Objectives Sheet

CMQ 210 - Calibration Systems

Course Learning/Performance Objectives followed by enabling learning objectives

CMQ 210.U01.01	**Given quality control scenario descriptions, recognize the importance of calibration to quality assurance.**
CMQ 210.U01.01.01	Define terms related to calibration.
CMQ 210.U01.01.02	Recognize the relationship between metrology and calibration.
CMQ 210.U01.01.03	Identify reasons for calibration.
CMQ 210.U01.01.04	Recognize the purpose of calibration reviews.
CMQ 210.U02.01	**Given an appropriate quality control standard and sample calibration system descriptions, select the written description of a supplier's calibration system that meets the standard's requirements.**
CMQ 210.U02.01.01	Recognize the purpose of a calibration system.
CMQ 210.U02.01.02	Identify required elements of a calibration system.
CMQ 210.U02.01.03	Recognize the methods used for evaluating a supplier's calibration system.
CMQ 210.U02.01.04	Identify common issues related to validating automated calibration systems.
CMQ 210.U03.01	**Given a sample of calibration system standards, recognize the importance of the following calibration standards and guides: ISO 17025 – General requirements for the competence of testing and calibration laboratories; ISO 10012 – Measurement management systems – Requirements for measurement processes and measuring equipment; and ANSI Z540 – Calibration Laboratories and Measuring and Test Equipment – General Requirements.**
CMQ 210.U03.01.01	Recognize the importance of the calibration standards.
CMQ 210.U03.01.02	Identify calibration requirements included in ISO 17025.
CMQ 210.U03.01.03	Identify calibration requirements included in ISO 10012.
CMQ 210.U03.01.04	Identify calibration requirements included in ANSI/NCSL Z540.
CMQ 210.U04.01	**Given the appropriate calibration standards and sample documentation, identify the documentation that proves a given Quality Assurance technician is qualified to perform an identified process.**
CMQ 210.U04.01.01	Identify laboratory management responsibilities with regard to the Quality Assurance technician ensuring appropriate training for calibration personnel.
CMQ 210.U04.01.02	Identify required qualifications of Quality Assurance technicians performing calibration activities.
CMQ 210.U04.01.03	Identify the minimum requirements for defining Quality Assurance job descriptions of personnel performing calibration activities.
CMQ 210.U05.01	**Define the hierarchy of measurement standards.**
CMQ 210.U05.01.01	Define the measurement standards: national, primary, reference (secondary), and working.
CMQ 210.U05.01.02	Recognize the purpose of measurement standards.
CMQ 210.U05.01.03	Recognize the role of working standards
CMQ 210.U05.01.04	Define traceability with respect to measurement standards.
CMQ 210.U05.01.05	Recognize the importance of traceability with respect to measurement standards.
CMQ 210.U05.01.06	Recognize the relationship between National Institute of Standards and Technology (NIST) and calibration traceability.
CMQ 210.U05.01.07	Recognize how traceability is maintained.
CMQ 210.U06.01	**Given a calibration standards/regulations scenario description and related applicable documentation, including the manufacturer's service manual, recognize when the intervals of calibration and calibration procedures have been managed in accordance with the supplier's documented procedures**
CMQ 210.U06.01.01	Define accuracy and reliability.
CMQ 210.U06.01.02	Recognize the importance of regular calibration.
CMQ 210.U06.01.03	Identify sources of calibration intervals.
CMQ 210.U06.01.04	Recognize the effects of purpose and location of use on calibration intervals for measuring and test equipment (M&TE).
CMQ 210.U06.01.05	Identify the supplier responsibilities in relation to intervals of calibration.
CMQ 210.U06.01.06	Recognize requirements for calibration procedures.
CMQ 210.U07.01	**Given a calibration standard/regulation scenario description, the supplier's procedures, and a calibration-test report that includes the nominal value, tolerance range, and the out-of-tolerance value, identify the out-of-tolerance information.**
CMQ 210.U07.01.01	Recognize the impact of out of tolerance conditions on M&TE.
CMQ 210.U07.01.02	Recognize the requirements for out-of-tolerance reporting.
CMQ 210.U07.01.03	Identify the procedures for out-of-tolerance reporting.
CMQ 210.U08.01	**Given an OEM manual and the uncertainty values for a selection of measuring and test calibration equipment, identify the factors that may contribute to measurement uncertainty and error.**

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Course Learning/Performance Objectives followed by enabling learning objectives

CMQ 210.U08.01.01	Define measurement uncertainty with respect to calibration.
CMQ 210.U08.01.02	Define measurement error with respect to calibration measurements.
CMQ 210.U08.01.03	Recognize the difference between measurement uncertainty and error.
CMQ 210.U08.01.04	Identify causes of measurement uncertainty.
CMQ 210.U08.01.05	Identify factors that may contribute to measurement uncertainty and error in different categories of measuring and test equipment.
CMQ 210.U08.01.06	Recognize the purpose of an uncertainty comparison.
CMQ 210.U09.01	**Given standards and calibration records, audit the supplier's calibration records against the standard's requirements.**
CMQ 210.U09.01.01	Identify the purpose of calibration records.
CMQ 210.U09.01.02	List examples of documents included as part of calibration records.
CMQ 210.U09.01.03	Identify the standards for keeping calibration records.
CMQ 210.U09.01.04	Identify the requirements for evidence of calibration status.
CMQ 210.U09.01.05	Identify the contents of a calibration report.
CMQ 210.U09.01.06	Recognize the difference between a Certificate of Compliance and a Certificate of Calibration.
CMQ 210.U09.01.07	Identify the information required on a Certificate of Calibration.
CMQ 210.U10.01	**Given calibration scenario descriptions and applicable technical documentation, select the environmental controls required to ensure calibration measurements are accurate.**
CMQ 210.U10.01.01	Identify examples of hand-held mechanical tools requiring calibration.
CMQ 210.U10.01.02	Identify the key factors that affect calibration of electronic and physical tools.
CMQ 210.U10.01.03	Identify examples of electronic equipment requiring calibration.
CMQ 210.U10.01.04	Identify the key factors that affect calibration of electronic equipment.
CMQ 210.U10.01.05	Identify the effect of various environmental parameters such as humidity , temperature, and electrostatic discharge (ESD) on calibration activities.
CMQ 210.U10.01.06	Identify environmental condition requirements for test equipment operation and calibration.
CMQ 210.U10.01.07	Recognize reasons for tighter temperature and humidity requirements with respect to calibration.