
**THE
SIX SIGMA YELLOW BELT
SOLUTIONS TEXT**

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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?
- a. 4.2
 - b. 4.4
 - c. 4.6
 - d. 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:
- a. Key operation points (KOPS)
 - b. Dynamic pull chart
 - c. Current state map
 - d. 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?
- a. Visual aids and work instructions
 - b. Education and/or discipline
 - c. Work standardization and discipline
 - d. 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: Answer **c** is true. Answers **a**, **b**, and **d** 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. Answer **b** represents the 5 sigma level and answer **d** 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 positive correlation
 - No correlation
 - A higher order relationship
 - 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.




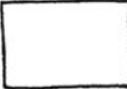
- 2.8. Six sigma project methodology normally begins with what initial step?
- Problem definition
 - Define
 - Project charter
 - Champion approval

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.  | c.  |
| b.  | d.  |

Solution: This is either a familiarity or look-up question. Answer **b** means go see. Answer **c** stands for load leveling. Answer **d** is a schedule box.

Answer a is correct.

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

SECTION IV

DEFINE PHASE - SAMPLE QUESTIONS

- 4.28. Community or society quality benefits resulting from a business enterprise would include which of the following?
- a. Safe products to use
 - b. Shorter cycle times
 - c. Prestige and self-fulfillment
 - d. A quicker marketplace response

Solution: Society is benefitted by safe products (a). Answer c is an employee benefit. Answers b and d relate to improved company processes.

Answer a is correct.

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

- 4.29. Which of the following management tools requires the least preliminary knowledge about a subject or activity?
- a. Prioritization matrices
 - b. Matrix diagrams
 - c. Affinity diagrams
 - d. Activity network diagrams

Solution: Matrix diagrams, prioritization matrices, and activity network diagrams require a considerable amount of advance subject knowledge.

Answer c is correct.

Reference: *CSSYB Primer*, Section IV - 40/41, 44/47, and 50/51.

- 4.30. When selecting a project, priority should first be given to a project that:
- a. Only affects employees in the work cell
 - b. Has objectives that align with organizational goals
 - c. Is expected to be completed within one week
 - d. The solution is readily apparent before the project is started

Solution: Many factors can affect selecting one project over another. Experience of team members, cost savings or benefits of the project, safety issues, and availability of resources. Project objectives should align with organizational or departmental goals.

Answer b is correct.

Reference: *CSSYB Primer*, Section IV - 23/24.

SECTION IV

DEFINE PHASE - SAMPLE QUESTIONS

4.40. Affinity diagrams are useful tools to help analyze and solve what type(s) of problems:

- a. Unfamiliar problems
- b. Structured problems
- c. Mathematical models
- d. Establishing project flows

Solution: The affinity diagram is used for unfamiliar, new, or complex problems by discovering or organizing patterns of thought. Structural problems, mathematical problems, and project flows are not included.

Answer a is correct.

Reference: *CSSYB Primer*, Section IV - 40/41.

4.41. The major elements of project management include:

- a. Modeling, scheduling, and funding
- b. Planning, scheduling, and controlling
- c. Scheduling, funding, and planning
- d. Controlling, modeling, and planning

Solution: The elements of project management are: planning, scheduling, and controlling. This can be stated as 1) deciding what to do, 2) deciding when to do it, and 3) assuring that desired results are obtained. Modeling is a subset of these three major areas.

Answer b is correct.

Reference: *CSSYB Primer*, Section IV - 30.

4.42. Which of the following management tools could be used to rate the factors necessary to pass the CSSYB exam?

- a. Affinity diagrams
- b. Tree diagrams
- c. Prioritization matrices
- d. Interrelationship digraphs

Solution: Only prioritizing matrices and matrix diagrams use weighting systems.

Answer c is correct.

Reference: *CSSYB Primer*, Section IV - 44/47.

SECTION IV

DEFINE PHASE - SAMPLE QUESTIONS

4.43. Which of the following is a primary reason for periodic project reviews?

- a. To highlight the project team's effort
- b. To select either manual or automated reporting methods
- c. To review the schedule and costs
- d. To assess the team responsibilities and requirements

Solution: The measurements involved in judging the success of a project are time and money. This is also the reason for a periodic review. The efforts of the project team should be acknowledged after the completion of the project. Even if outstanding achievement should be recognized, it is not the major purpose of a project review. Answers **b** and **d** are distracter choices.

Answer c is correct.

Reference: *CSSYB Primer*, Section IV - 32/38 and VII - 35/37.

4.44. Tollgate reporting differs from lesson learned in that:

- a. Lessons learned generally comes mid-way through a project
- b. Lessons learned focuses on progress and tollgate reporting does not
- c. Tollgate reporting focuses on progress and lessons learned on the final results
- d. Tollgate reporting deals with expenditures whereas lessons learned deals with results

Solution: Tollgate reporting can occur frequently throughout the course of a project. Lesson learned comes at the end of the project.

Answer c is correct.

Reference: *CSSYB Primer*, Section IV - 53.

4.45. Which of the modern quality tools could use 3" x 5" cards or post-it notes as part of the brainstorming or idea generation stage?

- a. Tree and affinity diagrams
- b. Affinity and prioritization diagrams
- c. Matrix and prioritization diagrams
- d. Activity network and matrix diagrams

Solution: Only two of the seven quality tools do not employ post-it notes or index cards (matrix and prioritization matrix techniques are exempt).

Answer a is correct.

Reference: *CSSYB Primer*, Section IV - 40/43.

