

Unit 13 - Week 11

Course outline

How does an NPTEL online course work?

Week 0

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Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

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Week 9

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Week 11

- Temperature Compensation, Two-wire and Three-wire Circuits
- Strain Gauge Selection
- Bonding of a Strain Gauge
- Quiz : Assignment 11**
- Experimental Stress Analysis: Week 11 Feedback Form

Week 12

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Assignment 11

The due date for submitting this assignment has passed. **Due on 2020-04-15, 23:59 IST.**
As per our records you have not submitted this assignment.

- Self-temperature compensation gauge can be used in general for
 - A particular material
 - Any material
 - Only for Steel
 - Only for Aluminium

No, the answer is incorrect.
Score: 0
Accepted Answers: A particular material
- Loss in signal due to lead wire resistance (R_L) is best represented by (Note: $R_{s.g}$ is resistance of strain gauge):
 - $R_L \times R_{s.g}$
 - $R_L + R_{s.g}$
 - $R_L - R_{s.g}$
 - $R_L / R_{s.g}$

No, the answer is incorrect.
Score: 0
Accepted Answers: $R_L / R_{s.g}$
- In the following designation given by Micro-measurements, what is represented by "250":

EA-06-250BG-120

 - Gage type
 - Gauge length
 - Resistance
 - Temperature compensation

No, the answer is incorrect.
Score: 0
Accepted Answers: Gauge length
- In the following designation given by Micro-measurements, what is represented by "120":

EA-06-250BG-120

 - Gage type
 - Gauge length
 - Resistance
 - Temperature compensation

No, the answer is incorrect.
Score: 0
Accepted Answers: Resistance
- At a point in a biaxial stressed material, the principal stress directions are known. Which one of the following choices will be optimum to calculate strain tensor at that point.
 - Rectangular rosette
 - Delta rosette
 - T-rosette
 - Stacked delta rosette

No, the answer is incorrect.
Score: 0
Accepted Answers: T-rosette
- A strain gauge of 120Ω is pasted on a stainless steel specimen at a distance of 100 m from the instrument (which is used to measure strain), connected with 0.5 mm copper lead wires. At room temperature, calculate the effective gauge arm resistance connected to Wheatstone bridge of the instrument in three-lead circuit to that of a two lead wire circuit. Given: The specific resistance of the copper wire (ρ) is $1.50 \times 10^{-8} \Omega - m$

No, the answer is incorrect.
Score: 0
Accepted Answers: (Type: Range) 0.80,1.00
- Which one of the following statement(s) are true for self-temperature compensation (STC) gauges?
 - STC gauges can accommodate $i^2 R$ loss
 - STC gauges can accommodate small changes in environment temperature
 - STC gauges can accommodate large changes in environment temperature
 - STC gauges works like superconductors

No, the answer is incorrect.
Score: 0
Accepted Answers: STC gauges can accommodate $i^2 R$ loss
STC gauges can accommodate small changes in environment temperature
- What are the benefits of three wire circuit for a strain gauge:
 - Increased measurement sensitivity
 - Useful for strain calculation in static loading
 - Automatic temperature compensation
 - Intrinsic bridge balance

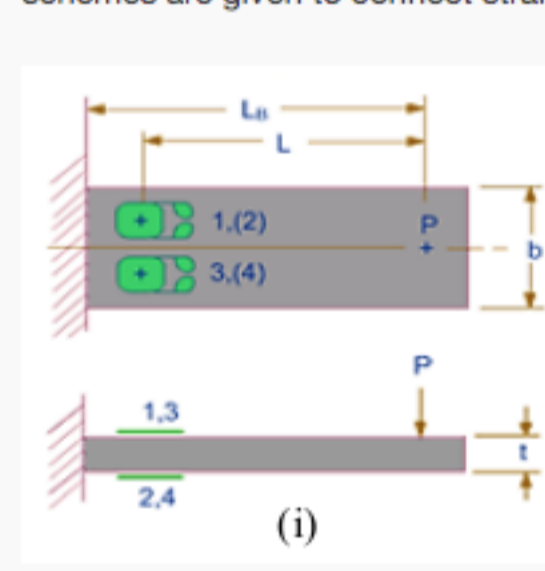
No, the answer is incorrect.
Score: 0
Accepted Answers: Increased measurement sensitivity
Useful for strain calculation in static loading
Automatic temperature compensation
Intrinsic bridge balance
- Which one of the following statement(s) are true for maximizing the signal for strain gauge measurement:
 - Full bridge circuit of same strain component gauge
 - Increase the bridge voltage
 - Decrease the bridge voltage
 - Increase resistance of strain gauge





No, the answer is incorrect.
Score: 0
Accepted Answers: Increase the bridge voltage
Increase resistance of strain gauge
- Which one of the following strain gauge(s) should be used for getting residual stress by drilling hole method:
 - EA-XX-120RE-120
 - EA-XX-125RA-120
 - EA-XX-062RE-120
 - WA-XX-120WR-120

No, the answer is incorrect.
Score: 0
Accepted Answers: EA-XX-120RE-120
EA-XX-062RE-120
- A strain gauge is pasted on an Aluminium specimen kept in a room having temperature 25°C . Given data: Resistance of the strain gauge = 120Ω , sensitivity of the strain gauge to temperature $S_t = 8 \times 10^{-5}$, coefficient of linear expansion for Aluminium specimen $\alpha_s = 23.5 \times 10^{-6} / ^\circ\text{C}$, coefficient of linear expansion for the gauge material $\alpha_g = 0.3 \times 10^{-6} / ^\circ\text{C}$ and strain sensitivity of the strain gauge $S_g = 1.5$. Answer the following questions based on given data:

