Assignment 9

The due date for submitting this assignment is 24th May 00:00 IST.

Due Date: 24 May 2023, 00:00 IST

1. Find the eigenvalues and eigenvectors of the matrix:

\[ A = \begin{pmatrix} 5 & 2 \\ 1 & 6 \end{pmatrix} \]

2. Calculate the principal stress matrix which emerges from yielding if the principal stresses are \( \sigma_1 = 200 \) MPa, \( \sigma_2 = 150 \) MPa, and \( \sigma_3 = 100 \) MPa. (Assume Von-Mises Yield criterion)

3. If the stress state matrix of a body is given as:

\[ [\sigma] = \begin{pmatrix} 15 \sigma_1 & 20 \\ 20 & 20 \end{pmatrix} \]

Find the deviatoric components for give state of stress.

4. Which of the following is/are true?

- Both statement a and statement b are true.
- Both statement a and statement c are true.
- Both statement b and statement c are true.
- None of the above.

5. Which of the following statements are true?

- Statement a is true.
- Both statement a and statement b are true.
- Both statement a and statement c are true.
- None of the above.

6. Which of the following statements are true?

- Statement a is true.
- Both statement a and statement b are true.
- Both statement a and statement c are true.
- None of the above.

7. Which of the following statements are true?

- Statement a is true.
- Both statement a and statement b are true.
- Both statement a and statement c are true.
- None of the above.

8. Which of the following statements are true?

- Statement a is true.
- Both statement a and statement b are true.
- Both statement a and statement c are true.
- None of the above.

9. Which of the following statements are true?

- Statement a is true.
- Both statement a and statement b are true.
- Both statement a and statement c are true.
- None of the above.

10. Which of the following statements are true?

- Statement a is true.
- Both statement a and statement b are true.
- Both statement a and statement c are true.
- None of the above.

11. Match the following:

<table>
<thead>
<tr>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. Residual stress</td>
<td>B1. Inter-granular mismatch</td>
</tr>
<tr>
<td>A2. Type I</td>
<td>B2. Inter-granular mismatch</td>
</tr>
<tr>
<td>A3. Type II</td>
<td>B3. Inelastic deformation</td>
</tr>
<tr>
<td>A4. Type III</td>
<td>B4. Mechanical force and thermal gradient</td>
</tr>
</tbody>
</table>

12. Which of the following represent non-linear mechanical analysis of a particular structure using \( \sigma_{ijkl} \)?

A. 2
B. 3
C. 4
D. 5

13. Which of the following represent non-linear mechanical analysis of a particular structure using \( \sigma_{ijkl} \)?