

Unit 3 - Week 1

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Assignment 1

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-08-14, 23:59 IST.

Instructions for answering numerical questions

- In all numerical type questions, you are expected to round off the answers to two decimal places accuracy unless otherwise specified.
Examples: 1. Ans: 9.825, you report as 9.83
2. Ans: 9.8, you report as 9.80
3. Ans: 9, you report as 9.00
This style of reporting is essential for computer based automated correction of your answers.
- The answers for various quantities asked are to be reported in the following units unless otherwise specified, Stress- MPa, Stress Intensity Factor- MPa√m, Strain energy- Nmm, Energy release rate- J/m², deflection – mm,

1) In case of combined axial, bending and torsion loads, the onset of yielding in a material is checked using 1 point

Beam theory
 A tension test
 Theories of Failures
 Any one of the above

No, the answer is incorrect.
Score: 0
Accepted Answers: Theories of Failures

2) According to Tresca's Failure criteria, the material will fail when the maximum shear stress reaches _____. 1 point

Yield strength of the material
 Twice the Yield strength of the material
 Half the Yield strength of the material
 Maximum tensile stress of the material

No, the answer is incorrect.
Score: 0
Accepted Answers: Half the Yield strength of the material

3) Under compressive load, the most important failure mode is 1 point

Shear
 Buckling
 Yielding
 Fracture

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

4) In a conventional fatigue test, the specimen is subjected to 1 point

Maximum stress
 A sinusoidal variation of stress
 Monotonic bending stress
 Axial stress

No, the answer is incorrect.
Score: 0
Accepted Answers: A sinusoidal variation of stress

5) The quantity recorded in a fatigue test when the specimen fails is ____ 1 point

Maximum shear stress
 Maximum tensile stress
 Cross section of the specimen
 Number of cycles

No, the answer is incorrect.
Score: 0
Accepted Answers: Number of cycles

6) When a material is subjected to fatigue below the endurance limit, the material will 1 point

Theoretically have an infinite life
 Fail after 10000 cycles
 Fail after 100 cycles
 Fail after 15000 cycles

No, the answer is incorrect.
Score: 0
Accepted Answers: Theoretically have an infinite life


7) Which of the following statements are true regarding spectacular failures? 1 point

A. The structures got separated without much warning
B. There was visible plastic deformation
C. Ductile materials failed in a brittle fashion

A and B
 A and C
 Only B
 only A

No, the answer is incorrect.
Score: 0
Accepted Answers: A and C

8) The contours in the Figure represents the principal stress difference for which of the following loading condition? 1 point



- Pure shear
 Pure bending
 Tension
 Torsion

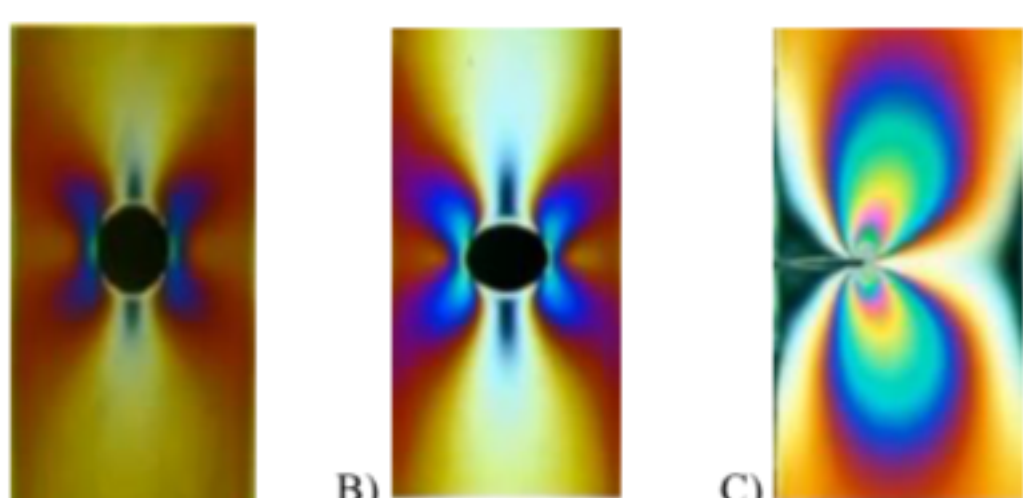
No, the answer is incorrect.
Score: 0
Accepted Answers: Pure bending

9) In S-N diagram of a fatigue test, the maximum amplitude of the cyclic stress is usually expressed in terms of 1 point

Yield strength
 Young's Modulus
 Ultimate tensile strength
 Number of cycles

No, the answer is incorrect.
Score: 0
Accepted Answers: Ultimate tensile strength

10) From the given options, which is the correct order of stress concentration from high to low? 2 points



- A, B, C
 B, C, A
 C, B, A
 B, A, C

No, the answer is incorrect.
Score: 0
Accepted Answers: C, B, A

11) Match the following 2 points

A. Boston Molasses tank failure	i. Structural Health Monitoring
B. Liberty ship failure	ii. Temperature effects on material behaviour
C. Comet Disaster	iii. Cracks develop in stress concentration zone
D. Aloha Airlines Boeing Fuselage Failure	iv. Stress corrosion.
	v. Design approach for corrosion prevention and control
	vi. Simulation of service loads during testing

- A-i B-ii C-iii, vi D-iv, v
 A-i,vi B-ii, v C-iii D-iv
 A-i B-ii,vi C-iii,v D-iv
 A-i,v B-ii C-iii D-iv,vi

No, the answer is incorrect.
Score: 0
Accepted Answers: A-i B-ii C-iii, vi D-iv, v

12) A component is subjected to a maximum stress of 340 MPa. The factor of safety for a conventional design approach based on strength is taken as 2. Which of the following material would you choose for manufacturing the component? (the materials are listed along with their yield strength) 2 points

- Copper – 70 MPa
 Aluminum alloy – 400 MPa
 Stainless steel – 520 MPa
 High strength steel – 690 MPa

No, the answer is incorrect.
Score: 0
Accepted Answers: High strength steel – 690 MPa