



## SAMPLE EXAMINATION

**The purpose of the following sample examination is to present an example of what is provided on exam day by ASQ, complete with the same instructions that are given on exam day.**

**The test questions that appear in this sample examination are retired from the CCT pool and have appeared in past CCT examinations. Since they are now available to the public, they will NOT appear in future CCT examinations. This sample examination WILL NOT be allowed into the exam room.**

**Appendix A contains the answers to the sample test questions. ASQ will not provide scoring and analysis for this sample examination. Remember: These test questions will not appear on future examinations so your performance on this sample examination may not reflect how you perform on the formal examination. A self-appraisal of how well you know the content for the specific areas of the body of knowledge (BOK) can be completed by using the worksheet in Appendix B.**

**On page 2 of the instructions, it states “There are 125 questions on this 4-hour examination.” Please note that this sample exam only contains 35 questions.**

If you have any questions regarding this sample examination, please email [cert@asq.org](mailto:cert@asq.org)

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NAME \_\_\_\_\_

## CERTIFIED CALIBRATION TECHNICIAN

→ Please print your name above. Read all the instructions before beginning the examination. If you are unsure about any part of the instructions, consult your proctor. In order for ASQ to be able to properly scan the Scantron answer sheet you **must** completely fill in the circle. Each circle **must** be filled in dark enough for the scanner to properly pick up the answer you chose. If not this could result in the exam not being scored correctly, or potentially delay your results.

### General Instructions

All answers **must** be recorded on the Scantron Answer Sheet; no exam will be graded with the answers marked in the exam booklet.

1. Using a soft lead pencil (#2 or softer) only, blacken the circle of the correct answer. **Do not use ink.** If you change your answer, be sure to erase the previous answer completely.
2. Each question has **ONE** correct answer only.
3. This is a timed test; do not linger over difficult questions. Instead, skip the questions of which you are unsure; return to them when you reach the end of the test.
4. Do not fold, staple, or tear the answer sheets.
5. Although this is an open book examination and personally generated materials/notes from training or refresher courses **are** allowed, the following conditions apply:
  - Each examinee must make his/her reference materials available to the proctor for review.
  - Absolutely no collections of questions and answers or weekly refresher course quizzes are permitted. Reference sources that contain such copy are not allowed unless the questions and answers are removed or obscured. **Examples of such sources include but are not limited to refresher and preparatory primers.**
  - **Calculator Policy:** With the introduction of palmtop computers and increasing sophistication of scientific calculators, ASQ has become increasingly aware of the need to limit the types of calculators that are permitted for use during the examinations. **Any silent, hand-held, battery-operated calculator WITHOUT an alphabetic keyboard will be permitted; however, all programmable memory must be cleared from the calculator before you enter the exam room.** The examination is written so that a simple calculator will be sufficient to perform calculations.
  - No laptop or palmtop computers are allowed.
  - No Cell Phones are allowed in exam room
  - Reference materials and calculators may not be shared.
6. When you have finished, check your answer sheet to be sure it is properly identified with your name and member number. Return your examination booklet, answer sheet, examinee comment form and scratch paper to your proctor. You must sign the roster sheet to signify the return of your test booklet.
7. It is strictly forbidden to copy or remove examination materials. You will be disqualified from the examination and not certified by ASQ if you breach this trust.
8. **TEST RESULTS** – you can check your test results 7-9 days after the exam date by logging into the [www.asq.org](http://www.asq.org) website and navigating to the Certification webpage. Otherwise, your exam results will be mailed in approximately three weeks. **Please Be Patient** we do not answer telephone requests for results.



## CERTIFIED CALIBRATION TECHNICIAN Test

Directions: Each of the questions or incomplete statements below is followed by four suggested answers or completions. Select the one that is best in each case and then fill in the corresponding space on the answer sheet.

Please note: Throughout the test, “IM&TE” will be used to represent the term *inspection, measurement, and test equipment* and “SI units” will be used to represent *Système International d'unités*. All other abbreviations (e.g., ISO) are expected to be understood by the candidate and are associated with their numeric standard, guideline title, etc.

Number groupings: Numbers having four or more digits will be placed in groups of three, separated by a space instead of a comma, counting both to the left and to the right of the decimal point. This style follows an internationally accepted use of number groupings.

