Week-2 Assignment-1

The due date for submitting this assignment has passed. Due on 2018-02-07, 23:59 IST.

Submitted assignment

Assignment-1
Answer all the multiple choice question.

1) The smallest increment in the measured value that can be detected with certainty is termed as

- [ ] Hysteresis
- [x] Drift
- [ ] Resolution
- [ ] Threshold

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

2) Threshold of the instrument is defined as the

- [ ] Ratio of the output of the instrument to the corresponding input signal
- [ ] Drift of the output of the instrument due to ageing of components
- [ ] Smallest measurable change in input(non-zero value)
- [x] Smallest measurable input signal which can be detected by the instrument

No, the answer is incorrect.
Score: 0
Accepted Answers:
Smallest measurable input signal which can be detected by the instrument

3) An AC millivoltmeter has a range of 0-1000 mV and its accuracy is ±0.5% of fsd(full-scale deflection). If the input voltage of the instrument is 400mV, the output of the instrument would be

- [ ] 402 mV
- [x] 398 mV
- [ ] Between 398 and 402 mV
- [ ] Between 395 and 405 mV

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

Accepted Answers:

Between 395 and 405 mV

4) The term backlash used in instrumentation means

- Smallest increment in the measurand that can be detected by the instrument
- Gradual departure of the measured value from its calibrated value
- Maximum distance or angle through which any part of the mechanical system may be moved without causing any motion in the next part
- The ability of the instrument to give output reading close to each other, when the input is of fixed type

No, the answer is incorrect.
Score: 0

Accepted Answers:

Maximum distance or angle through which any part of the mechanical system may be moved without causing any motion in the next part

5) A pressure transmitter has a calibrated measurement range of 200 to 300 psig, and an output range of 4-20 mA. What is the expected output if the input pressure is 235 psig

- 16.5 mA
- 5.6 mA
- 9.6 mA
- 12.5 mA

No, the answer is incorrect.
Score: 0

Accepted Answers:

9.6 mA

6) When calibrating an instrument, you may detect the presence of hysteresis error by:

- Comparing the instrument against a known standard that is free from any hysteresis
- Comparing accuracy at certain points both going up and down the calibration scale
- Measuring error before and after turning the 'dead band' adjustment screw
- Checking for calibration drift at certain points over long periods of time

No, the answer is incorrect.
Score: 0

Accepted Answers:

Comparing accuracy at certain points both going up and down the calibration scale

7) During a measurement, for a measure value “B”, absolute error is obtained as “A”, what will be the relative error of measurement

- B/A
- A/B
- A+1/B
- B+A/A

No, the answer is incorrect.
Score: 0

Accepted Answers:

A/B

8) Using a voltmeter, the measured value is 24.3 V, while its true value is 24 V. What is the relative

- A point
9) In a measurement, what is the term used to specify the closeness of two or more measurements?

- Threshold
- Accuracy
- Precision
- None of the above

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

10) A thermocouple having a sensitivity of 5.1 mV/°C is being used for the measurement of temperature. Its output is connected to a millivoltmeter having a sensitivity of 1 mV/°C. If the length of the pointer of the instrument is 20 mm, determine the overall sensitivity of the temperature-sensing system in mm/°C.
(Note: Overall sensitivity = sensitivity of thermocouple \times sensitivity of millivoltmeter)

- 1.87 mm/°C
- 1.78 mm/°C
- 1.67 mm/°C
- 1.96 mm/°C

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.78 mm/°C

11) A Bourdon pressure gauge having a linear calibration has a 50 mm long pointer. It moves over a circular dial having an arc of 270°. It displays a pressure range of 0 to 15 bar. Determine the unknown pressure when the output deflection is 50 mm.

- 3.14 bar
- 4.011 bar
- 3.18 bar
- 4.18 bar

No, the answer is incorrect.
Score: 0
Accepted Answers:
A pressure transducer gives a deflection of 0.4 mm when a pressure of $2.2 \times 10^6$ N/m$^2$ is applied. An electrochemical device converts the input displacement of pressure transducer into the voltage and has a sensitivity of 50 V/mm. Determine the unknown pressure when the output voltage of 1.5 V is observed on the meter.

- $1.85 \times 10^5$ N/m$^2$
- $1.75 \times 10^5$ N/m$^2$
- $1.65 \times 10^5$ N/m$^2$
- $1.55 \times 10^5$ N/m$^2$

No, the answer is incorrect.
Score: 0
Accepted Answers:
- $1.65 \times 10^5$ N/m$^2$

The desirable static characteristics of a measuring system are

- Accuracy and speed of response
- Accuracy, sensitivity, and reproducibility
- Drift and dead zone
- Static error and hysteresis

No, the answer is incorrect.
Score: 0
Accepted Answers:
- Accuracy, sensitivity, and reproducibility

A first-order mercury-in-glass thermometer has a time constant of 10 s. It is at a steady state temperature of 0 °C. At time $t = 0$, the thermometer is suddenly immersed in a constant temperature bath at 100 °C. The time required for the thermometer to read 95 °C, approximately is (in s) ______________

- 10.78
- 29.96
- 50.23
- 70.16

No, the answer is incorrect.
Score: 0
Accepted Answers:
- 29.96

A mercury-in-glass thermometer has the time constant $T_1$. If we replace mercury by another liquid whose density and specific heat capacity are lower than those of mercury, the time constant of the thermometer becomes $T_2$. What is the relation between $T_1$ and $T_2$?

- $T_1 = T_2$
- $T_1 > T_2$
- $T_1 < T_2$
- Insufficient data

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( T_1 > T_2 \)