

PRACTICE EXAM 22: LEAN SIX SIGMA BLACK BELT

(150 QUESTIONS)

This 150-question practice exam is designed for Lean Six Sigma Black Belt study. Choose the best answer for each question. A suggested completion time is 270 minutes. This is an independent study resource; certification requirements vary by provider.

1. What is a value stream map?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A map of material and information flow from request to delivery.
- D. A customer preference that cannot be measured or defined.

2. What does takt time express?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The required production pace to meet customer demand.

3. What is a bottleneck?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The resource or step that limits total system throughput.
- D. A customer preference that cannot be measured or defined.

4. What is Little's Law used to relate?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Work in process, throughput, and lead time in a stable system.

5. What is a pull system?

- A. A financial forecast prepared after the project has ended.
- B. A system that releases work in response to downstream demand.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

6. What is a Kanban?

- A. A visual authorization to replenish or move work.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

7. What is 5S intended to create?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. A workplace that is organized, visual, safe, and sustainable.

8. What is standard work?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The currently best known method for performing a task consistently.
- D. A customer preference that cannot be measured or defined.

9. What is a poka-yoke?

- A. A financial forecast prepared after the project has ended.
- B. A device or method that prevents errors or makes them immediately detectable.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

10. What is a cause-and-effect diagram used for?

- A. Organizing potential causes of a defined effect.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

11. What is the 5 Whys technique intended to support?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Progressive questioning from a symptom toward an underlying causal mechanism.
- D. A customer preference that cannot be measured or defined.

12. What is root cause verification?

- A. Testing whether a suspected cause actually drives the observed problem.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.

D. A customer preference that cannot be measured or defined.

13. What is a hypothesis test used for?

- A. A financial forecast prepared after the project has ended.
- B. Assessing whether observed evidence is consistent with a stated statistical claim.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

14. What is the null hypothesis?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The default statement of no difference or no effect.

15. What is a p-value?

- A. The probability of data at least this extreme if the null hypothesis were true.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

16. What is alpha in hypothesis testing?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The preselected risk of a Type I error.
- D. A customer preference that cannot be measured or defined.

17. What is a Type I error?

- A. A financial forecast prepared after the project has ended.
- B. Rejecting a true null hypothesis.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

18. What is a Type II error?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Failing to reject a false null hypothesis.

19. What is statistical power?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The probability of detecting a real effect when one exists.

20. What is a confidence interval?

- A. A range of plausible values for an estimated population parameter.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

21. What does a two-sample t test commonly compare?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The means of two independent groups.
- D. A customer preference that cannot be measured or defined.

22. What does a paired t test use?

- A. A financial forecast prepared after the project has ended.
- B. Matched observations measured in pairs, such as before and after results.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

23. What does ANOVA test?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Whether at least one mean differs among three or more groups.
- D. A customer preference that cannot be measured or defined.

24. What does a chi-square test commonly analyze?

- A. A financial forecast prepared after the project has ended.
- B. Association or differences involving categorical count data.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

25. What is a regression model used for?

- A. Modeling and predicting a response using one or more predictors.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.

D. A customer preference that cannot be measured or defined.

26. What does R-squared summarize?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The proportion of response variation explained by the fitted model.

27. What are residuals in regression?

- A. A financial forecast prepared after the project has ended.
- B. The differences between observed responses and model predictions.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

28. What is design of experiments?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. A planned method for changing inputs to learn their effects on outputs.

29. What is a factor in DOE?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. An input variable deliberately changed or studied for its effect.
- D. A customer preference that cannot be measured or defined.

30. What is a level in DOE?

- A. A specific setting of a factor used in an experiment.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

31. What is an interaction in DOE?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A condition where the effect of one factor depends on another factor's setting.
- D. A customer preference that cannot be measured or defined.

32. Why use randomization in an experiment?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. To protect conclusions from time-related and nuisance-variable bias.

