



SAMPLE EXAMINATION

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

The test questions that appear in this sample examination are retired from the CQE pool and have appeared in past CQE examinations. Since they are now available to the public, they will NOT appear in future CQE 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 160 questions on this 5-hour examination.” Please note that this sample exam only contains 75 questions.

If you have any questions regarding this sample examination, please email coneill@asq.org

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NAME _____

CERTIFIED QUALITY ENGINEER

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.

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.
 - 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. **PLEASE BE PATIENT** - you will receive your results in approximately two weeks. Sorry, but we do not answer telephone requests for results. If you pass, your certificate will be sent directly to your address of record. If you do not pass, you will receive a Pareto analysis of your test results along with retake information.

CERTIFIED QUALITY ENGINEER Test

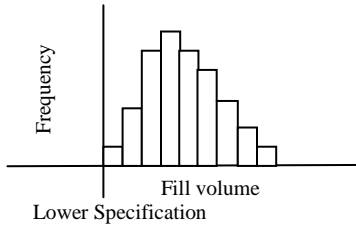
Directions: Each of the questions or incomplete statements below is followed by four suggested answers or completions. Select the one that is best in each case and then fill in the corresponding space on the answer sheet.

1. Which of the following techniques is most appropriate for generating continuous improvement ideas?
 - (A) Tree diagram
 - (B) Brainstorming
 - (C) Prioritization matrix
 - (D) Interrelationship digraph
2. A randomly drawn sample used to determine whether a defined inspection lot conforms to requirements is known as
 - (A) an acceptance sample
 - (B) a statistical process control sample
 - (C) a process validation sample
 - (D) a measurement system correlation sample
3. Which of the following tools is used extensively in quality function deployment (QFD)?
 - (A) Affinity diagram
 - (B) Matrix diagram
 - (C) Cause and effect diagram
 - (D) Activity network diagram
4. Which of the following affects system availability?
 - (A) FMECA
 - (B) Maintainability
 - (C) Producibility
 - (D) LTPD
5. The ISO 9001 standard is best described as the
 - (A) guidelines for developing quality manuals
 - (B) guidelines for auditing quality systems
 - (C) quality assurance requirements for measuring equipment
 - (D) quality management systems requirements
6. For consumer products, an increase in the percentage of returned goods most likely equates to an increase in
 - (A) products not meeting specifications
 - (B) end-user dissatisfaction
 - (C) internal reject rates
 - (D) nonconforming material costs
7. On a drawing, the maximum permissible variation of form, orientation, or location of a feature is known as the
 - (A) benchmark value
 - (B) tolerance bias
 - (C) geometric tolerance
 - (D) isometric tolerance
8. The primary advantage to using double sampling rather than single sampling is that double sampling
 - (A) gives the lot a second chance to be rejected
 - (B) provides more protection to the customer
 - (C) improves the likelihood of accepting the lot when it is of average quality
 - (D) requires a smaller number of total samples when quality is very good or very bad

