CQPA BOK Map 2005 – 2013

The Certified Quality Process Analyst (CQPA) body of knowledge (BOK) has been updated to ensure that the most current state of practice is being tested in the examination. If you would like more information on how a BOK is updated, see a description of the process on page 4 in the Certification Handbook (PDF – 228 KB) on the www.asq.org website.

Part of the updating process is to conduct a content validation survey to determine whether the topics in the 2005 BOK are still relevant to the role of quality process analysts and to identify any new topics that have emerged since that BOK was developed. The results of the CQPA content validation survey showed that most of the topics that were in the 2005 BOK are still relevant to quality process analysts in 2013. The major changes to the BOK were:

- The topic of **PRE-control** *failed* meet the validation threshold to be included in the new BOK (see page 6).
- The topic of **six sigma** was added to the new BOK (see page 4.)
- The topic of **corrective and preventive action (CAPA)** was moved from BOK IV to become its own area as BOK V.
- By moving **CAPA** from a topic level to its own area, the BOK areas in the exam increased from four to five.
- **Style change for "gage":** The new BOK and exam will reflect the more contemporary spelling of 'gauge' rather than 'gage,' except for the phrases "gage blocks" and "pin gage," since the manufacturers of these tools still use the spelling 'gage.'

The 2013 BOK will be implemented at the December 7, 2013 administration. The 2005 BOK will continue to be available online until that date, after which it will be removed from the website.

General comments about ASQ Body of Knowledge updates

When the Body of Knowledge (BOK) is updated for an ASQ exam, the majority of the material covered in the BOK remains the same. There are very few programs that change dramatically over a 5-year period. One of the points that we make to all of the exam development committees is that ASQ Certification Exams need to reflect "the state of the practice" not "the state of the art." This helps to keep the examinations grounded in what people currently do, rather than being driven by the latest hot-topic improvement idea or trend. Typically, the biggest change in any updated BOK is in how the content is organized. When a new BOK is announced and posted on the ASQ website, we also include this "BOK Map" to highlight the changes between the old and new bodies of knowledge. Any new content that has been added to the BOK is clearly identified; as is any topics that have been removed. Movement of topics and subtopics is also shown on the BOK map.

With regard to exam preparation materials, you should be able to use any of the reference books that are currently listed on the bibliography for the exam program. These source materials are what the exam development committees use to write questions and verify the correct answers.

2005 BOK	**2013 BOK Details**	New Elements in **2013** BOK
	I. Quality Concepts and Tools (22 Questions)	**Decreased by 2 questions**
1B	**A. Quality concepts** 1. Quality planning Define a quality plan, describe its purpose for the organization as a whole, and know who has responsibility for contributing to its development. (Understand)	
1D	2. Quality standards, requirements, and specifications Define and distinguish between national or international standards, customer requirements, and product or process specifications. (Understand)	
1C	3. Cost of quality (COQ) Define and describe the four basic cost of quality categories: prevention, appraisal, internal failure, external failure. (Understand)	
1E	4. Quality documentation Identify and describe common elements of various document control systems, including configuration management, and describe the relationship between quality manuals, procedures, and work instructions. (Understand)	
1F1	**B. Quality audits** 1. Audit types Define and distinguish between basic audit types, including internal and external audits, product, process, and systems audits, and first-, second-, and third-party audits. (Understand)	Expanded the list of terms used to describe audit types
1F2	2. Audit components Identify various elements of the audit process, including audit purpose and scope, the standard to audit against, audit planning (preparation) and performance, opening and closing meetings, final audit report, and verification of corrective actions. (Understand)	Revised title from ‘process’ to ‘components’; expanded subtext to include final audit report and verification of corrective actions
1F3	3. Audit roles and responsibilities Identify and describe the roles and responsibilities of key audit participants: lead auditor, audit team member, client, and auditee. (Understand)	