33. Why use replication in an experiment?

- A. To estimate experimental error and improve confidence in effects.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

34. What is blocking in DOE?

- A. A financial forecast prepared after the project has ended.
- B. Grouping similar experimental units to reduce known nuisance variation.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

35. What is FMEA used for?

- A. Anticipating failure modes and prioritizing actions to reduce risk.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

36. What does severity rate in FMEA?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The seriousness of the effect if a failure occurs.

37. What does occurrence rate in FMEA?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The likelihood that a failure cause will occur.
- D. A customer preference that cannot be measured or defined.

38. What does detection rate in FMEA?

- A. A financial forecast prepared after the project has ended.
- B. The likelihood that existing controls will detect the problem before impact.
- C. A tool used only to assign individual blame for errors.

D. A customer preference that cannot be measured or defined.

39. What is a control plan?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. A documented method for monitoring critical measures and responding to signals.

40. What is a reaction plan?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Predefined action when a monitored measure indicates an unacceptable condition.
- D. A customer preference that cannot be measured or defined.

41. What is a pilot implementation?

- A. A financial forecast prepared after the project has ended.
- B. A limited deployment used to evaluate a solution before broad rollout.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

42. What is a process owner accountable for?

- A. Maintaining the process and its ongoing performance after project closure.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

43. What is a project sponsor responsible for?

- A. Providing organizational support, resources, and barrier removal.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

44. What is a Green Belt expected to do?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Lead or support data-driven improvement projects using DMAIC tools.

45. What is change management in improvement work?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Preparing people to adopt, use, and sustain a new way of working.
- D. A customer preference that cannot be measured or defined.

46. What is stakeholder analysis used for?

- A. A financial forecast prepared after the project has ended.
- B. Understanding affected parties, their needs, influence, and communication requirements.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

47. What is a communication plan?

- A. A plan for what information is shared, with whom, when, and how.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

48. What is a RACI matrix?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. A role chart identifying who is responsible, accountable, consulted, and informed.

49. What is a balanced scorecard approach?

- A. A financial forecast prepared after the project has ended.
- B. Using several aligned measures to avoid optimizing one result at another's expense.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

50. What is a leading indicator?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A measure that signals conditions likely to influence future results.
- D. A customer preference that cannot be measured or defined.

51. What is a lagging indicator?

- A. A measure that reports outcomes after they occur.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.

D. A customer preference that cannot be measured or defined.

52. What is a Kaizen event?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. A focused, short-term cross-functional effort to improve a defined process.

53. What is a visual management system?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Visible cues that communicate standards, status, and abnormalities at a glance.
- D. A customer preference that cannot be measured or defined.

54. What is a dashboard?

- A. A financial forecast prepared after the project has ended.
- B. A concise visual display of selected performance measures for decision making.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

55. What is a business case?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The rationale explaining why a project matters to the organization.
- D. A customer preference that cannot be measured or defined.

56. What is a project tollgate?

- A. A financial forecast prepared after the project has ended.
- B. A formal review point for confirming progress and readiness to continue.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

57. What is a lessons-learned review?

- A. A structured capture of useful knowledge for future work.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

58. What is benchmarking?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Comparing performance or practices with a relevant reference point.

59. What is a service blueprint?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A map linking customer touchpoints with frontstage and backstage process work.
- D. A customer preference that cannot be measured or defined.

60. What is a constraint?

- A. Anything that limits a system from achieving more of its goal.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

61. What is queue time?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Elapsed time that work waits before the next processing activity starts.

62. What is cycle time?

- A. A financial forecast prepared after the project has ended.
- B. The time needed to complete one unit at a process step.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

63. What is lead time?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Total elapsed time from customer request to delivery.

64. What is a handoff risk?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Loss, delay, or misunderstanding when work moves between people or steps.

