



DEFENSE ACQUISITION UNIVERSITY

CMQ 210 - Calibration Systems

150327

Course Learning/Performance Objectives followed by its enabling learning objectives on separate lines if specified.

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| 1 | <p>Given quality control scenario descriptions, recognize the importance of calibration to quality assurance.</p> <p>Define terms related to calibration.</p> <p>Recognize the relationship between metrology and calibration.</p> <p>Identify reasons for calibration.</p> <p>Recognize the purpose of calibration reviews.</p> |
| 2 | <p>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.</p> <p>Recognize the purpose of a calibration system.</p> <p>Identify required elements of a calibration system.</p> <p>Recognize the methods used for evaluating a supplier's calibration system.</p> <p>Identify common issues related to validating automated calibration systems.</p> |
| 3 | <p>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.</p> <p>Recognize the importance of the calibration standards.</p> <p>Identify calibration requirements included in ISO 17025.</p> <p>Identify calibration requirements included in ISO 10012.</p> <p>Identify calibration requirements included in ANSI/NCSL Z540.</p> |
| 4 | <p>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.</p> <p>Identify laboratory management responsibilities with regard to the Quality Assurance technician ensuring appropriate training for calibration personnel.</p> <p>Identify required qualifications of Quality Assurance technicians performing calibration activities.</p> <p>Identify the minimum requirements for defining Quality Assurance job descriptions of personnel performing calibration activities.</p> |
| 5 | <p>Define the hierarchy of measurement standards.</p> <p>Define the measurement standards: national, primary, reference (secondary), and working.</p> <p>Recognize the purpose of measurement standards.</p> <p>Recognize the role of working standards</p> <p>Define traceability with respect to measurement standards.</p> <p>Recognize the importance of traceability with respect to measurement standards.</p> <p>Recognize the relationship between National Institute of Standards and Technology (NIST) and calibration traceability.</p> <p>Recognize how traceability is maintained.</p> |
| 6 | <p>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</p> <p>Define accuracy and reliability.</p> <p>Recognize the importance of regular calibration.</p> <p>Identify sources of calibration intervals.</p> <p>Recognize the effects of purpose and location of use on calibration intervals for measuring and test equipment (M&TE).</p> <p>Identify the supplier responsibilities in relation to intervals of calibration.</p> <p>Recognize requirements for calibration procedures.</p> |
| 7 | <p>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.</p> <p>Recognize the impact of out of tolerance conditions on M&TE.</p> <p>Recognize the requirements for out-of-tolerance reporting.</p> <p>Identify the procedures for out-of-tolerance reporting.</p> |



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| 8 | 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. |
| | Define measurement uncertainty with respect to calibration. |
| | Define measurement error with respect to calibration measurements. |
| | Recognize the difference between measurement uncertainty and error. |
| | Identify causes of measurement uncertainty. |
| | Identify factors that may contribute to measurement uncertainty and error in different categories of measuring and test equipment. |
| | Recognize the purpose of an uncertainty comparison. |
| 9 | Given standards and calibration records, audit the supplier's calibration records against the standard's requirements. |
| | Identify the purpose of calibration records. |
| | List examples of documents included as part of calibration records. |
| | Identify the standards for keeping calibration records. |
| | Identify the requirements for evidence of calibration status. |
| | Identify the contents of a calibration report. |
| | Recognize the difference between a Certificate of Compliance and a Certificate of Calibration. |
| Identify the information required on a Certificate of Calibration. | |
| 10 | Given calibration scenario descriptions and applicable technical documentation, select the environmental controls required to ensure calibration measurements are accurate. |
| | Identify examples of hand-held mechanical tools requiring calibration. |
| | Identify the key factors that affect calibration of electronic and physical tools. |
| | Identify examples of electronic equipment requiring calibration. |
| | Identify the key factors that affect calibration of electronic equipment. |
| | Identify the effect of various environmental parameters such as humidity, temperature, and electrostatic discharge (ESD) on calibration activities. |
| | Identify environmental condition requirements for test equipment operation and calibration. |
| Recognize reasons for tighter temperature and humidity requirements with respect to calibration. | |