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2A1	**C. Quality tools** Select, construct, apply, and interpret the seven basic quality tools: 1) cause and effect diagrams, 2) flowcharts (process maps), 3) check sheets, 4) Pareto charts, 5) scatter diagrams, 6) control charts, and 7) histograms. (Evaluate)	
1G1	**D. Team dynamics** 1. Types of teams Distinguish between various types of teams: process improvement teams, workgroups/ workcells, self-managed teams, temporary/ad hoc project teams, and cross-functional teams. (Analyze)	Changed title from "Teams"
1G2	2. Team-building techniques Identify various elements in team-building such as inviting team members to share information about themselves during the initial meeting, using ice-breaker activities to enhance team membership, and developing a common vision and agreement on team objectives. (Apply)	
1G3	3. Team roles and responsibilities Describe the roles and responsibilities of various team stakeholders: sponsor, champion, facilitator, team leader, team member. (Understand)	Moved 'conflict' to its own subtopic
1G3	4. Team conflict Identify common group challenges, including members with hidden agendas, intentional distractions, and other disruptive behaviors. Describe ways of resolving these issues and keeping team members on task. (Understand)	Separated 'conflict' from team roles
1H	5. Training and evaluation Describe various elements of training, including linking the training to organizational goals, identifying training needs, adapting information to meet adult learning styles, and using coaching and peer training methods. Use various tools to measure the effectiveness of the training, including post-training feedback, end-of-course tests, and individual and department performance improvements measures. (Understand)	Reduced from a topic level to a subtopic level
1A1	**E. Professional conduct and ethics** Identify and apply behaviors that are aligned with the ASQ Code of Ethics. (Apply)	

2005 BOK	2013 BOK Details	New Elements in 2013 BOK
	II. Problem Solving and Improvement (22 Questions)	**Decreased by 1 question**
2B	**A. Continuous improvement models** Define and explain elements of Plan-Do-Check-Act (PDCA), kaizen, and incremental and breakthrough improvement. (Apply)	
–	**B. Process improvement techniques** 1. Six Sigma Identify key six sigma concepts and tools, including green belt and black belt roles and responsibilities, project types and processes used, and six sigma DMAIC phases, design, measure, analyze, improve, and sustaining control. (Understand)	New subtopic
2F	1. Lean Identify and apply lean tools and processes, including set-up reduction (SUR), pull (including just-in-time (JIT) and kanban), 5S, continuous flow manufacturing (CFM), value stream, poka-yoke, and total preventive/predictive maintenance (TPM) to reduce waste in areas of cost, inventory, labor, and distance. (Apply)	
2G	2. Benchmarking Define and describe this technique and how it can be used to support best practices. (Understand)	
2C	**C. Project and quality management tools** 1. Basic quality management tools Select and apply affinity diagrams, tree diagrams, process decision program charts, matrix diagrams, interrelationship digraphs, prioritization matrices, and activity network diagrams. (Apply)	Reorganized this area to distinguish between quality management and project management tools
2D	2. Project management tools Select and interpret scheduling and monitoring tools such as Gantt charts, program evaluation and review technique (PERT), and critical path method (CPM). (Analyze)	
2E	**D. Taguchi loss function** Identify and describe Taguchi concepts: signal-to-noise ratio, controllable and uncontrollable factors, and robustness. (Understand)	

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	III. Data Analysis (33 Questions)	**Decreased by 2 questions**
3A1	**A. Terms and definitions** 1. Basic statistics Define, calculate, and interpret measures of central tendency (mean, median, mode) and measures of dispersion (standard deviation, range, variance). (Apply)	
3A2	2. Basic distributions Define and explain frequency distributions (normal, binomial, Poisson, and Weibull) and the characteristics of skewed and bimodal distributions. (Understand)	
3A3	3. Probability concepts Describe and use probability concepts: independent and mutually exclusive events, combinations, permutations, additive and multiplicative rules, conditional probability. Perform basic probability calculations. (Apply)	Expanded description to include combinations, permutations, additive and multiplicative rules, conditional probability
4D	4. Reliability concepts Define basic reliability concepts: mean time to failure (MTTF), mean time between failures (MTBF), mean time between maintenance actions (MTBMA), mean time to repair (MTTR). Identify elements of the bathtub curve model and how they are used to predict failure patterns**.** (Remember)	
3A4	5. Measurement scales Define and use nominal, ordinal, interval, and ratio measurement scales. (Apply)	
3B1 & 3B2	**B. Data types and data collection methods** Identify, define, and classify in terms of continuous (variables) and discrete (attributes) data. Determine when it is appropriate to convert attributes data to variables measures. Distinguish between collecting data and generating useful information, and describe the planning and implementation steps that will support meaningful output. (Apply)	Deleted 'data coding and automatic gaging' and added: "Distinguish between collecting data and generating useful information, and describe the planning and implementation steps that will support meaningful output."
3C1	**C. Sampling** 1. Characteristics Identify and define sampling characteristics such as lot size, sample size, acceptance number, and operating characteristic (OC) curve. (Understand)	
3C2	2. Sampling methods Define and distinguish between various sampling methods such as random, sequential, stratified, fixed sampling, and attributes and variables sampling. (Understand)	

