1. What is single conditioning in the context of data acquisition?

a) The process of conditioning only one type of signal
b) Conditioning a single sensor signal for data acquisition
c) Limiting data acquisition to a single source
d) Converting analog signals to digital signals

Answer: b) Conditioning a single sensor signal for data acquisition

Explanation: Single conditioning involves preparing one sensor signal for data acquisition, often involving amplification, filtering, and conversion to digital format.

2. Why is single conditioning necessary in data acquisition systems?

a) To simplify the system design
b) To reduce noise and interference
c) To increase the number of input channels
d) To decrease the sampling rate

Answer: b) To reduce noise and interference

Explanation: Single conditioning helps to minimize noise and interference in the signal, ensuring accurate data acquisition.

3. Which component is commonly used for signal amplification in single conditioning?

a) Transistors
b) Capacitors

c) Op-amps
d) Resistors

Answer: c) Op-amps

Explanation: Operational amplifiers (op-amps) are frequently used for signal amplification in single conditioning due to their high gain and versatility.

4. What is a primary purpose of protection circuitry in single conditioning?

a) To prevent damage to the sensor
b) To enhance signal clarity
c) To amplify the signal
d) To reduce power consumption

Answer: a) To prevent damage to the sensor

Explanation: Protection circuitry safeguards the sensor from potential damage due to overvoltage, overcurrent, or other harmful conditions.

5. What is the role of filtering in single conditioning?

a) To increase signal amplitude
b) To decrease signal clarity
c) To remove unwanted frequencies
d) To introduce noise

Answer: c) To remove unwanted frequencies

Explanation: Filtering removes unwanted frequencies, such as noise, from the signal to ensure accurate data acquisition.

6. In the context of Wheatstone bridge, what does it primarily measure?

a) Voltage
b) Current
c) Resistance
d) Frequency

Answer: c) Resistance

Explanation: A Wheatstone bridge is primarily used to measure resistance, often in strain gauges and other sensors.

7. How do digital signals differ from analog signals in data acquisition?

a) Digital signals are continuous, while analog signals are discrete
b) Digital signals are discrete, while analog signals are continuous
c) Digital signals are immune to noise, while analog signals are not
d) Analog signals require more processing than digital signals

Answer: b) Digital signals are discrete, while analog signals are continuous

Explanation: Analog signals represent continuous variations in voltage or current, while digital signals are discrete, represented by binary values.

8. What is the function of a multiplexer in data acquisition systems?

a) To amplify signals
b) To filter signals
c) To select and route multiple signals
d) To convert analog signals to digital

Answer: c) To select and route multiple signals

Explanation: A multiplexer selects and routes multiple analog or digital input signals to a single output.

9. What is the purpose of data acquisition in the context of digital signal processing?

a) To convert digital signals to analog
b) To analyze and process digital signals
c) To filter out noise from analog signals
d) To amplify analog signals

Answer: b) To analyze and process digital signals

Explanation: Data acquisition captures and prepares data for digital signal processing, where analysis and processing take place.

10. What are some common methods used in digital signal processing?

a) Amplification and attenuation
b) Filtering and modulation
c) Sampling and quantization
d) Demodulation and encoding

Answer: c) Sampling and quantization

Explanation: Sampling involves measuring the signal at discrete time intervals, while quantization involves mapping these samples to discrete amplitude values, essential processes in digital signal processing.

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