D. A customer preference that cannot be measured or defined.

65. What is a cost of poor quality?

- A. A financial forecast prepared after the project has ended.
- B. The cost caused by defects, rework, scrap, failures, and lost opportunities.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

66. What is a non-value-added activity?

- A. Work that consumes resources without changing the output in a way the customer values.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

67. What is overproduction waste?

- A. Producing more, sooner, or faster than downstream demand requires.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

68. What is a future-state map?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A visual design of the improved value stream after targeted changes.
- D. A customer preference that cannot be measured or defined.

69. Which DMAIC phase confirms that the project is worth pursuing?

- A. A financial forecast prepared after the project has ended.
- B. Define, by establishing the problem, business case, scope, and goal.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

70. What is the principal objective of the Measure phase?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Establish a reliable baseline of current process performance.

71. What is the primary purpose of the Analyze phase?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Verify the vital causes that drive the performance gap.

72. What is the primary purpose of the Improve phase?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Develop and test solutions that address verified causes.
- D. A customer preference that cannot be measured or defined.

73. What is the primary purpose of the Control phase?

- A. Sustain improved performance through monitoring, ownership, and response plans.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

74. What does a project charter formally authorize?

- A. A financial forecast prepared after the project has ended.
- B. A defined team to work on an approved problem within stated boundaries.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

75. Which item belongs in a strong problem statement?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The current measurable performance gap and where it occurs.
- D. A customer preference that cannot be measured or defined.

76. What is a critical-to-quality characteristic?

- A. A measurable requirement that strongly affects customer satisfaction.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

77. What is the purpose of a SIPOC?

- A. A financial forecast prepared after the project has ended.
- B. To provide a high-level view of suppliers, inputs, process, outputs, and customers.
- C. A tool used only to assign individual blame for errors.

D. A customer preference that cannot be measured or defined.

78. What does a process map reveal especially well?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The sequence, decisions, handoffs, and rework loops in a process.

79. What is an operational definition?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. An unambiguous rule for measuring or classifying data.
- D. A customer preference that cannot be measured or defined.

80. What does a measurement system analysis evaluate?

- A. Whether the measurement process is adequate for decision making.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

81. What does repeatability assess?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Consistency of repeated measurements by the same appraiser.

82. What does reproducibility assess?

- A. A financial forecast prepared after the project has ended.
- B. Consistency of measurements across different appraisers.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

83. What is accuracy in measurement?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Closeness of a measured value to the accepted true value.

84. What is precision in measurement?

- A. Closeness of repeated measurements to one another.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

85. What is a continuous data type?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Measurements that can take any value within an interval.
- D. A customer preference that cannot be measured or defined.

86. What is an attribute data type?

- A. A financial forecast prepared after the project has ended.
- B. Counts or classifications such as pass-fail or defect-no defect.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

87. Why use a sampling plan?

- A. To collect representative evidence efficiently from a larger population.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

88. What is a sampling frame?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The list or source from which a sample is drawn.

89. What does random sampling reduce?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Selection bias in the choice of observations.
- D. A customer preference that cannot be measured or defined.

90. What does stratification do?

- A. A financial forecast prepared after the project has ended.
- B. Separates data into meaningful subgroups for comparison.
- C. A tool used only to assign individual blame for errors.

D. A customer preference that cannot be measured or defined.

91. What does a histogram display?

- A. The distribution, center, spread, and shape of numerical data.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

92. What does a box plot help identify?

- A. A financial forecast prepared after the project has ended.
- B. Center, spread, skew, and potential outliers across data sets.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

93. What does a Pareto chart help a team do?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Prioritize categories contributing the greatest frequency or impact.
- D. A customer preference that cannot be measured or defined.

94. What does a scatter plot explore?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The relationship between two numerical variables.

95. What does correlation alone establish?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Association, but not proof that one variable causes the other.

96. What does a run chart show?

- A. Data plotted in time order without calculated control limits.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

97. What is the mean?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The arithmetic average of a set of observations.
- D. A customer preference that cannot be measured or defined.