CQE-SAMPLE EXAM

9. What is the standard deviation of a process that operates according to an exponential distribution with a mean of 25 units?
- (A) 0.4
 - (B) 5.0
 - (C) 12.5
 - (D) 25.0
10. Which of the following tools is most likely to be used to organize a list of ideas generated during a brainstorming session?
- (A) Activity network diagram
 - (B) Affinity diagram
 - (C) Histogram
 - (D) Process control chart
11. Which of the following tools would be most appropriate for collecting data to study the symptoms of a problem?
- (A) A check sheet
 - (B) A flow diagram
 - (C) A force field analysis
 - (D) An activity network diagram
12. In a third-party audit, the lead auditor is responsible for distributing the audit report to the
- (A) audit team
 - (B) auditee
 - (C) client
 - (D) department managers
13. An effective method of evaluating a supplier's quality performance is to
- (A) analyze all relevant historical quality data
 - (B) review historical data from receiving inspection only
 - (C) conduct a compliance audit
 - (D) survey a selected customer group
14. The purpose of work instructions is to
- (A) specify how a job should be done
 - (B) prescribe production rates and yields
 - (C) provide documentation that leads to automation
 - (D) quantify the engineering requirements
15. Kaizen is defined as
- (A) re-engineering
 - (B) lean manufacturing
 - (C) continuous improvement
 - (D) error-proofing
16. When preparing for an audit, which of the following steps should the auditor perform first?
- (A) Notify the auditee of the dates of the audit
 - (B) Determine which team members will be performing the audit
 - (C) Determine the purpose of the audit
 - (D) Obtain copies of the auditee's quality documents and procedures
17. Which of the following are the fundamental units of the International System (SI) that are used as a basis for primary reference standards?
- (A) Watt, volt, ampere, light candles, mole, Kelvin, hertz
 - (B) Meter, kilogram, second, Kelvin, ampere, candela, mole
 - (C) Ampere, cubic foot, watt, mole, Angstrom, electron, meter
 - (D) Primary, secondary, tertiary, transfer, working, master, reference

18. Legal requirements specify that a bottled product must contain no less than the volume printed on the label. A bottling company wants to reduce the amount of overfilled bottles.



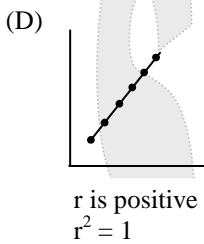
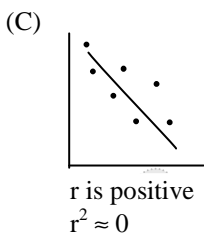
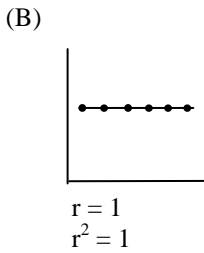
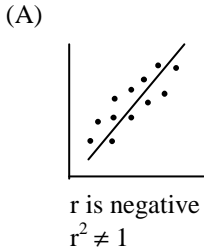
On the basis of the data above, what is the most effective strategy to accomplish this task?

- (A) Decrease the target fill volume only
 (B) Decrease the target fill variation only
 (C) First decrease the target fill volume, then decrease the target fill variation
 (D) First decrease the target fill variation, then decrease the target fill volume
19. According to Juran, when a major quality improvement project is launched, which of the following describes the desired change in performance level?
- (A) Six sigma
 (B) Continuous
 (C) Breakthrough
 (D) Sporadic
20. The LEAST informative of the four measurement scales is the
- (A) ratio
 (B) nominal
 (C) ordinal
 (D) interval
21. Which of the following can be used to determine the goodness-of-fit of a distribution to a data set?
- (A) t test
 (B) ANOVA
 (C) F test
 (D) Chi square test
22. When $\sigma = 10$, what sample size is needed to specify a 95% confidence interval of ± 3 units for the mean?
- (A) 7
 (B) 11
 (C) 32
 (D) 43
23. Which of the following statements is true about a regression model with $b_0 = -300$, $b_1 = 0.00$, and $n = 5$?
- (A) No relationship exists between x and y .
 (B) x and y are positively correlated.
 (C) x and y are negatively correlated.
 (D) The standard error of the estimate is high.
24. In a sampling situation, the population contains a finite number of items, each of which is classified as either good or bad. When the sampling is without replacement, the probability distribution that best models this situation is
- (A) negative binomial
 (B) binomial
 (C) hypergeometric
 (D) geometric
25. Which of the following best describes a design validation?
- (A) It takes place periodically throughout the design development process.
 (B) It matches design output to input requirements.
 (C) It ensures the product conforms to defined user needs or requirements.
 (D) It is the final technical document used throughout the process.

26. Which of the following tools is NOT used to compare process performance to specifications?

- (A) Frequency distribution histogram
- (B) Process flowchart
- (C) Control charts for individuals
- (D) Probability paper

27. Which of the following figures is labeled correctly?



28. The time for a fail-safe device to trip is thought to follow a discrete uniform distribution from 1 to 5 seconds. To test this hypothesis, 100 tests are conducted with results as shown below.

