

Unit 3 - Week 1

Course outline
How does an NPTEL online course work?
Week 0
Week 1
<ul style="list-style-type: none"> Overview of Experimental Stress Analysis Optical Methods Work as Optical Computers Stress, Strain and Displacement Fields
<input type="radio"/> Quiz : Assignment 1 <ul style="list-style-type: none"> Week 1 Feedback Form : Experimental Stress Analysis
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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 2020-02-12, 23:59 IST.

1) Can you get a solution for a rectangular bar subjected to torsion from strength of materials approach? 1 point

- Yes
 Yes, solution is same as the beam under bending
 No, because plane sections do not remain plane before and after loading
 No, because rectangular bar cannot be subjected to torsion

No, the answer is incorrect.
Score: 0

Accepted Answers:
No, because plane sections do not remain plane before and after loading

2) Displacement is represented as a 1 point

- number
 vector
 tensor
 Can be any of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
vector

3) A closed form solution is 1 point

- Solution obtained close to the real solution
 Solution obtained at every point in a model
 Solution obtained near to the field of interest
 Solution obtained at a point of interest

No, the answer is incorrect.
Score: 0

Accepted Answers:
Solution obtained at every point in a model

4) Which method comes in handy for solving problems involving arbitrary shaped boundaries such as a spanner tightening a nut? 1 point

- Strength of Materials approach
 Numerical methods
 Theory of elasticity approach
 Any of the above methods

No, the answer is incorrect.
Score: 0

Accepted Answers:
Numerical methods

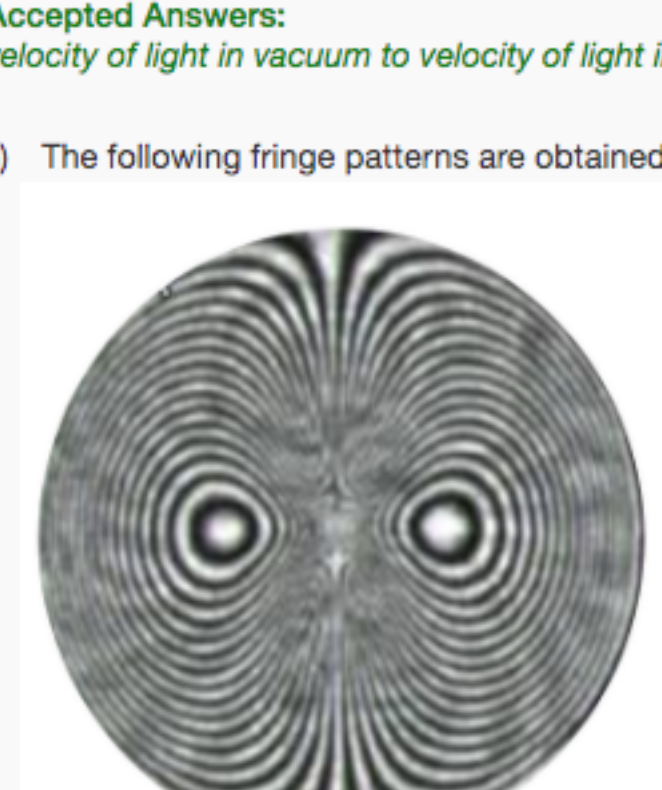
5) Refractive index is the ratio of 1 point

- velocity of light in vacuum to velocity of light in specific medium
 velocity of light in specific medium to the velocity of light in vacuum
 velocity of light in air to velocity of light in specific medium
 velocity of light in specific medium to velocity of light in water

No, the answer is incorrect.
Score: 0

Accepted Answers:
velocity of light in vacuum to velocity of light in specific medium

6) The following fringe patterns are obtained using shearing interferometry. The patterns represent contours of 1 point



- Slope for a circular plate with central load
 out of plane displacement for circular plate with central load
 u/v displacement for circular disc under diametral compression
 slope for circular disc under diametral compression