98. What is the median?

- A. A financial forecast prepared after the project has ended.
- B. The middle observation after values are ordered.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

99. What is standard deviation?

- A. A measure of typical spread around the mean.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

100. What does a data outlier require first?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Investigation to determine whether it is error, special cause, or a valid rare event.
- D. A customer preference that cannot be measured or defined.

101. What is a control chart designed to distinguish?

- A. A financial forecast prepared after the project has ended.
- B. Common-cause variation from special-cause signals over time.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

102. What is common-cause variation?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Routine variation inherent in a stable process system.

103. What is special-cause variation?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.

D. Variation from an unusual, identifiable event outside the routine system.

104. What are control limits based on?

- A. The observed variation of a process over time.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

105. What are specification limits based on?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Customer, design, contractual, or regulatory requirements.
- D. A customer preference that cannot be measured or defined.

106. What does C_p compare?

- A. A financial forecast prepared after the project has ended.
- B. The process spread with the width of the specification limits.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

107. What does C_{pk} additionally consider?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. How centered the process mean is within the specification limits.

108. When is capability analysis meaningful?

- A. After the process is demonstrated to be statistically stable.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

109. In a complex Black Belt project, what is a value stream map?

- A. A financial forecast prepared after the project has ended.
- B. A map of material and information flow from request to delivery.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

110. In a complex Black Belt project, what does takt time express?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The required production pace to meet customer demand.
- D. A customer preference that cannot be measured or defined.

111. In a complex Black Belt project, what is a bottleneck?

- A. The resource or step that limits total system throughput.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

112. In a complex Black Belt project, what is Little's Law used to relate?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Work in process, throughput, and lead time in a stable system.

113. In a complex Black Belt project, what is a pull system?

- A. A financial forecast prepared after the project has ended.
- B. A system that releases work in response to downstream demand.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

114. In a complex Black Belt project, what is a Kanban?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A visual authorization to replenish or move work.
- D. A customer preference that cannot be measured or defined.

115. In a complex Black Belt project, what is 5S intended to create?

- A. A workplace that is organized, visual, safe, and sustainable.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

116. In a complex Black Belt project, what is standard work?

- A. A financial forecast prepared after the project has ended.
- B. The currently best known method for performing a task consistently.
- C. A tool used only to assign individual blame for errors.

D. A customer preference that cannot be measured or defined.

117. In a complex Black Belt project, what is a poka-yoke?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. A device or method that prevents errors or makes them immediately detectable.

118. In a complex Black Belt project, what is a cause-and-effect diagram used for?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. Organizing potential causes of a defined effect.
- D. A customer preference that cannot be measured or defined.

119. In a complex Black Belt project, what is the 5 Whys technique intended to support?

- A. A financial forecast prepared after the project has ended.
- B. Progressive questioning from a symptom toward an underlying causal mechanism.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

120. In a complex Black Belt project, what is root cause verification?

- A. Testing whether a suspected cause actually drives the observed problem.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

121. In a complex Black Belt project, what is a hypothesis test used for?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Assessing whether observed evidence is consistent with a stated statistical claim.

122. In a complex Black Belt project, what is the null hypothesis?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The default statement of no difference or no effect.
- D. A customer preference that cannot be measured or defined.

123. In a complex Black Belt project, what is a p-value?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The probability of data at least this extreme if the null hypothesis were true.

124. In a complex Black Belt project, what is alpha in hypothesis testing?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The preselected risk of a Type I error.
- D. A customer preference that cannot be measured or defined.

125. In a complex Black Belt project, what is a Type I error?

- A. Rejecting a true null hypothesis.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

126. In a complex Black Belt project, what is a Type II error?

- A. A financial forecast prepared after the project has ended.
- B. Failing to reject a false null hypothesis.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

127. In a complex Black Belt project, what is statistical power?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The probability of detecting a real effect when one exists.
- D. A customer preference that cannot be measured or defined.

128. In a complex Black Belt project, what is a confidence interval?

- A. A range of plausible values for an estimated population parameter.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

129. In a complex Black Belt project, what does a two-sample t test commonly compare?

- A. A financial forecast prepared after the project has ended.
- B. The means of two independent groups.
- C. A tool used only to assign individual blame for errors.

