Ain Shams University Credit Hours Engineering Program

Engineering Measurement MDP 141

Assignment 2

Generalized Measurement system

1. What is meant by measurement?
2. Write a brief note on the significance of measurement
3. Compare between the different methods of measurements
4. Why the measurement by indirect methods is more common than by direct method?
5. Give an example of a direct and in direct measurement process from your daily life.
6. Why the electrical signal is preferred in measurement
7. State TRUE or FALSE and correct the false one

   - Measurement is a comparison of a given unknown quantity with a standard value adopted as a unit.
   - The word measurement is used to designate the physical parameter being measured.
   - Indirect measurement is common for the measurement of length, mass and time.

- The human sense is capable to make direct comparison of all quantities.
- The human sense is sensitive enough to make direct comparison with the required high accuracy
- Remote reading can be performed by direct method.
- Most used transducers convert the measured signal into a mechanical movement.
- The measured physical quantity is directly sensed by the variable converting elements.
- The measured signal is amplified using the data processing element.
- The data representation element is responsible for transmitting the amplified measured signal.
- Data loggers can manage data faster than data acquisition systems.
- In Bourdon tube pressure gauge, the transmission system consists of a spring and a pinion.
- In diaphragm pressure transducer, the sensing element is the strain gauge attached to the diaphragm.
- In a computer vision system, data analysis is done within the camera system.
- In a car crash test, the accelerometer is used to determine the car acceleration.
- In a car crash test, load sensors are used to determine the crash force on the car body.

8. Using a block diagram show the three different stages of a generalized measurement system.

9. Using a block diagram show the six components of a generalized measurement system.

10. Explain the function of each of the following measurement system elements(components):

    - Primary sensing element
    - Variable conversion element
    - Variable manipulation element
    - Data transmission system
    - Data processing element
    - Data presentation element

11. What is the sensor; what are the main important sensor characteristics.

12. How ca a suit table sensor for a given application be selected

13. Compare between the data loggers and the data acquisition systems.

14. What are the main functions and types of data analyzers

15. Give an example of a measuring system, and mention the measured physical quantity and the system different components.

16. For the following measurement system; mention the system main six elements with their functions.

- Bourdon Pressure gauge
- Aneroid barometer
- Mercury column barometer
- Automobile speedometer
- Pendulum clock
- Tuning fork watch
- Dial indicator
- Pendulum scale
- Dimensional comparator
- Tuckerman strain gauge
- Pressure thermometer
- Engine indicator
- Pyrometer

Measuring Element	**Function(s)**	**From the given**