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SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

F. Y B. Sc.(1st Semester) EXAMINATION

2010

Date: 23/11/2010

Time: 11:30 AM - 1:30 PM

Sub: INSTRUMENTATION SYSTEM - I

Sub Code: **USCINS(V)02**

Max Marks: 70

Note:- Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.

Que 1 Each question below gives a multiple choice of answers. Choose the most appropriate one. [10]

1 Reproducibility of measurements be expressed as

i. Resolution ii. Accuracy

iii. Precision iv. None of the above

2 ____ refer to the deviation from the true value of the measured variable.

i. Error ii. Accuracy

iii. Significant figures iv. None of the above

3 In statistical ananlysis of observations D stands for

i. Arithmetic mean ii. Standard deviation

iii. Average deviation iv. None of the above

4 The ratio of output signal of the instrument to a change of input or measured variable is

i. Accuracy ii. Sensitivity

iii. Gross error iv. None of the above

5 ____ refers to the degree of closeness to the true value of quantity under measurement.

i. Accuracy ii. Error

iii. Resolution iv. Sensitivity

6 Fundamental unit of length is

i. Cm ii. Meter

iii. Killometer iv. decameter

7 Expression for Coulomb's law is

i. $F = Q_1 \frac{k\,Q_2}{r}$ ii. $F = \frac{k\,Q_1 Q_2}{r^2}$

iii. $F = \frac{k\,Q_1^2 Q_2^2}{r^2}$ iv. None of the above

8 Following is a type of error

i. arithmatic mean ii. precision

iii. random iv. none of the above

9 Demensionally electric charge Q can ne given

i. $cm\, g^{\frac{1}{2}} s^{-1}$ ii. $cm^2\, g^2 s^{-1}$

iii. $cm^{\frac{3}{2}} g^{\frac{1}{2}} s^{-1}$ iv. None of the above

10 In statistical analysis σ represents

i. Deviation from the mean ii. Average deviation

iii. Standard deaviation iv. None of the above

Que 2 Short answer type questions (Attempt any Ten). [20]

1 State different standards of measurement.
2 State different types of typical applications of instrument system.
3 Define Standard Deviation σ.
4 State use of Null and Deflection Type Instrument.
5 What is Auxillary Element in Measurement System?
6 Define 1) Aaccuracy, and 2) Precision.
7 State formula for Average Deviation.
8 What do you mean by Fundamental and Derived units?
9 What is Random Eerror?
10 Define 1) Sensitivity, and 2) Resolution.
11 List different Functional Elements of Measurement System.
12 Define Systematic Eerror?

Que 3 [A] Describe Manually Operated and Automatic Type instruments. [05]
[B] Discuss functional elements of measurement system. [05]

OR

[A] Discribe Null and Deflection type instruments. [05]
[B] Discuss any three typical application of Instrument System. [05]

Que 4 [A] Discuss Gross Errors and Random Errors in detail. [05]
[B] A set of independent current measurement was taken by six observers and recorded as 12.8 mA, 12.2 mA, 12.5 mA, 13.1 mA, 12.9 mA, and 12.4 mA. Calculate 1) Arithmetic Mean, and 2) The deviation from the mean. [05]

OR

[A] Explain Arithmetic mean and Average deviation in with expresion. [05]
[B] Explain concept of Accuracy and Precision. [05]

Que 5 [A] Describe fundamental and derived units in measurement. [05]
[B] Derive expression for electric and magnetic units. [05]

OR

[A] Discuss concept of conversion of units. [05]
[B] The floor area of an office builing is 5000 meter ^{2}. Calculate the floor area in ft^2. [05]

Que 6 [A] Describe standards for time and frequency. [05]
[B] Describe standards for mass, length, and volume. [05]

OR

[A] Discuss the classification of standards of measurements. [05]
[B] Discuss Resistance standards. [05]

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