Trip time seconds (j)	Actual (O _j)	Theoretical (E _j)	(O _j -E _j) ²	
1	10	20	100	
2	15	20	25	
3	50	20	900	
4	15	20	25	
5	10	20	100	
	100	100		$\chi^2 = \underline{\hspace{2cm}}$ df = $\underline{\hspace{2cm}}$

On the basis of these data, what are the chi-square (χ^2) value and the number of degrees of freedom (df)?

	χ^2	df
(A)	57.5	4
(B)	57.5	5
(C)	1,150.0	4
(D)	1,150.0	5

29. Generally, which of the following statements is true about the Student's t distribution and the normal z distribution?

- (A) t has the same degrees of freedom as z.
- (B) t is more peaked (smaller variance) than z.
- (C) t is used instead of z when sample sizes are large.
- (D) t is used instead of z when sample sizes are small.

30. Which of the following is an example of a breach of the ASQ Code of Ethics?

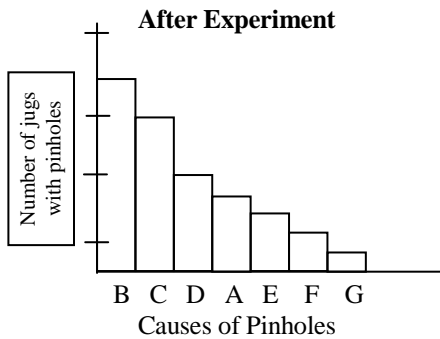
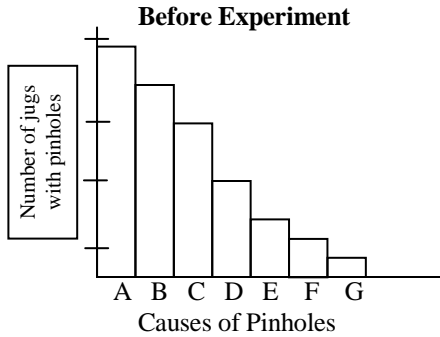
- (A) Publishing a report to management citing a coworker's work
- (B) Accepting a dinner at an expensive restaurant from a supplier
- (C) Accepting compensation from two consenting parties for the same service
- (D) Providing one supplier with process information gained from another supplier

31. A process capability analysis is NOT used to
- (A) determine the ability of a process to meet specifications
 - (B) maintain a process in a state of statistical control
 - (C) establish new specifications
 - (D) prioritize competing processes
32. Who is responsible for identifying and reporting the occurrence of nonconforming product?
- (A) Quality engineering
 - (B) Inspection personnel
 - (C) Manufacturing management
 - (D) Any employee
33. Training, control of purchased material, and process control are all elements of
- (A) implementing a quality system
 - (B) identifying performance measurements
 - (C) performing process analysis
 - (D) initiating document control
34. For an F-test to be inferentially valid, all of the following assumptions must be true EXCEPT the
- (A) populations are discrete distributions
 - (B) samples are independent
 - (C) populations are normally distributed
 - (D) samples are randomly selected from the population
35. All of the following are potential benefits of using short-run SPC methods EXCEPT
- (A) significantly fewer charts need to be maintained
 - (B) control methods are focused on the product rather than the process
 - (C) process variability improvements affect many parts rather than just one
 - (D) process control is continuous
36. Taguchi defines loss as a function of which of the following?
- (A) Manufacturing cost and product reliability
 - (B) Frequency of out-of-control occurrences
 - (C) Product maintainability and availability
 - (D) Variability and deviation from target
37. A type of line graph used to assess the stability of a process is called a
- (A) control chart
 - (B) Pareto chart
 - (C) check sheet
 - (D) cause and effect diagram
38. A process produces nonconformities according to a Poisson distribution. If the mean of the nonconformities is 25, what is the standard deviation?
- (A) 2.5
 - (B) 5.0
 - (C) 12.5
 - (D) 25.0
39. A number of units were returned from a customer because they did not work as advertised. To start an investigation for root cause, the supplier should use which of the following techniques?
- (A) Reliability prediction
 - (B) Burn-in testing
 - (C) Stress analysis
 - (D) Failure analysis
40. Five six-sided dice are rolled together 100 times. Two histograms are constructed: one for the 500 individual results and one for the 100 averages of five results. In this situation, the individual results follow a uniform distribution, while the averages follow which of the following distributions?
- (A) Normal
 - (B) Student's t
 - (C) Binomial
 - (D) Uniform

