Given the displacement distributions for a circular shaft undergoing a torsional loading: i.e. :

$$u_1 = 0$$

$$u_2 = -\phi(x_1)x_3$$

$$u_3 = -\phi(x_1)x_2$$

Which are the non-zero components of strain?

1. ε_{11} only

2. ε_{22} and ε_{33}

3. ε_{12} and ε_{13}

4. ε_{23} only

5. ε_{23}, ε_{12} and ε_{13}

6. Some other answer

7. I do not know/I do not understand.

M10 Concept Question 2

Given a distribution of shear stresses, σ_{12} and σ_{13} on the cross-section of a circular shaft, which expression below most completely describes the torque, T, transmitted at that cross-section:

1. $T = \iint (x_2\sigma_{13} - x_3\sigma_{12}) dx_3 dx_2$

2. $T = \pi R^2 (\sigma_{12} + \sigma_{13})$

3. $T = \iint (x_3\sigma_{12} - x_2\sigma_{13}) dx_3 dx_2$

4. $T = \int (\sigma_{12}x_3) dx_3 + \int (\sigma_{13}x_2) dx_2$

5. $T = \dfrac{\pi R^3}{8} (\sigma_{12} + \sigma_{13})$

6. Some other answer

7. I don't know/don't understand.