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1. Which of the following documents provides information about the requirements for controlling dust levels?
  - (A) NCSLI RP-1
  - (B) NCSLI RP-7
  - (C) ISO 17025
  - (D) ISO 17011
2. Hertz is a measure of
  - (A) electronic conductance
  - (B) time
  - (C) magnetic flux
  - (D) frequency
3. Which of the following is the SI unit of force?
  - (A) Meter
  - (B) Second
  - (C) Ampere
  - (D) Newton
4. Which of the following is the best definition of a flowchart?
  - (A) A diagram used to structure ideas into useful categories
  - (B) An illustration used to analyze variation in a process
  - (C) A picture used to separate steps of a process in sequential order
  - (D) An analytical tool used to clarify opposing aspects of a desired change
5. The binary number 1010 is equal to which of the following decimal numbers?
  - (A) 505
  - (B) 101
  - (C) 10
  - (D) 5
6. At what degree latitude at sea level is acceleration due to gravity approximately  $980 \text{ cm/s}^2$ ?
  - (A)  $0^\circ$
  - (B)  $20^\circ$
  - (C)  $40^\circ$
  - (D)  $90^\circ$
7. What is the result when 1 milliamp is multiplied by 1 kohm?
  - (A) 1 volt
  - (B) 1 millivolt
  - (C) 1 microvolt
  - (D) 1 nanovolt
8. In preparation for construction of a cause and effect diagram, it is important to
  - (A) plot separate charts for each source
  - (B) focus only on what makes things go wrong
  - (C) record everything people suggest
  - (D) validate possible root causes

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9. Which of the following methods is used to calculate expanded uncertainty?
- (A) Dividing the combined standard uncertainty by the coverage factor
  - (B) Multiplying the combined standard uncertainty by the coverage factor
  - (C) Summing the combined standard uncertainty and the coverage factor
  - (D) Subtracting the coverage factor from the combined standard uncertainty
10. A calibration laboratory must maintain proper control of its environment in order to
- (A) facilitate proper performance of calibrations
  - (B) ensure peak performance of the test instruments
  - (C) control humidity to be less than 20%
  - (D) maintain a temperature of  $72 \pm 1$  degree Fahrenheit
11. Which of the following documents contains specific information about uncertainties, temperature and humidity at the time of calibration, and the address where the calibration was performed?
- (A) Quality manual
  - (B) Calibration certificate
  - (C) Calibration sticker
  - (D) Quality report
12. Which of the following is another expression for 9 876 543 ohms?
- (A) 9.876 543 Mohms
  - (B) 9 876.543 mohms
  - (C) 9.88 E+6 Mohms
  - (D) 9.88 E+3 ohms
13. A  $240^\circ$  angle is equal to how many radians?
- (A)  $13.750\ 987 \times 10^3$
  - (B) 4.188 790
  - (C) 2.356 194
  - (D) 0.424 413
14. Which of the following standards is used by agreement between contracting parties when a national standard is not available?
- (A) Consensus
  - (B) Reference
  - (C) Transfer
  - (D) Intrinsic
15. The extent to which an instrument replicates its result when measurements are taken repeatedly on the same unit is called
- (A) real bias
  - (B) precision
  - (C) accuracy
  - (D) true value
16. For a normal distribution, two standard deviations on each side of the mean would include what percentage of the total population?
- (A) 47%
  - (B) 68%
  - (C) 95%
  - (D) 99%

17. Process audits serve which of the following functions?
- (A) To identify low performing employees
  - (B) To ensure standardized quality practices
  - (C) To develop corrective actions
  - (D) To find non-compliant products
18. Candela is a measure of an object's
- (A) ambient temperature
  - (B) amount of substance
  - (C) amount of mass
  - (D) luminous intensity
19. The smallest incremental value that can be generated, modified, measured, or displayed is known as the measurement
- (A) parameter
  - (B) precision
  - (C) repeatability
  - (D) resolution
20. Which of the following has the strongest influence on the variation of air density?
- (A) Electromagnetic inference
  - (B) Humidity
  - (C) Mass
  - (D) Volume
21. Which of the following measures is a sufficient statistic for the parameter  $\mu$  ?
- (A) Median
  - (B) Mid-range
  - (C) Mean
  - (D) Mode
22. Assuming a rectangular distribution, which of the following is the result of converting an instrument specification of  $\pm 0.15\%$  to a standard uncertainty?
- (A) 0.061 2%
  - (B) 0.086 6%
  - (C) 0.106 1%
  - (D) 0.300 0%
23. A 250 psi pressure gage has a specification of  $\pm(0.5\%$  of reading +  $1\%$  of full scale). What is the allowable error for this gage when used at 78 psi?
- (A)  $\pm 0.64$  psi
  - (B)  $\pm 1.17$  psi
  - (C)  $\pm 2.89$  psi
  - (D)  $\pm 6.40$  psi
24. The excessive use of force is a form of what type of error?
- (A) Drift
  - (B) Manipulative
  - (C) Observational
  - (D) Environmental
25. If a technician is checking a micrometer against a gage block, which of the following measurement methods is being used?
- (A) Direct only
  - (B) Transfer only
  - (C) Differential only
  - (D) A combination of direct and indirect