SECTION IV

DEFINE PHASE - SAMPLE QUESTIONS

- 4.46. An organized and disciplined approach to problem solving in most six sigma organizations is called:
- SIPOC
 - DMAIC
 - PDCA
 - DPMO

Solution: This is a straight forward knowledge question. The only two problem solving approaches listed are DMAIC and PDCA. The tool most closely associated with six sigma is DMAIC (Define, Measure, Analyze, Improve and Control). Plan-do-check-act is another common team problem solving tool. SIPOC (Suppliers, Inputs, Process, Outputs, Customers) is a high level process flow map used in six sigma and DPMO is an acronym for defects per million opportunities.

Answer b is correct.

Reference: *CSSYB Primer*, Section IV - 20/22 and II - 4.

- 4.47. Which of the following statements is a correct description of QFD?
- It translates fuzzy customer requirements into design specifications
 - It can be used to replace FMEA
 - It is similar to project management
 - It does not permit comparisons with competitors

Solution: QFD focuses on identifying the "voice of the customer." Project management does not focus on gathering customer requirements. Project management focuses on implementation. It is an iterative process like FMEA but the focus is different. Answer **d** is false.

Answer a is correct.

Reference: *CSSYB Primer*, Section IV - 11/13.

- 4.48. A project has more than one critical path. This means that:
- Crashing an event might shorten the project time
 - The critical path was not calculated correctly
 - Delaying an event on a critical path may not delay the project
 - Shortening any one event cannot shorten the project duration

Solution: It is possible for projects to have more than one critical path. Delay of an event on the critical path will delay the project. Shortening one event that is on the critical path will reduce the project time, if it is not in parallel with another critical path. The only potentially true statement is that crashing an event might shorten the project time.

Answer a is correct.

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

SECTION IV

DEFINE PHASE - SAMPLE QUESTIONS

4.49. Stakeholders that could help define a project charter include:

- a. Customers, suppliers, and management
- b. Work breakdown structure and planning
- c. Metrics and project plan elements
- d. Benchmark partners and risk takers

Solution: Customers, suppliers, and members of management are all stakeholders that could help drive a project charter. Answers **b**, **c**, and **d** are not part of the charter.

Answer a is correct.

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

4.50. The quality tool that could be used to display slack times in the implementation of a project is a/an:

- a. Affinity diagrams
- b. ID
- c. Prioritization matrices
- d. AND

Solution: Of the four answer choices, only the activity network diagram can show slack times for project implementation.

Answer d is correct.

Reference: *CSSYB Primer*, Section IV - 50/51.

4.51. Understanding, controlling and improving an organization's processes to create value for all stakeholders would be called:

- a. The SIPOC diagram
- b. Process performance metric
- c. Business process management
- d. The establishment of KPIVs and KPOVs

Solution: The question is describing business process management (BPM), answer **c**. The other answers are tools and techniques that could be used to support BPM.

Answer c is correct.

Reference: *CSSYB Primer*, Section IV - 17/19 and 24.

SECTION IV

DEFINE PHASE - SAMPLE QUESTIONS

- 4.52. The initial construction of several matrices to display a QFD involves the building of a "house of quality." The side walls normally depict:
- Customer needs and comparison of customer priorities
 - Competitive ratings and rankings
 - Design features and rankings of design features
 - Technical competitive assessments and target values

Solution: This question is testing the student's knowledge of the construction of a "house of quality." The side walls are indicated by customer needs and customer competitive assessments (priorities). The foundation is the technical competitive assessment, while the ceiling depicts the design features.

Answer a is correct.

Reference: *CSSYB Primer*, Section IV - 12/13.

- 4.53. When constructing a tree diagram what is the last set of content additions?
- Whys
 - Targets
 - Means
 - Goals

Solution: Tree diagrams are organized by levels of importance, from the "whys" to the "hows" or from the "goals" to the "means."

Either "hows" or "means" would be acceptable answers to this question, but only one of these options is presented.

Answer c is correct.

Reference: *CSSYB Primer*, Section IV - 42/43.

- 4.54. The target length of an initial six sigma project should be approximately:
- 60 days
 - 90 days
 - 120 days
 - 180 days

Solution: Eckes (2001) points out that initial projects should be approximately 120 days in length. A 4 month project is considered to be of appropriate length and difficulty.

Answer c is correct.

References: *CSSYB Primer*, Section IV - 14/16. Eckes, G. (2001) *The Six Sigma Revolution*.

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 - 42/43.

- 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 - 23/24.

SECTION VI

ANALYZE PHASE - SAMPLE QUESTIONS

- 6.18. A regression analysis yielded a total sum of squared errors of 1000 and a total sum of squares equal to 1600. What is the correlation coefficient?
- a. Cannot be determined from the given information
 - b. +0.375 or -0.375
 - c. +0.612 or -0.612
 - d. +0.790 or -0.790

Solution: A calculation for r is required.

$$r^2 = \frac{SST - SSE}{1600} = \frac{1600 - 1000}{1600} = \frac{600}{1600} = 0.375$$
$$r = \pm 0.612$$

Answer c is correct.

Reference: *CSSYB Primer*, Section VI - 35/37.

- 6.19. American visitors to an aluminum plant in Japan were given white gloves to wear. What category of the 5S program was being displayed?
- a. Sort
 - b. Scrub
 - c. Straighten
 - d. Standardize

Solution: This is a form of white glove or white rag inspection. It emphasized the importance of the scrub (shine and clean) portion of the 5S approach.

Answer b is correct.

Reference: *CSSYB Primer*, Section VI - 2/5.