CQE-SAMPLE EXAM

41. Which of the following is necessary when a complete quality cost system is implemented?
- (A) Cost data are presented in broad categories.
 - (B) The quality department solely maintains the system.
 - (C) Top management supports the system.
 - (D) Implementation occurs simultaneously company-wide.
42. A calibrated micrometer was used to take 10 replicated measures of a reference standard. If $\bar{X}_m = 0.073$, and the true value of the reference standard is 0.075, what is the bias of the micrometer?
- (A) 0.001
 - (B) 0.002
 - (C) 0.073
 - (D) 0.075
43. The three types of audits that are commonly used to evaluate a supplier are
- (A) receiving, work in process, and finished goods
 - (B) design, development, and manufacture
 - (C) material control, documentation control, and manufacturing control
 - (D) program, product, and process
44. The power of a test for the difference between means is measured by
- (A) α
 - (B) $1 - \alpha$
 - (C) β
 - (D) $1 - \beta$
45. A document giving authorization to use product that does not conform to specified requirements is called a
- (A) contract
 - (B) waiver
 - (C) requisition order
 - (D) scrap report
46. Which of the following refers to the process of comparing one standard against a higher-order standard of greater accuracy?
- (A) Calibration
 - (B) Inspection
 - (C) Validation
 - (D) Correction
47. A process is stable and its output is normally distributed. The process has a specification of 16.73 ± 0.01 . What is the maximum process standard deviation if the C_p must be ≥ 1.5 ?
- (A) 0.0011
 - (B) 0.0022
 - (C) 0.0041
 - (D) 0.0133
48. A registration quality audit report should provide executive management with information related to
- (A) conformance and effectiveness of the quality system
 - (B) persons responsible for any deficiencies
 - (C) details of audit findings and corrective actions
 - (D) recommendations to correct deficiencies
49. Which of the following types of charts is based directly on specification limits?
- (A) Cusum
 - (B) PRE-control
 - (C) \bar{X} and mR
 - (D) \bar{X} and R
50. As a general rule, the resolution of measuring equipment should be how many times greater than the product's tolerance?
- (A) Two
 - (B) Five
 - (C) Ten
 - (D) Twenty

51. A quality improvement team that was assigned to decrease the number of pinholes in milk jugs presented the following Pareto diagrams during a management briefing.



The best interpretation of these data is that the project was

- (A) not successful in reducing pinholes, since causes B, C, and D now occur more frequently than cause A
- (B) successful in removing the primary cause of pinholes, and no further improvements are necessary
- (C) successful, and tracking pinholes by cause A is no longer necessary
- (D) successful in decreasing pinholes, and the team should work on cause B to further improve the process

52. Rank order, from first to last, the following steps in a structured procedure for troubleshooting.

1. State the nonconformity.
2. Reduce or eliminate the nonconformity.
3. Test the possible causes.
4. Identify the unique characteristics of the deviation.

