KNOWLEDGE PROBE 1: DATA ACQUISITION SYSTEMS
Introduction to Data Acquisition Systems

Learning Objectives

1. Describe a data acquisition system.
2. Describe components of a data acquisition system.
3. Describe sensor operation.

1. A data acquisition system is a(n)
   a. Computer that displays data in a variety of ways
   b. Electronic product that collects data from sensors, converts, processes, stores, and displays information
   c. Piece of electronic equipment that analyzes data to make decisions
   d. Type of computer

2. Which of the following is NOT part of a data acquisition system?
   a. Analog-to-digital converter
   b. Computer and video display
   c. Sensors and signal conditioning
   d. Shift registers

3. The common abbreviation for a data acquisition system is
   a. DAQ
   b. DAS
   c. DQS
   d. S-DA

4. The inputs and outputs of a DAQ are
   a. Analog
   b. Digital
   c. Either or both
   d. Something else

5. Which field is NOT commonly a user of data acquisition systems?
   a. Industrial monitoring
   b. Manufacturing
   c. Process control
   d. Software development

6. Most data input to a data acquisition system comes from
   a. A computer
   b. Memory
   c. Relays
   d. Sensors

7. Which of the following is NOT a common type of signal conditioning?
   a. Amplification
   b. Filtering
   c. Linearization
   d. Storage

8. What electrical characteristic changes as a strain gauge is subjected to pressure?
   a. Current
   b. Power
   c. Resistance
   d. Voltage

9. Which type of circuit is usually connected with a resistive transducer?
   a. Bridge
   b. Pi-network
   c. Resonant network
   d. Y-network

10. What type of amplifier is often used to condition a sensor signal?
    a. Instrumentation amplifier
    b. Op amp
    c. RF amplifier
    d. Source or emitter follower

11. Why are balanced lines normally used to transmit low level signals from sensors?
    a. Balanced lines cancel noise
    b. Balanced lines cause less distortion
    c. They can be run over longer distances
    d. They have less resistance

12. Which of the following best describes a multiplexer?
    a. Multiple inputs, multiple outputs
    b. Multiple inputs, single output
    c. Multiple inputs, single output
    d. Single input, single output

13. The most common MUX switch is a
    a. Bipolar transistor
    b. Diode
    c. MOSFET
    d. Relay

14. Precision of conversion of sensor data is a function of which ADC specification?
    a. Noise level
    b. Number of bits
    c. Reference voltage level
    d. Sample rate

15. A sensor output varies at a maximum rate of 50 Hz. What is the minimum useful sample rate for the ADC?
    a. 120 Hz
    b. 500 Hz
    c. 1 kS/s
    d. 100 kS/s

16. The most common bit size for a DAQ ADC is
    a. 10-bits
    b. 12-bits
    c. 14-bits
    d. 16-bits

17. Which of the following can be the computer in a DAQ?
    a. Embedded controller
    b. Laptop
    c. PC
    d. Any of the above

18. Some DAQs do NOT use DSP.
    a. True
    b. False

19. Most DAQ video displays are
    a. Animation
    b. Graphical
    c. Pie charts
    d. Tabular data

20. Which of the following is NOT a processing method used in DAQs?
    a. File storage
    b. Filtering
    c. Mixing
    d. Statistical analysis

21. Analog outputs from a DAQ are produced by a(n)
    a. ADC
    b. DAC
    c. Logic gate
    d. MUX

22. Digital outputs from a DAQ are used to
    a. Open or close a valve
    b. Operate a light
    c. Turn motors off or on
    d. Any of the above

23. Which is NOT a common use of a counter in a DAQ?
    a. Event counting
    b. Frequency synthesis
    c. PWM
    d. Timing

24. Which of the following often connects DAQs to other systems?
    a. Parallel interface bus
    b. Serial interface

25. The main difference between a DAQ and a data logger is that the data logger has
    a. A bigger display
    b. Greater computing power
    c. Less computing capability
    d. No interface