No, the answer is incorrect.
Score: 0

Accepted Answers:
Slope for a circular plate with central load

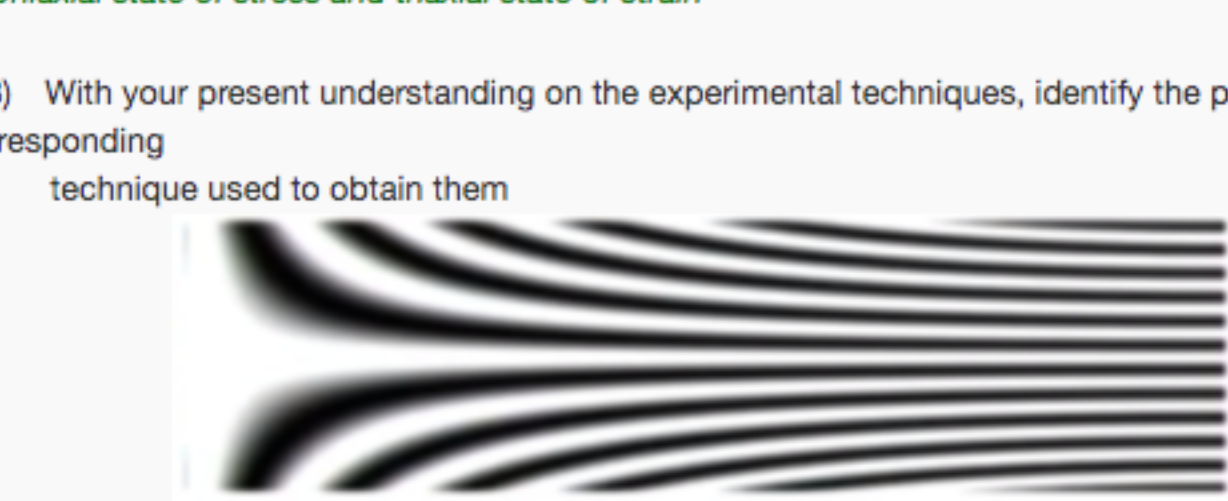
7) On solving a beam under pure bending using analytical method, taking plane stress assumptions, one gets 1 point

- Uniaxial state of stress and biaxial state of strain
 Biaxial state of stress and uniaxial state of strain
 Triaxial state of stress and uniaxial state of strain
 Uniaxial state of stress and triaxial state of strain

No, the answer is incorrect.
Score: 0

Accepted Answers:
Uniaxial state of stress and triaxial state of strain

8) With your present understanding on the experimental techniques, identify the problem along with the information given in the figure and the corresponding technique used to obtain them 1 point