- (A) 1, 2, 3, 4
- (B) 1, 4, 3, 2
- (C) 2, 4, 3, 1
- (D) 3, 4, 1, 2

53. When sample size is increased, the operating characteristic curve will

- (A) steepen
- (B) flatten
- (C) remain unchanged
- (D) reduce discrimination

54. What is the predicted value for a regression model when $x = 36$, $b_0 = -16$, and $b_1 = 2.6$?

- (A) 28.1
- (B) 52.0
- (C) 77.6
- (D) 93.6

55. The main advantage of a matrix diagram is that it
- (A) displays all the possible causes related to a problem
 - (B) displays the strength of relationships between each paired combination of variables
 - (C) identifies, analyzes, and classifies the cause and effect relationships that exist among all critical issues
 - (D) identifies a sequence of actions and materials entering a process
56. Poka-yoke is best defined as
- (A) improving machine efficiency
 - (B) reducing field failures to virtually zero
 - (C) capturing the voice of the customer
 - (D) preventing controllable defects
57. “Forming, storming, norming, and performing” are terms that describe
- (A) process variation reduction and improvement phases
 - (B) brainstorming process steps
 - (C) stages of team growth
 - (D) root cause identification and corrective action

Questions 58-59 refer to the following situation.

A quality engineer for the Acme Company is assigned to perform a pre-award survey on the XYZ Company, a prospective new supplier of a critical component for Acme’s best-selling product. Before the audit, the engineer collects data on XYZ and its products and processes by reviewing the “Pre-audit Questionnaire” completed by XYZ staff. The engineer also reviews the specifications and testing requirements for the component. Testing is destructive.

58. Which of the following activities does NOT occur during this phase of the pre-award survey?
- (A) Determine the scope
 - (B) Arrange the logistics
 - (C) Develop the audit plan
 - (D) Negotiate the contract
59. Which of the following terms best describes this phase of the pre-award survey?
- (A) Planning
 - (B) Field work
 - (C) Check list
 - (D) Closure

SAMPLE EXAM

60. The percent defective that is considered unsatisfactory but which the consumer is willing to accept with a small probability of acceptance is known as the
- (A) AOQ
 - (B) AOQL
 - (C) AQL
 - (D) LTPD
61. During the random failure period on the bathtub curve, the failure rate is
- (A) increasing
 - (B) fluctuating
 - (C) decreasing
 - (D) constant
62. The failure of any organization's quality improvement efforts is most frequently caused by the
- (A) inability to manufacture product cost effectively and meet market demands
 - (B) selection of initial objectives and projects that are too complex and have a high probability of failure
 - (C) use of an improvement strategy that fits poorly with the processes and culture of the organization
 - (D) lack of involvement by top and middle management in the improvement effort
63. Which of the following are needed to calculate the process capability index, C_p ?
- (A) The specification limits and the mean
 - (B) The specification limits and $\hat{\sigma}$
 - (C) The process mean and $\hat{\sigma}$
 - (D) The upper and lower specification limits
64. At what point in the design/production process should a critical components list be initiated?
- (A) Early in the design effort
 - (B) As soon as the design is firmly established
 - (C) Before prototype testing starts
 - (D) Just before production starts
65. Repeatability and reproducibility are terms that operationally define
- (A) bias
 - (B) accuracy
 - (C) discrimination
 - (D) precision
66. A method that classifies data without significantly reducing accuracy or precision is known as
- (A) bias adjustment
 - (B) statistical efficiency
 - (C) blocking
 - (D) coding
67. Which of the following best describes two of the basic responsibilities of the material review board (MRB)?
- (A) Assuring that effective action is taken to prevent future occurrences of a problem and positioning nonconforming materials
 - (B) Assuring that effective action is taken to prevent future occurrences of a problem and addressing customer complaints
 - (C) Positioning nonconforming materials and addressing customer complaints
 - (D) Determining the source of a nonconformance and investigating its root cause

