
**THE
SIX SIGMA YELLOW BELT
SOLUTIONS TEXT**

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A Note to Fellow Quality Professionals

The Solutions Text follows the content and questions in the Second Edition of the *CSSYB Primer* (July, 2022).

Acknowledgments

WITH A LITTLE HELP FROM MY FRIENDS.

JOHN LENNON/PAUL McCARTNEY

I thank Tim Brenton and other professional associates at QCI for their assistance.

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

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SECTION II

SIX SIGMA FUNDAMENTALS - SAMPLE QUESTIONS

- 2.1. The DPMO for a process is 860. What is the approximate six sigma level of the process?
- 4.2
 - 4.4
 - 4.6
 - 4.8

Solution: The easiest way to solve this question is to look it up in a table. In the CSSYB Primer, Appendix VIII, Table II, 860 falls very close to 4.6 sigma. But, let's calculate an approximation just for fun.

$$\begin{aligned}6\sigma &= 0.8406 + \sqrt{29.37 - 2.221 \times \ln(860)} \\ &= 0.8406 + \sqrt{29.37 - 15.01} \\ &= 0.8406 + 3.7895 = 4.63 \quad (\text{about } 4.6)\end{aligned}$$

Answer c is correct.

Reference: *CSSYB Primer*, Section II - 52/53 and Section VIII, Table II.

- 2.2. When describing a process being considered for cycle time reduction, the existing process flows are known as a:
- Key operation points (KOPS)
 - Dynamic pull chart
 - Current state map
 - Activity network diagram (AND)

Solution: The current state map is a description of a process before changes are considered or implemented.

Answer c is correct.

Reference: *CSSYB Primer*, Section II - 18/20.

- 2.3. There are a large number of potential human errors. What are possible countermeasures for inexperience?
- Visual aids and work instructions
 - Education and/or discipline
 - Work standardization and discipline
 - TPM and skill building

Solution: There are a number of countermeasures for amateur or beginner errors. Training, skill building, work standardization, visual aids, and work instructions are examples.

Answer a is correct.

Reference: *CSSYB Primer*, Section II - 15.

SECTION II

SIX SIGMA FUNDAMENTALS - SAMPLE QUESTIONS

2.4. Process flow improvement steps would normally include:

- a. Asking what are the significant few
- b. Asking what are the trivial many
- c. Analyzing each step in detail
- d. The use of Pareto diagrams

Solution: Process improvement should analyze each step in detail. The other three answers relate to Pareto analysis.

Answer c is correct.

Reference: *CSSYB Primer*, Section II - 23 and 40/42.

2.5. Using six sigma methodology, a company at 4.5 sigma would have a failure rate of:

- a. 3.4 ppm
- b. 233 ppm
- c. 1350 ppm
- d. 6210 ppm

Solution: The six sigma approach allows for a ± 1.5 sigma shift. 233 ppm represents the 5 sigma level and answer 6210 ppm is the 4 sigma level.

Answer c is correct.

Reference: *CSSYB Primer*, Section II - 3 and VIII - 3.

2.6. The smoothing of the work load in all steps of a process is called:

- a. Level loading
- b. Minimal cycle time
- c. Point of use processing
- d. Perfection

Solution: The smoothing or balancing of the work load is referred to as level loading or load leveling

Answer a is correct.

Reference: *CSSYB Primer*, Section II - 23.

SECTION II

SIX SIGMA FUNDAMENTALS - SAMPLE QUESTIONS

- 2.7. A scatter diagram in which the points plotted appear to form an almost straight band that flows from the lower left to the upper right would be said to display:
- a. A positive correlation
 - b. No correlation
 - c. A higher order relationship
 - d. A negative correlation

Solution: An almost straight band of points flowing from lower left to upper right would indicate a positive correlation between the variables. A nearly straight band seems to indicate a strong linear relationship between the variables.

Answer a is correct.

Reference: *CSSYB Primer*, Section II - 46/47.



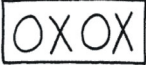
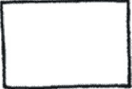
- 2.8. Six sigma project methodology normally begins with what initial step?
- a. Problem definition
 - b. Define
 - c. Project charter
 - d. Champion approval

Solution: The "define" step is the first step in the 5 step methodology for six sigma projects. The steps are: define, measure, analyze, improve, and control. The other answer choices: problem definition, having a project charter, and having champion approval are also important for team projects but they do not directly answer this question.