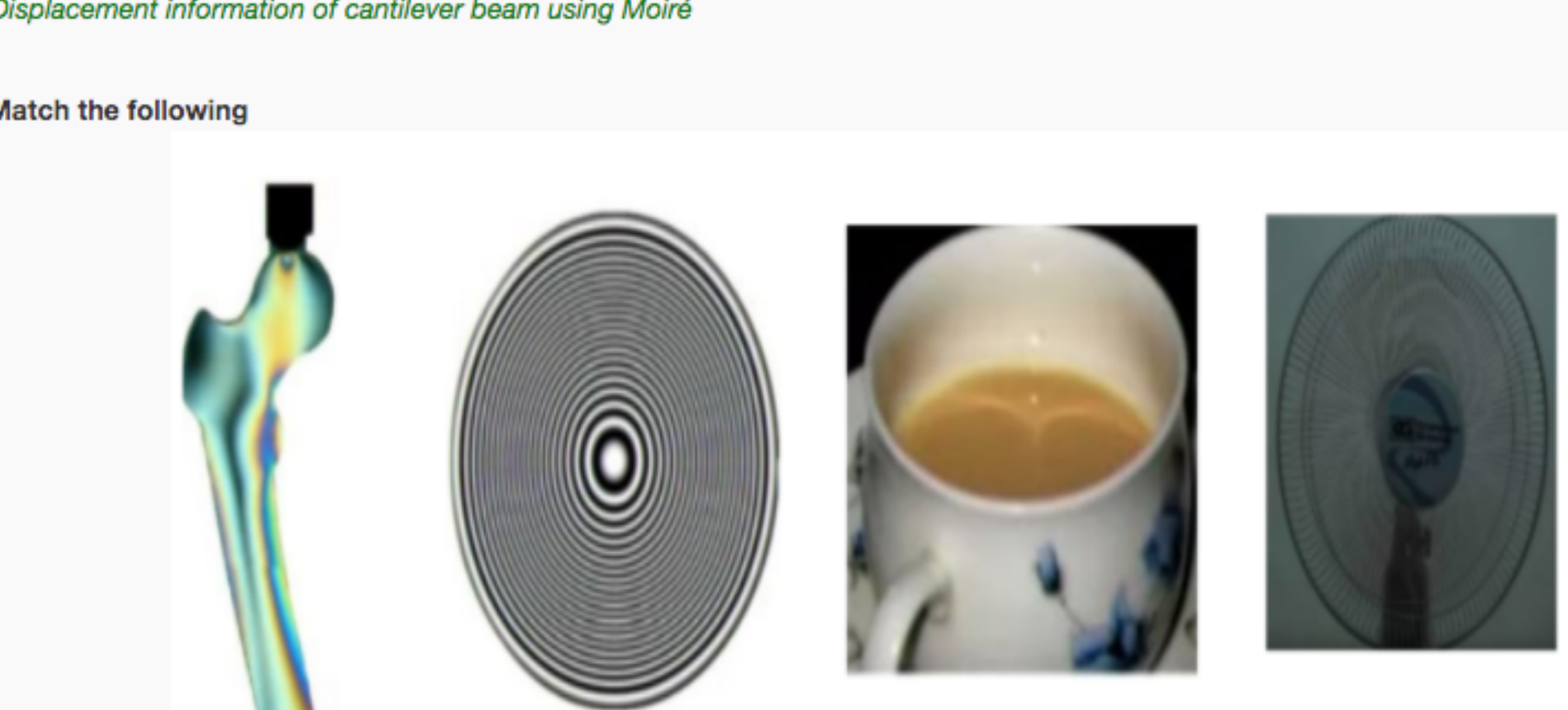


- Displacement information of cantilever beam using Moiré
 Displacement information of beam under pure bending using Moiré
 Slope in a cantilever beam using Shearing interferometry
 Deflection of a cantilever beam using holography

No, the answer is incorrect.
Score: 0

Accepted Answers:
Displacement information of cantilever beam using Moiré

Match the following



Enter appropriate letters (a, b, c, d) representing the figures corresponding to the information given below

9) Displacement information _____

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) b

10) Physical principle of Moiré : ____ 0.5 points

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) d

11) Physical principle of Caustics: ____ 0.5 points

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) c

12) Stress information: ____ 0.5 points

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: String) a

13) For which of the problems a closed form solution is available 2 points

- Beam under four-point bending
 Disc under diametral compression
 Clamped circular disc with central load
 Spanner tightening a nut

No, the answer is incorrect.
Score: 0

Accepted Answers:
Beam under four-point bending
Disc under diametral compression
Clamped circular disc with central load

14) The inner core of a rail cross section is removed due to the fact that 2 points

- a) The stress is distributed uniformly across the cross section
 b) The inner core does not contribute to the load sharing
 c) The rail is subjected to bending
 d) The stress varies linearly across the rail cross section

which of the above statement are true?

- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b
c
d

15) Which of the following are true regarding functionally graded materials (FGM) 2 points

- They are homogenous by nature
 They have varying properties within the volume of the material
 Tooth and bone come under FGMs
 All a, b, and c are true

No, the answer is incorrect.
Score: 0

Accepted Answers:
They have varying properties within the volume of the material
Tooth and bone come under FGMs

16) Experimental methods provide direct information. In this context, which of the following statements are false? 2 points

- A. Majority of optical techniques provide whole field solution
 B. Strain gauge is used to obtain a closed form solution
 C. A single experimental technique can provide all stress, strain and displacement information
 D. Moiré technique provides the stress information

- BCD
 ACD
 DAB
 ABCD

No, the answer is incorrect.
Score: 0

Accepted Answers:
BCD

17) Match the following techniques with the information provided 2 points

A. Photoelasticity	i. Principal stress direction
B. Geometric Moiré	ii. Slope and curvature
C. Moiré Interferometry	iii. In and out of plane displacement
D. Holography	iv. Component of strain over the domain
E. Brittle Coating	v. Principal stress/strain difference
	vi. Component of strain at a point
	vii. Out of plane displacement

- A-iii, B-v, C-iv, D-vii, E-i
 A-v, B-iii, C-iv, D-vii, E-i
 A-v, B-iii, C-i, D-vii, E-iv
 A-iv, B-iii, C-v, D-vii, E-vi

No, the answer is incorrect.
Score: 0

Accepted Answers:
A-v, B-iii, C-iv, D-vii, E-i