68. When a team consists of five quality engineers and eight manufacturing engineers, how many unique meetings could be held consisting of one quality engineer and two manufacturing engineers?
- (A) 40
(B) 80
(C) 140
(D) 280
69. When collecting samples of perishable goods, a quality engineer should consider all of the following EXCEPT
- (A) maximum holding time of samples for accurate analytical results
(B) necessary handling procedures
(C) special preservation conditions or techniques
(D) calibration intervals of test equipment
70. A quality plan should define and document which of the following?
- (A) How the process flow will add value to the manufacturing steps
(B) The indices for determining quality costs
(C) The approval status and selection criteria for suppliers and subcontractors
(D) How the requirements for quality will be met
71. The facilitator for a quality improvement team should have which of the following characteristics?
- (A) Previous experience in the process, procedures, controls, and job instructions being investigated by the team
(B) Previous experience as a consultant from outside the company
(C) An in-depth understanding of process improvement tools and experience in implementing them
(D) The authority to resolve team impasses
72. If a process has a variance of 4 units and a specification of 96 ± 4 , what is the process performance index (P_p)?
- (A) 0.33
(B) 0.66
(C) 1.00
(D) 1.50
73. The person or group responsible for implementing corrective action as a result of an audit is the
- (A) auditee
(B) auditor
(C) client
(D) auditor's management
74. The main purpose of segregating nonconforming material is to
- (A) provide for its rework
(B) identify root causes of nonconformances
(C) prevent investment of additional time and labor
(D) prevent its incorporation with good material
75. An important aspect of data collection is that the data collector should
- (A) know how the data are to be used
(B) use a stratified sampling plan
(C) use a control chart to analyze the data
(D) determine the dispersion of the data

STOP.

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 CQE, please go to <http://www.asq.org/certification/quality-engineer/bok.html>

Question	BOK	Correct Answer
1	V.C.	B
2	IV.C.1	A
3	V.B.4	B
4	III.E.2	B
5	II.C.	D
6	I.G.	B
7	III.C.	C
8	IV.C.2	D
9	VI.C.1	D
10	V.B.1	B
11	VI.A.3	A
12	II.D.2	C
13	I.H.	A
14	II.B.	A
15	V.C.	C
16	II.D.3	C
17	IV.E.	B
18	VI.A.7	D
19	I.A.	C
20	VI.A.2	B
21	VI.D.4	D
22	VI.D.1	D
23	VI.E.1	A
24	VI.C.2	C
25	III.D.	C
26	VI.G.2	B
27	VI.E.2	D
28	VI.D.4	A
29	VI.C.1	D
30	I.C.	D
31	VI.G.1	B
32	IV.B.1	D
33	II.A.	A
34	VI.B.2	A
35	VI.F.8	B
36	I.A.	D
37	V.A.4	A
38	VI.C.2	B

Question	BOK	Correct Answer
39	III.E.4	D
40	VI.A.5	A
41	II.E.	C
42	IV.F.	B
43	II.D.1	D
44	VI.D.2	D
45	IV.B.4	B
46	IV.E.	A
47	VI.G.3	B
48	II.D.4	A
49	VI.F.7	B
50	IV.D.1	C
51	V.A.2	D
52	V.D.	B
53	IV.C.1	A
54	VI.E.1	C
55	V.B.4	B
56	V.E.	D
57	I.E.	C
58	I.H.	D
59	I.H.	A
60	IV.C.1	D
61	III.E.3	D
62	II.	D
63	VI.G.3	B
64	III.B.	A
65	IV.F.	D
66	VI.A.4	D
67	IV.B.4	A
68	VI.B.3	C
69	IV.C.3	D
70	II.A.	D
71	I.E.	C
72	VI.G.4	B
73	II.D.2	A
74	IV.B.2	D
75	VI.A.3	A

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 2nd column of the worksheet. The 3rd 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.

2006 BOK Topic Area	Total You Had Correct on Sample Exam	Total in the Sample Exam	Total in Formal ASQ Exam
I. Management and Leadership		10	<i>15</i>
II. The Quality System		10	<i>15</i>
III. Product and Process Design		6	<i>25</i>
IV. Product and Process Control		14	<i>32</i>
V. Continuous Improvement		9	<i>30</i>
VI. Quantitative Methods and Tools		26	<i>43</i>
GRAND TOTAL		75	<i>160</i>