

**THE
CCT PRIMER
SOLUTIONS TEXT**

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WITH A LITTLE HELP FROM MY FRIENDS.

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We would appreciate any comments regarding improvement and errata. It is our concern to be accurate.

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SECTION IV

CALIBRATION SYSTEMS -- TEST QUESTIONS

- 4.1. A calibration customer has requested that a laboratory follow a customer written procedure to carry out the work it has contracted to be done. The laboratory should do this:
- Under all circumstances
 - Unless there's a law against it
 - Unless a National Standard method exists
 - Unless the lab has a better procedure

Solution: As with any quality business, customer requirements take precedence over other considerations except, of course, when there's a law against it. *ISO/IEC 17025* requires that a lab carry out a customer procedure if one is supplied, but the lab is required to notify the customer if it believes the customer's procedure to be incorrect, out of date, or not applicable.

Answer b is correct.

Reference: *CCT Primer*, Section IV - 10.

- 4.2. Items showing on a calibration overdue list are an indication that:
- There are devices past their due date for calibration
 - Management is not aware of the calibration staff shortage
 - The quality management system is significantly broken
 - The laboratory's accreditation should be withdrawn

Solution: Without further investigation the only conclusion that can be drawn is that "There are devices past their due date for calibration." The overdue list may have been the exception, and it is being corrected at the time the list was viewed. However, it may also indicate a major problem such as those shown in the other answer choices, or other root causes.

Answer a is correct.

Reference: *CCT Primer*, Section IV - 35.

- 4.3. Written procedures for all tests and calibrations are:
- Required at all times for all work
 - Required only for accredited tests and calibrations
 - Not required but are commonly used
 - Required for U.S. Military applications only

Solution: Written procedures are not required, even by *ISO/IEC 17025*, the strictest of quality system standards for laboratories. In order to not use a procedure, though, the lab must demonstrate that the work can be done correctly without it. There are many good reasons to always use procedures, but they are not mandatory.

Answer c is correct.

Reference: *CCT Primer*, Section IV - 2.

SECTION IV

CALIBRATION SYSTEMS -- TEST QUESTIONS

- 4.4. A customer has requested that if an instrument passes specifications, no measurement data be included on the calibration certificate. Is this a permissible practice?
- Yes, unconditionally
 - Yes, but the laboratory must retain the data anyway
 - No, data must be provided on all certificates
 - Maybe, data must be provided if the title says "Calibration Certificate" but may be omitted if it says "Calibration Report"

Solution: The only data values that are required to be reported are those that are failures or out of tolerance. Any passing value may be recorded but is not required. The laboratory must retain all measurement data collected in any case but is not required to report passing values on a certificate.

Answer b is correct.

Reference: *CCT Primer*, Section IV - 58.

- 4.5. Under which circumstances should calibration environmental conditions be recorded and reported?
- Only when working in the laboratory
 - Only when working in the field
 - Only when calibrating reference standards to use in future work
 - Under practically all calibration situations

Solution: Recording and reporting of the calibration environment is always a good idea. There are few, if any, calibrations in which the environment does not have an effect. In addition, when working under accreditation, there is a requirement to keep all information necessary to reproduce the conditions under which the work was done.

Answer d is correct.

Reference: *CCT Primer*, Section IV - 14.

- 4.6. Calibration of a high pressure sensor requires cross-floating a reference piston gage (max pressure 10 000 psig or 69 MPa) against a source of 1500 MPa. Is it possible to calibrate this TI, and if so, what is required?
- Yes, extra weights can be added to the piston to increase its range
 - The sensor should not be calibrated at full scale but only to the maximum pressure available
 - Yes, but a pressure divider unit (attenuator) is required
 - It is not possible to calibrate this TI

Solution: An input attenuator or pressure divider is required in order to scale the 1500 MPa source by a known amount. The scaled, lower pressure may then be compared to the reference piston gage at a pressure within its capabilities. The reference attenuator is calibrated as well, so the division of the unknown pressure under test is done by a precisely known ratio.

Answer c is correct.

Reference: *CCT Primer*, Section IV - 8.

SECTION IV

CALIBRATION SYSTEMS -- TEST QUESTIONS

- 4.7. A calibration report should have as many as three addresses or locations listed on it. They are:
- The address of the laboratory, the client's facility, and the location where the TI is used
 - The address of the laboratory, the client's calibration facility, and the location where the TI was calibrated
 - The address of the laboratory, the client's billing office, and the location where the TI was calibrated
 - The address of the laboratory, the client's office, and the location where the TI is used

Solution: Several identifying items are required on calibration certificates. The name and address of the laboratory doing the work is required. The location where the TI was calibrated (address, building, room number... whatever is needed to completely identify the location) is required, and the name of the customer of the work is required. Often, the business or billing address of the customer is included along with the name.

If a laboratory is "in-house" to a factory or other facility, the name and address of the customer is not needed, but the location of the TI is still required.

Answer c is correct.

Reference: *CCT Primer*, Section IV - 55/58.

- 4.8. According to *ISO/IEC 17025*, laboratory managerial personnel must:
- Appoint deputies or alternates for all calibration and testing personnel positions
 - Ensure personnel are free from undue pressures and influences that affect the quality of work
 - Have a member of their staff with the title of quality manager or quality assurance manager
 - Provide for electronic storage and transmission of client test results

Solution: *ISO/IEC 17025* states "have arrangements to ensure that its management and personnel are free from any undue internal and external commercial, financial and other pressures and influences that may adversely affect the quality of their work." Deputies are required for key managerial personnel and not for all calibration and testing positions. A member of staff must be appointed as quality manager (however named), but this person's title does not need to be any specific title. If electronic storage and transmission of test results are used, there must be policies and procedures in place to protect the customer's confidential information. However, it is not required that these be provided in electronic format.

Answer b is correct.

References: *CCT Primer*, Section IV - 23 and *ISO/IEC 17025:2005*.

SECTION IV

CALIBRATION SYSTEMS -- TEST QUESTIONS

- 4.9. A calibration certificate must be identified in some fashion. A requirement for the identification is that:
- It must be in boldface type, at least 12 points high
 - It must be unique
 - It must appear on every page of the report
 - It must somehow include the date of calibration

Solution: The certificate number or other identification must be unique. It must not be possible to have two certificates with the same number. The type style and size is not specified. It usually appears on every page but is not required. The date of calibration is required but it does not have to be part of the certificate number or other identification.

Answer b is correct.

Reference: *CCT Primer*, Section IV - 57.

- 4.10. Calibration intervals for each measuring instrument based upon *ANSI/NCSL Z540.3* are established:
- By the appropriate GIDEP standards
 - By corporate rules and procedures
 - To control the probability of calibrations being out of tolerance
 - At a predetermined time interval

Solution: The interval of calibration of measuring equipment should be established to control the probability of calibrations being out of tolerance at the end of the calibration interval.

Answer c is correct.

References: *CCT Primer*, Section IV - 32. *ANSI/NCSL Z540.3*