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3E5	3. Rational subgroups Define and describe the principles of rational subgroups. (Understand)	
3D	**D. Measurement system analysis (MSA)** Define and distinguish between accuracy, precision, repeatability and reproducibility (gauge R&R) studies, bias, and linearity. (Understand)	Heading changed from 'terms' to MSA
3E1	**E. Statistical process control (SPC)** *[Content from previous 3E1 "Techniques & applications" was distributed to appropriate subtopics.]*	
3E2	1. Control limits and specification limits Identify and distinguish between control limits and specification limits. (Understand)	
3E4	2. Control charts for attributes data Identify, interpret, and select control charts (p, np, c, and u) for data that must be plotted in discrete units (dollars, hours, go/no-go and yes-no choices) and that measure only the presence or absence of a characteristic. (Analyze)	
3E3	3. Control charts for variables data Identify, interpret, and select control charts ($\overline{X} - R$, $\overline{X} - s$, and XmR) for data that must be plotted on a continuous and infinite scale (distance, pressure, temperature). (Apply)	
3E6	4. Process capability measures Describe the conditions that must be met in order to measure capability. Calculate C_p, C_{pk}, P_p, and P_{pk} measures and interpret their results. (Analyze)	
3E8	5. Common and special cause variation Interpret various control chart patterns (runs, hugging, trends) to determine process control, and use SPC rules to distinguish between common cause and special cause variation. (Analyze)	
3E9	6. Data graphics Identify the advantages and limitations of presenting data graphically instead of numerically. (Understand)	Title change: was 'data plotting'
3E7	"PRE-control" has been deleted entirely from the CQPA BOK	
3F	**F. Advanced Statistical Analysis** 1. Regression and correlation models Describe how these models are used for estimation and prediction. (Apply)	

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3G	2. Hypothesis testing Calculate confidence intervals using t tests and the z statistic, and determine whether the result is significant. (Analyze)	
3H	3. Design of experiments (DOE) Define basic DOE terms: blocking, randomization, treatment, error, response, and factors. (Remember)	Expanded basic terms to include treatment, error, response, and factors.
3I	4. Analysis of variance (ANOVA) Define key elements of ANOVAs and how the results can be used. (Understand)	
	IV. Customer-Supplier Relations (15 Questions)	**Decreased by 3 questions**
4A	**A. Internal and External Customers and Suppliers** Define and distinguish between internal and external customers and suppliers. Describe their impact on products, services, and processes, and identify strategies for working with them to make improvements. (Apply)	
4B	**B. Customer Satisfaction Methods** Describe the different types of tools used to gather customer feedback: surveys, complaint forms, warranty analysis. Define key elements of quality function deployment (QFD). (Understand)	Title changed from 'analysis' to 'methods'
4C	**C. Product and Process Approval Systems** Describe how validation and qualification methods, including beta testing, first-article, in-process, and final inspection, are used to approve new or updated products, processes, and services. (Understand)	
4E	**D. Supplier Management** Define and describe key supplier performance measures, including quality, price, delivery, and level of service, and commonly used metrics: defect rates, functional performance, timeliness, responsiveness, and technical support. (Understand)	
4G	**E. Material Identification, Status, and Traceability** Describe the importance of identifying material by lot, batch, source, and conformance status. Describe key requirements for preserving the identity of a product and its origin. Use various methods to segregate nonconforming material and process it according to procedures.(Apply)	Subtext expanded and clarified

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	V. Corrective and Preventive Action (CAPA) (8 Questions)	**New BOK Area – Increased 8 Questions**
4F	**A. Corrective Action** Identify and use key elements of the corrective action process: identify the problem, contain the problem , determine the causes of the problem, propose solutions to eliminate them or prevent their recurrence, verify that the solutions are implemented, and confirm their effectiveness . (Apply)	Description expanded for clarification
4F	**B. Preventive Action** Identify and use key elements of a preventive action process: track data trends and patterns, use failure mode and effects analysis (FMEA), review product and process monitoring reports, and study the process to identify potential failures, defects, or deficiencies; improve the process by developing error- or mistake-proofing methods and procedural changes, and verify that the changes are made and confirm their effectiveness. (Apply)	Description expanded for clarification