2-95

The given values for use in drawing Mohr's circle are

$$\sigma_x = 8 \text{ ksi}$$

$$\sigma_y = 0 \text{ ksi}$$

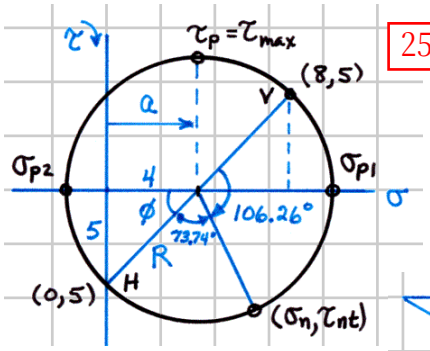
$$\tau_{xy} = -5 \text{ ksi}$$

$$\sigma_z = \sigma_{p3} = 0 \text{ ksi}$$

$$a = \frac{8+0}{2} = 4.00 \text{ ksi}$$

$$R = \sqrt{4^2 + 5^2} = 6.403 \text{ ksi}$$

$$\theta_{p1} = \frac{\phi}{2} = \frac{1}{2}\tan^{-1}\frac{5}{4} = 25.670° \text{ (CW)}$$



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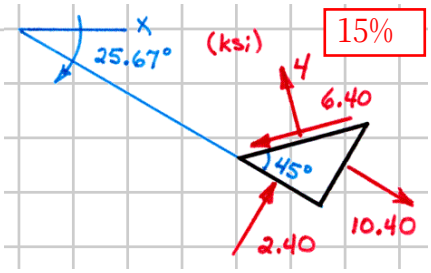

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(a)

$\sigma_{p1} = 4.00 + 6.40 = 10.40 \text{ ksi (T)}$ ∠ 25.67° ..... 10% ..Ans.

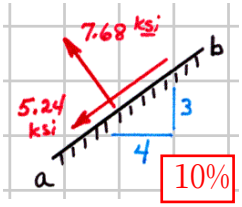
$\sigma_{p2} = 4.00 - 6.40 = -2.40 \text{ ksi} = 2.40 \text{ ksi (C)}$ ∠ 64.33° .... 10% ..Ans.

$\tau_{max} = \tau_p = R = 6.40 \text{ ksi}$ ..... 10% ..Ans.

(b)

$\sigma_{ab} = 4.00 + 6.403\cos 54.920° = 7.68 \text{ ksi (T)}$ ..... 10% ..Ans.

$\tau_{ab} = 6.403\sin 54.920° = 5.24 \text{ ksi (CCW)} = +5.24 \text{ ksi}$ ..... 10% ..Ans.



10%

1. Mohr's Circle 需在圖上標上 principle normal/shear stress, maximum shear stress, θ p, θ , normal/shear stress on a-b plane.
2. 題目有要求要畫圖，因此兩小題都需畫出 triangular stress element 或 sketch. 圖與式子皆須表示出，請勿僅有式子沒有圖或只有圖沒有式子。
3. 考試若有限定有Mohr's circle解時，請勿代公式解.
4. (a)小題兩個principle normal stress 需分開列出並附上相對應角度，並非每一題principle shear stress 皆與 maximum shear stress 相同，因此列式須標示清楚如參考解答。
5. (b)小題首先由正x方向的面旋轉順時針53.13度或逆時針126.87度，因此在圓上須分別旋轉順時針106.26度或逆時針253.74度，而解答上的54.920度是由106.26-2 θ p = 106.26 - 51.34 = 54.92。許多同學角度代錯，請多加注意。註: 亦可從正y方向旋轉，角度代對即可。
6. 小考與作業批改都較為寬鬆，考試將根據上述內容嚴格扣分