

## 2º Exame (2/7/2018) - Parte Prática

### Soluções

#### 1º Probl.

- (a)  $\epsilon_{11} = 3 \times 10^{-5}$ ;  $\epsilon_{22} = -1 \times 10^{-5}$ ;  $\epsilon_{12} = -4 \times 10^{-5}$ ;  $\epsilon_{AC} = -3 \times 10^{-5}$
- (b)  $\tau_{\max} = 4 \times 10^{-4}$ ;  $\alpha/2 = 18,4^\circ$  (  $\curvearrowright$  )
- (c)  $\sigma_{33} = 0,8 \text{ MPa}$

#### 2º Probl.

- (a)  $N_{AB} = 20/3 \text{ kN}$ ;  $N^1_{AB} = 6,33 \text{ kN}$ ;  $N^2_{AB} = 0,33 \text{ kN}$ ;  $\sigma^1 = 12,67 \text{ MPa}$ ;  $\sigma^2 = 0,13 \text{ MPa}$ ;  
 $N_{CD} = 10/3 \text{ kN}$ ;  $\sigma = 6,67 \text{ MPa}$
- (b)  $\Delta L_{CD} = 0,216 \text{ mm}$ ;  $\Delta L_{AB} = 0,816 \text{ mm}$ ;  $\theta = 2 \times 10^{-4} \text{ rad}$

#### 3º Probl.

- (a)  $M_1 = 0,8 \text{ i}_1^2 = 3,02 \text{ kNm}$ ;  $M_2 = 1,33 \text{ i}_2^2 = 1,23 \text{ kNm}$
- (b) Octógono convexo

#### 4º Probl.

- (a)  $U_0 = -704/EI$ ;  $f = 16/(3EI)$ ;  $X = 132 \text{ kNm}$ ;  
 $M_A = 132 \text{ kNm}$ ;  $M_B = -60 \text{ kNm}$
- (b)  $\theta_B = 16/EI$  (  $\curvearrowright$  )

#### 5º Probl.

- (a)  $R_B = P$ ;  $R_D = 3P$ ;  $R_E = -P$
- (b)  $V_2^B = 2P$ ;  $V_2^D = -P$ ;  
 $M_1^C = 2PL$ ;  $M_1^D = PL$ ;  $T^D = PL$