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# Unit 9 - Air quality monitoring

Register for Certification exam

Course outline

How to access the portal

MATLAB Online Access and Learning Modules

Localization in IoT - Part 1

Localization in IoT - Part 2

Sensors and protocols for next generation automobiles

Automotive IoT

Speech to text processing

Device Security

Air quality monitoring

- Need for air quality monitoring
- Air quality : pollutants and standards

## Week 7 Assessment

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

**Due on 2019-03-20, 23:59 IST**

1) What is the purpose of simple linear regression? ***1 point***

- To predict scores on an independent variable from scores on a single dependent variable predict scores on an independent variable from scores on a single dependent variable.
- To assess whether there is a significant difference between independent groups.
- To predict scores on a dependent variable from scores on multiple independent variables.
- To predict scores on a dependent variable from scores on a single independent variable

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

**Accepted Answers:**
*To predict scores on a dependent variable from scores on a single independent variable*

2) The permissible concentration of PM2.5 in ambient air as set by WHO is ***1 point***

- Less than 10ug/m3
- Less than 40ug/m3
- Less than 15ug/m3
- Less than 30 ug/m3

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

**Accepted Answers:**
*Less than 10ug/m3*

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- Sensor types : semiconductor and electrochemical
- Air quality : Overview of system design
- Air quality : System design - part 1
- Air quality : System design - part 2
- Air quality: Real time measurement for a drive cycle
- Quiz : Week 7 Assessment

**Case studies**

**Text Transcripts**

**DOWNLOAD VIDEO**

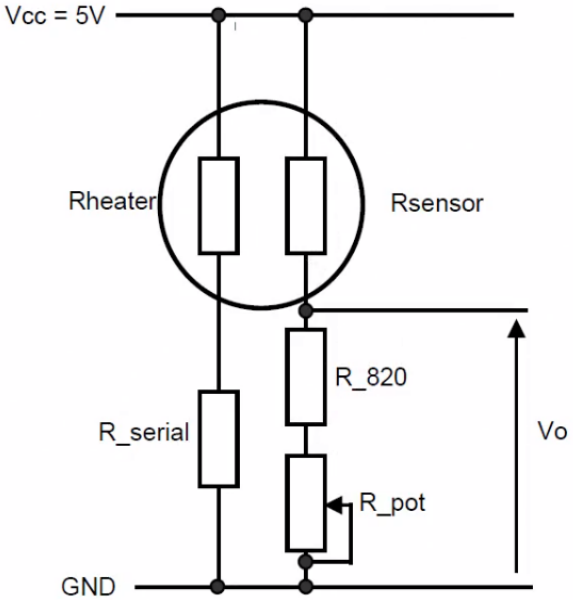
**Interaction Session**


- Wear and tear of tyres
- All of these

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

**Accepted Answers:**
*All of these*

4) To measure 1000 ppm gas concentration using given circuit, 22.5mW is dissipated by 100 ohm $R_{heater}$. The output voltage $V_0$ is measured as 3.33V for 1.8k ohm $R_{sensor}$. Find R_pot and R_serial. **1 pc**




- R_serial = 333 ohm, R_pot = 3600 ohm
- R_serial = 233 ohm, R_pot = 2780 ohm
- R_serial = 133 ohm, R_pot = 2600 ohm
- R_serial = 33 ohm, R_pot = 360 ohm

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

**Accepted Answers:**
*R_serial = 233 ohm, R_pot = 2780 ohm*

5) In Linear Regression, what are considered as residuals ? **1 point**

- Residuals are the difference between the observed and expected dependant variable values.
- Residuals are the independent values collected.
- Residuals are the confidence intervals.
- Residuals are the serendipitous findings.

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

**Accepted Answers:**
*Residuals are the difference between the observed and expected dependant variable values.*

6) Which of the following methods helps to best solve the **1 point**

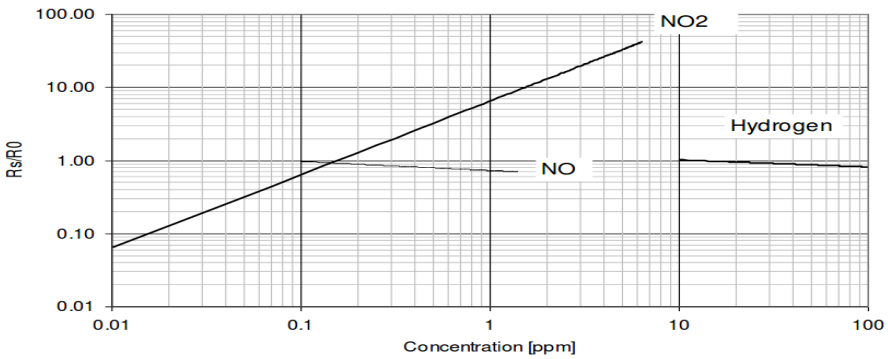
problem of calibration of gas sensor including correction for cross sensitivity?

- Simple linear regression
- Non- linear regression
- Logarithmic regression
- Artificial Neural Network

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

**Accepted Answers:**
*Artificial Neural Network*

7) Refer to the given linear log-log graph for NO2 sensor MiCS-4514: **1 point**




Find the behaviour equation for NO2 sensor i.e ppm vs Rs/Ro without considering the effect of temperature and humidity on resistance values.
Use the following data for calculation.
Rs/Ro = 6 at 1 ppm.
Rs/Ro = 0.6 at 0.1 ppm.
Datasheet:
https://www.sgxsensortech.com/content/uploads/2014/08/0278_Datasheet-MiCS-4514.pdf

- ppm = Rs/(Ro*6)
- ppm = Rs/(Ro*60)
- ppm = Rs/(Ro*0.6)
- ppm = Rs/(Ro*0.06)

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

**Accepted Answers:**
*ppm = Rs/(Ro*6)*

8) Consider the NO2 gas sensor MiCS-4514 behavior equation derived in Q7. It has Ro of 6000 ohm. The sensor resistance was found to be 6100 ohm in a polluted street. What is the concentration of NO2 according to the equation derived? **1 point**

- 170 ppb
- 600 ppb

- 240 ppb
- 24 ppb

No, the answer is incorrect.
Score: 0

Accepted Answers:
*170 ppb*

9) A diesel vehicle emits exhaust at an average rate of 15litres per second. A PM sensor which measures PM10 in micro gram/m3 is fitted to the tailpipe of the vehicle and data acquired from the exhaust is available i the dataset https://drive.google.com/open?id=1epB_HSP7IoSrTH9GwuPt-TIKg39RRo08 in column **PM 10 ex**. The data is collected every 5 seconds. Assume that PM 10 values in the dataset are the average values over a 5 second interval. What is the total amount of PM10 in micrograms output by the vehicle afte it starts moving from its stationary position? *1 po*

- 4700micrograms – 4900 micrograms
- 190micrograms -210micrograms
- 4500micrograms – 4600micrograms
- 2900micrograms -3000 micrograms

No, the answer is incorrect.
Score: 0

Accepted Answers:
*2900micrograms -3000 micrograms*

10) PM10 particles are the particles whose size is *1 point*

- More than 10nm
- Less than 10um
- Between 2.5 nm to 10nm
- Less than 10nm

No, the answer is incorrect.
Score: 0

Accepted Answers:
*Less than 10um*

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