D. A customer preference that cannot be measured or defined.

130. In a complex Black Belt project, what does a paired t test use?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Matched observations measured in pairs, such as before and after results.

131. In a complex Black Belt project, what does ANOVA test?

- A. Whether at least one mean differs among three or more groups.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

132. In a complex Black Belt project, what does a chi-square test commonly analyze?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Association or differences involving categorical count data.

133. In a complex Black Belt project, what is a regression model used for?

- A. A financial forecast prepared after the project has ended.
- B. Modeling and predicting a response using one or more predictors.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

134. In a complex Black Belt project, what does R-squared summarize?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The proportion of response variation explained by the fitted model.
- D. A customer preference that cannot be measured or defined.

135. In a complex Black Belt project, what are residuals in regression?

- A. A financial forecast prepared after the project has ended.
- B. The differences between observed responses and model predictions.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

136. In a complex Black Belt project, what is design of experiments?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. A planned method for changing inputs to learn their effects on outputs.

137. In a complex Black Belt project, what is a factor in DOE?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. An input variable deliberately changed or studied for its effect.
- D. A customer preference that cannot be measured or defined.

138. In a complex Black Belt project, what is a level in DOE?

- A. A specific setting of a factor used in an experiment.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

139. In a complex Black Belt project, what is an interaction in DOE?

- A. A condition where the effect of one factor depends on another factor's setting.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

140. In a complex Black Belt project, why use randomization in an experiment?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. To protect conclusions from time-related and nuisance-variable bias.
- D. A customer preference that cannot be measured or defined.

141. In a complex Black Belt project, why use replication in an experiment?

- A. A financial forecast prepared after the project has ended.
- B. To estimate experimental error and improve confidence in effects.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

142. In a complex Black Belt project, what is blocking in DOE?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.

D. Grouping similar experimental units to reduce known nuisance variation.

143. In a complex Black Belt project, what is FMEA used for?

- A. Anticipating failure modes and prioritizing actions to reduce risk.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

144. In a complex Black Belt project, what does severity rate in FMEA?

- A. A financial forecast prepared after the project has ended.
- B. The seriousness of the effect if a failure occurs.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

145. In a complex Black Belt project, what does occurrence rate in FMEA?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. The likelihood that a failure cause will occur.

146. In a complex Black Belt project, what does detection rate in FMEA?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. The likelihood that existing controls will detect the problem before impact.
- D. A customer preference that cannot be measured or defined.

147. In a complex Black Belt project, what is a control plan?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A documented method for monitoring critical measures and responding to signals.
- D. A customer preference that cannot be measured or defined.

148. In a complex Black Belt project, what is a reaction plan?

- A. A financial forecast prepared after the project has ended.
- B. A tool used only to assign individual blame for errors.
- C. A customer preference that cannot be measured or defined.
- D. Predefined action when a monitored measure indicates an unacceptable condition.

149. In a complex Black Belt project, what is a pilot implementation?

- A. A limited deployment used to evaluate a solution before broad rollout.
- B. A financial forecast prepared after the project has ended.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

150. In a complex Black Belt project, what is a process owner accountable for?

- A. A financial forecast prepared after the project has ended.
- B. Maintaining the process and its ongoing performance after project closure.
- C. A tool used only to assign individual blame for errors.
- D. A customer preference that cannot be measured or defined.