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26. Which of the following instruments is used to measure ambient dust levels?
- (A) Air velocity meter
  - (B) Air quality meter
  - (C) Optical particle counter
  - (D) Optical air data sensor
27. An interlaboratory comparison program can be used for which of the following purposes?
- (A) Create a data collection procedure for the laboratory
  - (B) Establish intervals for monitoring measurement equipment
  - (C) Assess a laboratory's ability to perform tests competently
  - (D) Audit the laboratory's testing capability processes
28. One amp applied for one second will result in one
- (A) volt
  - (B) watt
  - (C) siemen
  - (D) coulomb
29. Before alternate test equipment can be used for a calibration, the test equipment must meet which of the following requirements?
- (A) Full scale accuracy
  - (B) Random measurement uncertainty
  - (C) Minimum use specification
  - (D) Linearity
30. Which of the following must be known in order to have confidence in a measurement result?
- (A) The average of the measurand
  - (B) The measurement bias and mean
  - (C) The measurement error and uncertainty
  - (D) The standard deviation of nominal
31. A unit has just been returned from a third-party calibration laboratory, and a technician has been asked to evaluate the unit prior to placing it back in service. During the evaluation, the technician discovers that the unit does not conform to the company's specifications. What should the technician do first?
- (A) Write a corrective action.
  - (B) Identify and segregate the unit.
  - (C) Alert the supervisor to the problem.
  - (D) Disposition the unit as "Return to Vendor."
32. The following is a sample data set.
- 10 8 8 6 5
- What is the variance of this data set?
- (A) 3.0
  - (B) 3.8
  - (C) 7.3
  - (D) 7.4
33. A calibration procedure lists the required standard plus the phrase "or equivalent." In this situation, which of the following is true about the equivalent standard in relation to the required standard?
- (A) It is made by the same manufacturer.
  - (B) It has the same or later due date.
  - (C) It has the same or lower uncertainty.
  - (D) It has the same function and range.

34. A voltmeter is calibrated using a reliable and recently calibrated multifunction calibrator. The voltmeter produced the following final data.

<u>Standard</u>	<u>TI Indication</u>
0.0000 VDC	0.00 VDC
1.0000 VDC	1.02 VDC
2.0000 VDC	2.04 VDC
3.0000 VDC	3.06 VDC
4.0000 VDC	4.08 VDC
4.9000 VDC	4.99 VDC

These results indicate an error in

- (A) span
- (B) bias
- (C) offset
- (D) input

35. Which of the following measurement methods uses an algebraic sum to derive measurement data?

- (A) Transfer
- (B) Direct
- (C) Indirect
- (D) Differential

**END OF EXAM**

**IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY GO BACK AND CHECK YOUR WORK ON THIS TEST.**

**APPENDIX A: Answer Sheet**

For each sample test question, the correct answer is provided below along with the area of the body of knowledge (BOK) that the item is classified to. This sample examination is not intended to represent all areas of the BOK but to provide a sampling from each major topic area. All ASQ examinations are based on the BOK for that particular exam. To view the BOK for CCT, please go to <http://www.asq.org/certification/calibration-technician/bok.html>

Question	BOK	Correct Answer
1	III.D.2	B
2	I.B.7	D
3	I.E.5	D
4	V.B.2	C
5	IV.D.6	C
6	I.D.2	C
7	I.C.	A
8	V.B.1	C
9	IV.C.1	B
10	III.D.5	A
11	III.H.	B
12	I.C.	A
13	IV.A.8	B
14	I.G.6	A
15	II.B.3	B
16	IV.C.	C
17	V.C.1	B
18	I.A.6	D
19	II.B.3	D
20	III.D.1	B

Question	BOK	Correct Answer
21	IV.C.	C
22	IV.B..3	B
23	II.D.	C
24	II.E.3	B
25	II.A.1	A
26	III.D.2	C
27	II.F.1	C
28	I.B.6	D
29	III.A.1	C
30	IV.B.1	C
31	V.D.1	B
32	IV.C.	B
33	I.H.	C
34	III.B.	A
35	II.A.	D

**APPENDIX B: Analyzing Body of Knowledge (BOK) Content**

The following worksheet can be used to help you analyze the results of your answers on this sample examination. It can be used to determine which areas of the body of knowledge (BOK) you may want to study.

After learning which sample test questions you had correct, total the number you had correct and enter that number into the 2<sup>nd</sup> column of the worksheet. The 3<sup>rd</sup> column provides the total number of test questions that are in this sample examination for that major area of the BOK. The last column provides the total number of test questions that appear in a formal ASQ examination for that area of the BOK.

<b>BOK Topic Area</b>	<b>Total You Had Correct on Sample Exam</b>	<b>Total in the Sample Exam</b>	<b>Total in Formal ASQ Exam</b>
I. General Metrology		9	<i>30</i>
II. Measurement Systems		7	<i>25</i>
III. Calibration Systems		7	<i>25</i>
IV. Applied Mathematics and Statistics		5	<i>20</i>
V. Quality Systems and Standards		4	<i>15</i>
VI. Uncertainty		3	<i>10</i>
<b>GRAND TOTAL</b>		<b>35</b>	<b><i>125</i></b>