Data Acquisition Systems

1. The heart of any data acquisition system is its
   a. Computer
   b. Fiber optics
   c. Power source
   d. Sensors

2. Which of the following areas do NOT widely use data acquisition systems?
   a. Custom built products
   b. Factory automation
   c. Manufacturing
   d. Process control

3. The primary purpose of a data acquisition system is to
   a. Collect, analyze, and store data
   b. Convert analog to digital data
   c. Create software for data analysis
   d. Generate financial reports

4. Data acquisition (DAQ) systems typically collect analog data from
   a. Amplifiers
   b. CMOS circuits
   c. Sensors
   d. TTL circuits

5. Data collected by a DAQ system is often
   a. Stored in large data banks unused
   b. Used by management
   c. Used for ISO certification
   d. Used to control a manufacturing process

6. Which is NOT one of the main parts of a DAQ system?
   a. Audio interface
   b. Communication interface
   c. Multiplexer
   d. Signal conditioning circuits

7. Input signals to DAQ systems can be analog or digital.
   a. True
   b. False

8. Sensors convert a physical characteristic into a/an
   a. Amplified current
   b. Amplified voltage
   c. Proportional temperature
   d. Proportional voltage

9. Most sensor outputs signals require _____ before being used.
   a. Conversion to analog
   b. Feedback data
   c. Signal conditioning
   d. Visual display

10. Which of the following is NOT a form of signal conditioning?
    a. Attenuation
    b. Digital conversion
    c. Filtering
    d. Impedance matching

11. Most sensor outputs produce DC signals in the range of
    a. Less than 100 mV
    b. 0-1 V
    c. 1-5 V
    d. Less than 10 V max

12. Multiplexers are used to
    a. Allow 2 or more signals to use the same communication path
    b. Balance the output of a bridge circuit
    c. Convert resistance change to voltage
    d. Filter out any noise

13. Electronic multiplexers use _____ to connect the desired input to the output
    a. Counters
    b. Fiber optic cables
    c. Filters
    d. MOSFETS

14. If the input frequency to the DAC is 500 Hz, the sampling rate must be at least
    a. 250 Hz
    b. 500 Hz
    c. 1 kHz
    d. 2 kHz

15. Most sensors used in data acquisition systems do not require a high sampling rate.
    a. True
    b. False

16. Another function of the signal conditioning circuit is to
    a. Allow two or more signals to use the same path
    b. Convert analog signals to digital
    c. Display collected data in tabular form
    d. Produce a signal in the required voltage range

17. Some DAQs are packaged with the _____ circuits on the same PC board as the ADC.
    a. Communications interface
    b. Sensor
    c. Signal conditioning
    d. Video display

18. For most applications, the _____ ADC is most commonly used.
    a. Integrating
    b. Sigma delta
    c. Successive approximation
    d. Voltage-to-frequency

19. Which converters are used for 24- bit resolution?
    a. Integrating
    b. Sigma delta
    c. Successive approximation
    d. Voltage-to-frequency

20. Before the collected data can be analyzed, the binary words from the ADC must be
    a. Counted
    b. Displayed graphically
    c. Stored in memory
    d. Transmitted back to the sensor

21. In data acquisition systems, computers are often used to
    a. Perform additional signal processing
    b. Run statistical analysis of data
    c. Store the processed data
    d. All of the above

22. The least useful way to display the collected data is in
    a. A frequency spectrum display
    b. Animated form
    c. Graphical form
    d. Tabular form

23. In some applications, the DAQs digital output signals are used to
    a. Adjust light intensity
    b. Adjust the gas flow rate
    c. Control motor speed
    d. Turn other devices on or off

24. For analog control, the output data from the computer must first go through a/an
    a. Amplifier
    b. DAC
    c. Multiplexer
    d. Low pass filter

25. Some DAQ systems may also have _____ for special timing needs.
    a. Alarm systems
    b. Analog filters
    c. Digital counters
    d. Thermocouples

26. Today, DAQ systems can use a_____ for high speed transmission of data from one place to another.
    a. Ethernet port
    b. Parallel transmission port
    c. Phone outlet
    d. US postal interface

27. Wireless data transmission is not currently available to DAQ systems.
    a. True
    b. False

28. The difference between a data logger and a DAQ system is
    a. Data loggers are more robust than DAQ systems
    b. Data loggers do not store data
    c. Data loggers only capture and store data
    d. Data loggers only does real time processing

29. Most DAQ systems can be found on a/an
    a. CD ROM
    b. External hard drive
    c. Printed circuit board you plug into the PCI bus
    d. Single chip that you plug into a motherboard

30. Most DAQ boards contain _____ single ended inputs
    a. 4
    b. 8
    c. 16
    d. 32

31. A 16 input multiplexer has a sampling rate of 4.8 MS/s. What is the sampling rate per channel?
    a. 33 kS/s
    b. 76.8 kS/s
    c. 200 kS/s
    d. 300 kS/s

32. In DAQ systems, resolution refers to the
    a. Critical dimension of the circuit components
    b. Smallest data value that can be stored
    c. Smallest frequency to be measured
    d. Smallest increment of input voltage to be digitized

33. What determines the resolution of a DAQ system?
    a. The input voltage range
    b. The number of data bits used in the ADC
    c. The number of inputs to the multiplexer
    d. The sampling rate

34. External DAQ systems are also currently available.
    a. True
    b. False

35. One of the main areas of the DAQ software is
    a. Control
    b. Data analysis
    c. Programming languages
    d. All of the above

36. Which area of the DAQ software is responsible for developing the output signals of the system?
    a. Control
    b. Display
    c. Drivers
    d. Process Monitoring

37. Which area of the DAQ software collects the data and stores it?
    a. Control
    b. Data analysis
    c. Process monitoring
    d. Programming languages

38. The programs that bridge between the hardware and the software are called
    a. Control
    b. Display
    c. Drivers
    d. Programming languages

39. DAQ hardware can usually be purchased with matching software.
    a. True
    b. False

40. Creating your own DAQ software programs is
    a. Always recommended
    b. Costly and time consuming
    c. Not possible
    d. Preferred about half the time

41. Which company produces the most widely used DAQ system?
    a. Dell
    b. Freescale
    c. IBM
    d. National Instruments

42. What is the name of the most widely used software in DAQ systems?
    a. AnyVIEW
    b. Create-a-VIEW
    c. LabVIEW
    d. NationalVIEW

43. The advantage of LabVIEW over Basic or C is it
    a. Can use both Basic and C programming languages
    b. Is a text-based programming language
    c. Is programmed with graphics that can be easily connected
    d. Is programmed with less than 10 subroutines

44. Which programming language do you need to know to use LabVIEW?
    a. Assembler
    b. Basic
    c. C
    d. None

45. With DAQ hardware and LabView, you can simulate almost any common test instrument.
    a. True
    b. False

46. DAQ systems can be used in the
    a. Automotive industry
    b. Manufacturing industry
    c. Medical industry
    d. All of the above

47. In the automotive industry, a common application for DAQ systems is
    a. Customer feedback
    b. Development and testing
    c. Maintenance profiles
    d. Profit control

48. If a DAQ system is used to monitor slow temperature variations,
    a. A high sampling rate must be used
    b. A low sampling rate can be used
    c. The sampling rate is not important
    d. The sampling rate must be 10X the frequency

49. DAQ systems can also be used for environmental monitoring of weather or pollution control.
    a. True
    b. False