If room temperature is elevated to 50°C from 25°C , calculate change in resistance of a strain gauge (120Ω) pasted on Aluminium alloy

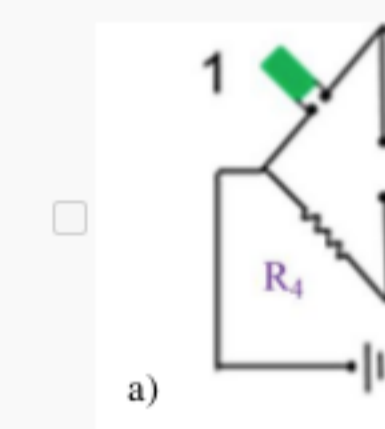
No, the answer is incorrect.
Score: 0
Accepted Answers: (Type: Range) 0.20,0.40
- Handling the temperature effects has two components - minimize heat generation and improve heat dissipation. One can improve the heat dissipation by choosing the appropriate gauge pattern instrumentation schemes which can also be used to minimize the temperature effects. Some of the instrumentation schemes are given to connect strain gauge to Wheatstone bridge as follows


- Which of the following bridge(s) ensures implicit temperature compensation

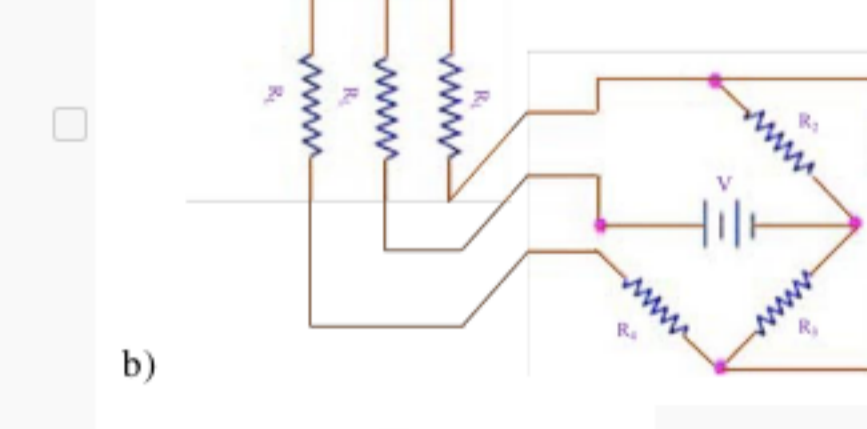





 - I
 - II
 - III
 - IV

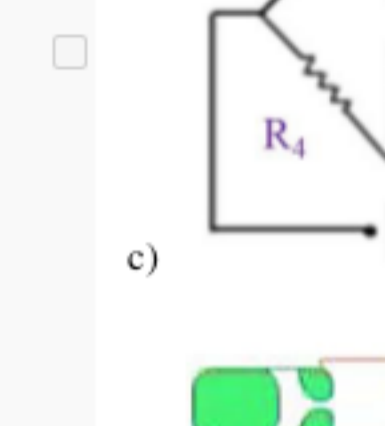
No, the answer is incorrect.
Score: 0
Accepted Answers: III
IV
- If a Self-temperature compensation strain gauge '1' in Fig. (i) is used, which one(s) of the following should be chosen to ensure temperature compensation:



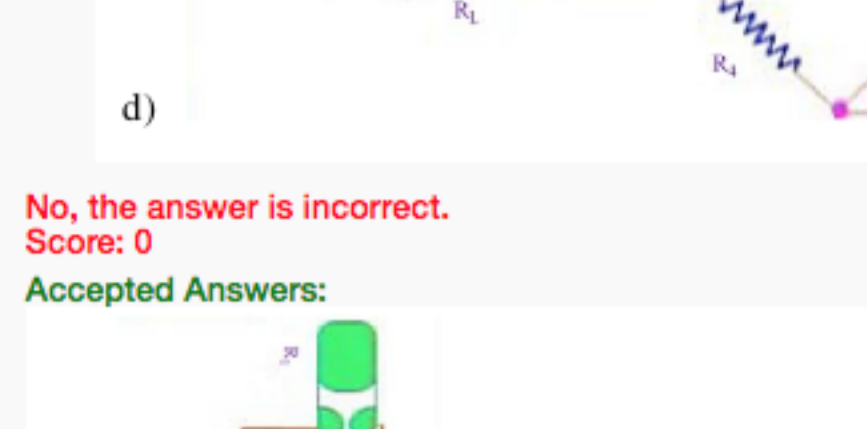
a)



b)



c)



d)

No, the answer is incorrect.
Score: 0
Accepted Answers: b)
d)
- If the applied load is $P = 100 \sin(\omega t)$ in Fig. (i), where ω is frequency of vibration and t is time interval. To calculate the maximum and minimum strain values, which one of the configuration is most preferred to get temperature compensation:
 - Three-wire circuit
 - Four-wire circuit
 - Two-wire circuit
 - All of the above

No, the answer is incorrect.
Score: 0
Accepted Answers: Two-wire circuit