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Courses » **Mechanics Of Materials** Announcements **Course** Ask a Question Progress Mentor

## Unit 5 - Week 3

### Course outline

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- Example 2: Extremum normal and shear stress
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- Biaxial and Plane state of stress
- Extreme stress for 3D stresses
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- Stresses in the Octahedral plane
- 2D Equilibrium equations
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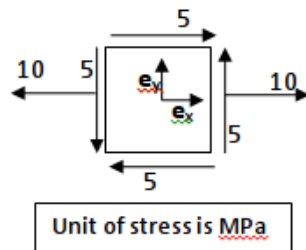
## Assignment 3

The due date for submitting this assignment has passed. **Due on 2018-02-14, 23:59 IST.**

### Submitted assignment

Based on the question 1, answer the following question upto 9

1) For the plane state of stress shown in the figure find the following accurately up to the first decimal place using Mohr's circle equations:



Maximum normal stress: \_\_\_\_\_ MPa

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

(Type: Range) 12.0,12.2

3 points

2) Minimum normal stress: \_\_\_\_\_ MPa

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

(Type: Range) -2.2,-2.0

3 points

3) Maximum shear stress: \_\_\_\_\_ MPa

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

(Type: Range) 7.0,7.1

3 points

[Solution for assignment - 3](#)

Week 4-Concept of strain

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Week 8 - Stresses and deflection in beams loaded about one principal axis

week 9: Stresses and deflection in beams not loaded about principal axis

Week 10: Stresses and displacement due to torsion or inflation

Week 11

Week 12 - Buckling of columns

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Notes

4) Orientation of the plane where the maximum normal stress occurs with respect to  $e_x$  measured in the counterclockwise direction: \_\_\_\_\_ degrees

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 22.4,22.6

3 points

5) Shear stress on the plane where the maximum normal stress occurs: \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

3 points

6) Orientation of the plane where the minimum normal stress occurs with respect to  $e_x$  measured in the counterclockwise direction: \_\_\_\_\_ degrees

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 112.4,112.6

3 points

7) Shear stress on the plane where the minimum normal stress occurs: \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

3 points

8) Orientation of the plane where the maximum shear stress occurs with respect to  $e_x$  measured in the counterclockwise direction: \_\_\_\_\_ degrees

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 67.4,67.6

3 points

9) Normal stress on the plane where the maximum shear stress occurs: \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 5

3 points

Based on the question 10 , answer the questions up to 33

10)

The Cartesian components of the stress at a point in the body is:  $\sigma = \begin{pmatrix} -10 & 5 & 0 \\ 5 & 10 & 5 \\ 0 & 5 & 0 \end{pmatrix}$ ,

MPa. For this state of stress find the following accurately up to the second decimal place:

The first principal invariant of the stress,  $K_1 =$  \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

3 points

11 The second principal invariant of the stress,  $K_2 =$  \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) -150

3 points

12 The third principal invariant of the stress,  $K_3 =$  \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 250

3 points

13) Maximum normal stress: \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 12.9,13.1

3 points

14) Minimum normal stress: \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) -11.4,-11.2

3 points

15) Maximum shear stress: \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 12.06,12.26

3 points

16) The x - component of the normal to the plane on which the maximum normal stress occurs is

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.19,0.21

3 points

17) The y - component of the normal to the plane on which the maximum normal stress occurs is

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.9,0.92

3 points

18) The z - component of the normal to the plane on which the maximum normal stress occurs is

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.34,0.36

3 points

19) The x - component of the normal to the plane on which the minimum normal stress occurs is

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) -0.97,-0.95

3 points

20) The y - component of the normal to the plane on which the minimum normal stress occurs is

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.24,0.25

3 points

21) The z - component of the normal to the plane on which the minimum normal stress occurs is \_\_\_\_\_

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) -0.12,-0.10

3 points

22) The absolute value of the x - component of the normal to the plane on which the maximum shear stress occurs is \_\_\_\_\_

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.53,0.55

(Type: Range) 0.81,0.83

3 points

23) The absolute value of the y - component of the normal to the plane on which the maximum shear stress occurs is \_\_\_\_\_

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.81,0.83

(Type: Range) 0.46,0.48

3 points

24) The absolute value of the z - component of the normal to the plane on which the maximum shear stress occurs is \_\_\_\_\_

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.16,0.18

(Type: Range) 0.32,0.34

3 points

25) The normal stress that occurs on the plane where the maximum shear occurs is \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.84,0.85

3 points

26) The shear stress that occurs on the plane where the maximum normal stress occurs is \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

3 points

27) The shear stress that occurs on the plane where the minimum normal stress occurs is \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

3 points

28) The magnitude of the shear stress that occurs on the octahedral plane is \_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 10

3 points

29) The magnitude of the normal stress that occurs on the octahedral plane is \_\_\_\_\_ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

3 points

30) Is this a pure shear state of stress?

- yes  
 No

3 points

No, the answer is incorrect.

Score: 0

Accepted Answers:

yes

31) Is this a uniaxial state of stress?

- yes  
 No

3 points

No, the answer is incorrect.

Score: 0

Accepted Answers:

No

32) Is this a plane state of stress?

- yes  
 No

3 points

No, the answer is incorrect.

Score: 0

Accepted Answers:

No

33) Is this a hydrostatic state of stress?

3 points

- yes  
 No

**No, the answer is incorrect.****Score: 0****Accepted Answers:**

No

34)

1 point

Does the following state of stress satisfy force and moment equilibrium equations?

$$\boldsymbol{\sigma} = \begin{pmatrix} \frac{\partial^2 \varphi}{\partial y^2} & -\frac{\partial^2 \varphi}{\partial y \partial x} & 0 \\ -\frac{\partial^2 \varphi}{\partial y \partial x} & \frac{\partial^2 \varphi}{\partial x^2} & 0 \\ 0 & 0 & 0 \end{pmatrix}, \text{ where } \varphi = \tilde{\varphi}(x, y) \text{ is a sufficiently smooth scalar function.}$$

- Yes  
 No

**No, the answer is incorrect.****Score: 0****Accepted Answers:**

Yes

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