScanner



الممسوحة ضوئيا بـ CamScanner