



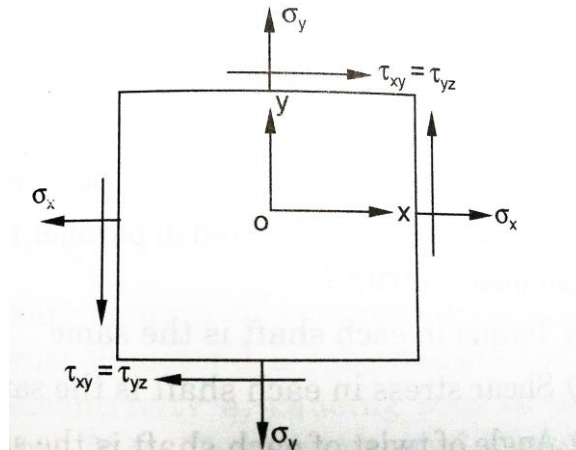
### SOM Sheet 3 : Complex stresses – 2 minute questions

Q1. On an element shown in the figure, the stresses are (in MPa)

$$\sigma_x = 110 \text{ MPa}$$

$$\sigma_y = 30 \text{ MPa}$$

$$\tau_{xy} = 30$$



The radius of Mohr's circle and the principal stresses  $\sigma_1, \sigma_2$  are

	Radius	$\sigma_1$	$\sigma_2$
(a)	50	20 MPa	120 MPa
(b)	55	110 MPa	30 MPa
(c)	60	20 MPa	140 MPa
(d)	70	0	140 MPa

**Answer: a**

Q2. Sets of principal stresses acting at any point in a stressed body are given below:

- I.  $\{\sigma, 0\}$
- II.  $\{\sigma, \sigma\}$
- III.  $\{\sigma, -\sigma\}$
- IV.  $\{\sigma, \frac{\sigma}{2}\}$

The correct sequence of the ascending order of intensity of the maximum shear stress induced by the above sets will be:

- (a) I, IV, III, II
- (b) II, I, IV, III
- (c) I, III, IV, II
- (d) II, IV, I, II

**Answer: d**

Q3. Principal stress at a point in a plane stressed element are:

$$\sigma_x = \sigma_y = 500 \text{ kg/cm}^2$$



Normal stress on the plane inclined at  $45^\circ$  to the x-axis will be \_\_\_\_\_  $\text{kg/cm}^2$ .

**Answer: 500**

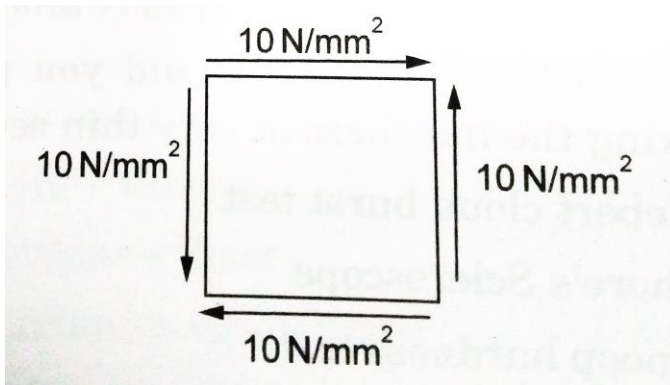
Q4. At a point in a strained material, if two mutually perpendicular tensile stresses of  $2000 \text{ kg/cm}^2$  and  $1000 \text{ kg/cm}^2$  are acting, then the intensity of tangential stress, then the intensity of tangential stress on a plane inclined at  $15^\circ$  to the axis of the minor stress will be \_\_\_\_\_  $\text{kg/cm}^2$ .

**Answer: 250**

Q5. At a point in a steel member, the major principal stress is  $200 \text{ MPa}$  (tensile) and the minor principal stress is compressive. If the uniaxial tensile yield stress is  $250 \text{ MPa}$ , then according to the maximum shear stress theory, the magnitude of the minor principal stress (compressive) at which yielding will commence is \_\_\_\_\_  $\text{MPa}$ .

**Answer: 50**

Q6. The state of stress at a point in a stressed element is shown in the given figure. The maximum tensile stress in the element will be \_\_\_\_\_  $\text{MPa}$ .



**Answer: 10**