Answer b is correct.

Reference: *CSSYB Primer*, Section II - 33.

- 2.9. The symbol widely associated with an operator or operator location is which of the following:

- a. 
- b. 
- c. 
- d. 

Solution: This is either a familiarity or look-up question. Several answers refer to go see, load leveling, and schedule box.

Answer a is correct.

Reference: *CSSYB Primer*, Section II - 21.

SECTION IV

DEFINE PHASE - SAMPLE QUESTIONS

- 4.55. The SIPOC process map stands for suppliers, inputs, process, outputs, and customers. It provides a view of the process that contains approximately how many steps?
- a. 21-40 steps
 - b. 16-20 steps
 - c. 8-15 steps
 - d. 4-7 steps

Solution: As a high level view, the process details should only contain 4-7 steps.

Answer d is correct.

Reference: *CSSYB Primer*, Section IV - 20/22.

- 4.56. Parallel activity paths are most likely to be noted using which of the following quality planning tools?
- a. Tree diagrams
 - b. Activity diagrams
 - c. Matrix diagrams
 - d. Interrelationship digraphs

Solution: Tree diagrams can show activity paths when solving a problem or taking advantage of an opportunity.

Process decision program charts and activity network diagrams can also show parallel activities but they are not among the answer choices.

Answer a is correct.

Reference: *CSSYB Primer*, Section IV - 54/55.

- 4.57. The boundaries of a project are contained in the:
- a. Problem statement
 - b. Project scope
 - c. Goal statement
 - d. Resources required

Solution: This is a basic definition question. The project scope defines the boundaries of the project.

Answer b is correct.

Reference: *CSSYB Primer*, Section IV - 35/36.

SECTION IV

DEFINE PHASE - SAMPLE QUESTIONS

- 4.58. The downward flow of communications is used for information transfer. By the time it gets to the lowest level, it has been affected by the process of:
- a. Spanning
 - b. Projecting
 - c. Filtering
 - d. Leveling

Solution: This is a definition question. The term used for the distortion and adjustment of information, as it progresses from a source to the final receiver, is called “filtering.”

Answer c is correct.

Reference: *CSSYB Primer*, Section IV - 39.

- 4.59. According to Juran, what the customer thinks he/she desires, would be classified as:
- a. Stated needs
 - b. Real needs
 - c. Perceived needs
 - d. Cultural needs

Solution: Juran lists customer needs as:

Stated needs: What the customers say they want (a car)

Real needs: What the customer really wants (transportation)

Perceived needs: What the customer thinks is desired (a new car)

Cultural needs: Status of the product (a BMW)

Unintended needs: The customer uses the product in an unintended manner

Answer c is correct.

Reference: *CSSYB Primer*, Section IV - 10. Juran, J.M. (1999). *Juran's Quality Handbook*, 5th ed. New York: McGraw-Hill.

- 4.60. The process map known as SIPOC provides team members an understanding of the process. It is a view of the process taken at:
- a. Floor level
 - b. A very high level
 - c. The customer's perspective
 - d. A very detailed level

Solution: The SIPOC process map provides a high level view with only 4-7 steps displayed. A detailed map could involve 50 to 60 steps and be too complicated for easy understanding.

Answer b is correct.

Reference: *CSSYB Primer*, Section IV - 20/22.

SECTION IV

DEFINE PHASE - SAMPLE QUESTIONS

4.61. Which two of the following quality management tools would benefit most from brainstorming activities?

- a. Tree and prioritization diagrams
- b. Matrix and affinity diagrams
- c. Affinity and activity network diagrams
- d. Interrelationship and affinity diagrams

Solution: Matrix and prioritization matrix diagrams require considerable advance subject knowledge. The activity network diagram also require knowledge of activities and critical times. Tree diagrams can benefit from preliminary work using affinity or cause-and-effect diagrams.

Interrelationship digraphs and affinity diagrams can utilize brainstorming techniques directly.

Answer d is correct.

Reference: *CSSYB Primer*, Section IV - 53/53 and 60/61.

4.62. One would say that, from an overall perspective, the activities of a company are tied together by:

- a. Customers
- b. Stockholders
- c. Suppliers
- d. Process management

Solution: In the context of the question, almost any model or schematic of an organization has either a business process management or internal company process at its core.

Answer d is correct.

Reference: *CSSYB Primer*, Section IV - 17/19.