

Unit 12 - Week 10

Course outline

How does an NPTEL online course work?

Week 0

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Week 10

● Strain Sensitivity of a Strain Gauge, Bridge Sensitivity, Rosettes

● Strain Gauge Alloys, Carriers and Adhesives

○ Performance of Strain Gauge System

○ Quiz : Assignment 10

○ Experimental Stress Analysis: Week 10 Feedback Form

Week 11

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Assignment 10

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

Due on 2020-04-08, 23:59 IST.

1) To comfortably use the strain gauge without any modifications to measure both elastic and plastic strains, the value of strain sensitivity of the conductor wire S_A should be closer to: 1 point

- 1
 2
 3
 4

No, the answer is incorrect.
Score: 0

Accepted Answers:
2

2) Match the following: 2 points

Applications	Strain gauge material
A) Room temperature applications	i) Karma alloy
B) Dynamic applications	ii) Advance alloy
C) Insitu measurements done over a period of time	iii) Isoelastic alloy

- A- i, B- ii, C- iii
 A- ii, B- i, C- iii
 A- i, B- iii, C- ii
 A- ii, B- iii, C- i

No, the answer is incorrect.
Score: 0

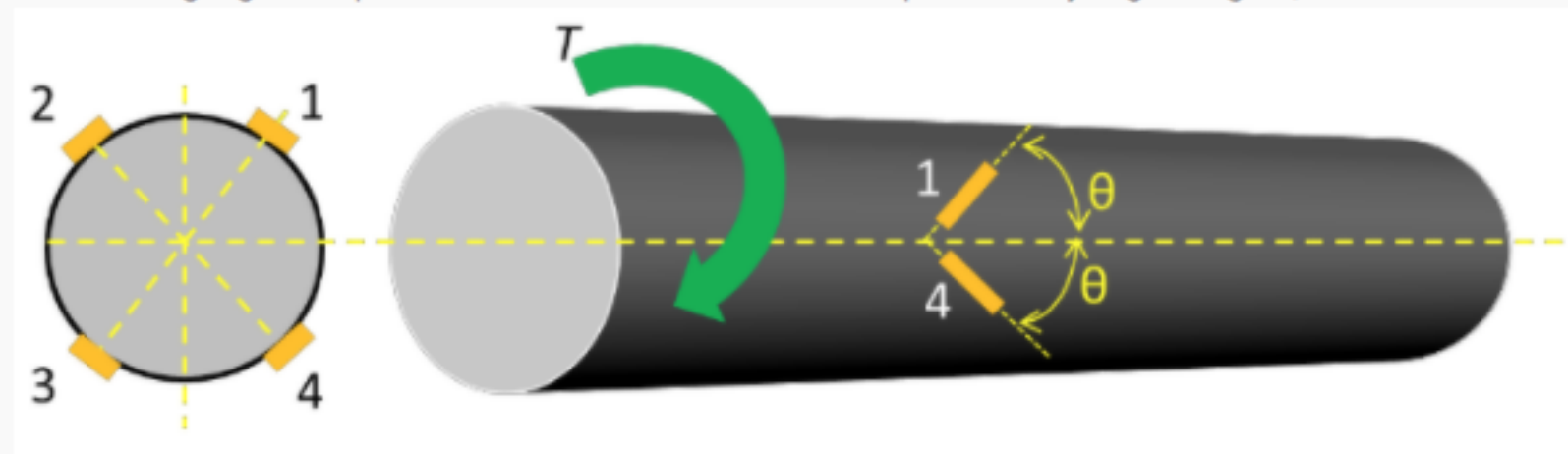
Accepted Answers:
A- ii, B- iii, C- i

3) What is the percentage of error involved in the strain measurement if a strain gauge is pasted on a 0.8 mm thick cantilever beam whose grid plane is at a height of 0.06 mm above the surface of the beam?

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 13.00,14.00

Four strain gauges are pasted on a shaft to measure the torque T . Analysing the figure, answer the following questions: 2 points

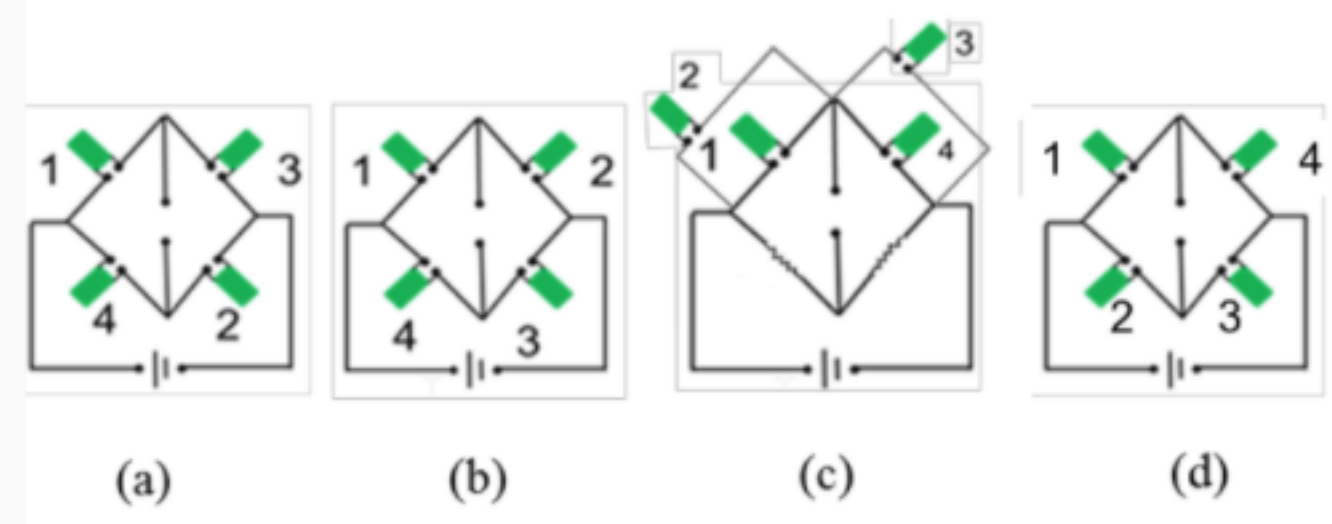


4) What must the angle θ (in degrees) ?

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 45

5) How should the strain gauges be connected in the Wheatstone bridge to maximize the output signal? 2 points



- a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b
d

6) What is the maximum bridge factor obtainable in this case?

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 4

The strain field in a component of interest in the range $(-5 \text{ mm}) < x < (5 \text{ mm})$ varies as follows:

$$5x^3 + 3x^2 + 4x$$

When x is substituted in mm the expression gives the micro strain at the point of interest. A general purpose strain gauge of gauge length 3 mm made of Constantan alloy having a wire diameter of 0.025 mm and specific resistance $0.49 \mu\Omega/m$ is what is available for measurement. If the strain gauge is pasted such that its center is at $x = -2 \text{ mm}$, answer the following questions based on the given data

7) The average strain ϵ_{avg} (in $\mu\epsilon$) measured by strain gauge is:

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) -58.25,-54.25

8) The actual strain ϵ_p (in $\mu\epsilon$) at the point is:

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) -39.00,-33.00

9) Error made in the measurement of ϵ_{xx} as a percentage of the actual strain ϵ_p

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 54.25,58.25

10) If the pasted strain gauge has 12 loops in its grid, calculate the base resistance R of the strain gauge (in ohms)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 32.00,39.00

11) If the gauge length was 2 mm, what would have been the error made in the measurement of ϵ_{xx} as a percentage of the actual strain ϵ_p

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 23.00,27.00

2 points