Practice Exam 22: Answer Key and Explanations

- 1. C** — A map of material and information flow from request to delivery. Value stream mapping exposes lead time, process time, inventories, and information signals across the entire value stream. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make
- 2. D** — The required production pace to meet customer demand. Takt links available work time to demand and helps teams identify mismatch between capacity and need. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the
- 3. C** — The resource or step that limits total system throughput. Improving the bottleneck can improve system performance, while improving nonconstraints may not increase output. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,
- 4. D** — Work in process, throughput, and lead time in a stable system. Little's Law highlights why excess work in process generally increases lead time when throughput is unchanged. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions
- 5. B** — A system that releases work in response to downstream demand. Pull avoids premature production and controls work in process through visible demand signals. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,
- 6. A** — A visual authorization to replenish or move work. Kanban is a practical pull-system mechanism that limits inventory and makes replenishment needs visible. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect
- 7. D** — A workplace that is organized, visual, safe, and sustainable. 5S reduces searching and ambiguity while making abnormal conditions easier to notice and correct. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

8. C — The currently best known method for performing a task consistently. Standard work provides a stable baseline for training, auditing, improvement, and reliable execution. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

9. B — A device or method that prevents errors or makes them immediately detectable. Mistake-proofing changes the work so common errors are difficult to make or cannot pass unnoticed. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

10. A — Organizing potential causes of a defined effect. The fishbone diagram broadens team thinking and organizes causes for later data-based verification. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the customer,

11. C — Progressive questioning from a symptom toward an underlying causal mechanism. Five Whys is useful when supported by evidence; it should not substitute for testing assumptions. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

12. A — Testing whether a suspected cause actually drives the observed problem. Verification separates plausible explanations from causes that demonstrably influence the response or defect. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

13. B — Assessing whether observed evidence is consistent with a stated statistical claim. Hypothesis testing quantifies whether an observed difference is unlikely to be explained by sampling variation alone. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

14. D — The default statement of no difference or no effect. The null is the claim tested against the data and is rejected only when evidence is sufficiently strong. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

15. A — The probability of data at least this extreme if the null hypothesis were true. A p-value measures compatibility with the null; it is not the probability that the null is true. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps

16. C — The preselected risk of a Type I error. Alpha sets the decision threshold for rejecting a true null hypothesis, commonly before data analysis begins. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

17. B — Rejecting a true null hypothesis. Type I error is a false positive decision and its probability is controlled by the chosen alpha level. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

18. D — Failing to reject a false null hypothesis. Type II error is a false negative decision and is related to statistical power and sample size. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

19. D — The probability of detecting a real effect when one exists. Power increases when effect size grows, variation decreases, alpha increases, or sample size increases. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

20. A — A range of plausible values for an estimated population parameter. Confidence intervals communicate estimate uncertainty and are generally more informative than a significance decision alone. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

21. C — The means of two independent groups. A two-sample t test evaluates whether the difference between two group means is larger than expected from variation. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

22. B — Matched observations measured in pairs, such as before and after results. Pairing removes between-subject differences by analyzing the change within each matched pair. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

23. C — Whether at least one mean differs among three or more groups. ANOVA compares group variation with within-group variation; follow-up analysis identifies which groups differ. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should

apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

24. B — Association or differences involving categorical count data. Chi-square methods compare observed category counts with expected counts under a stated assumption. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the customer,

25. A — Modeling and predicting a response using one or more predictors. Regression estimates how the response changes with predictors while quantifying uncertainty and residual variation. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

26. D — The proportion of response variation explained by the fitted model. R-squared is descriptive and should be considered with residual checks, prediction needs, and practical significance. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

27. B — The differences between observed responses and model predictions. Residual analysis checks whether model assumptions are reasonable and whether important patterns remain unexplained. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

28. D — A planned method for changing inputs to learn their effects on outputs. DOE enables efficient, causal learning about factors and interactions rather than changing one factor at a time. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team

29. C — An input variable deliberately changed or studied for its effect. Factors are controllable or observed inputs that may influence the process response. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

30. A — A specific setting of a factor used in an experiment. Levels define the planned conditions, such as low and high settings, for each studied factor. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

31. C — A condition where the effect of one factor depends on another factor's setting. Interactions matter because one-factor conclusions can be misleading when factors work together. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

32. D — To protect conclusions from time-related and nuisance-variable bias. Randomization spreads unknown influences across treatments and strengthens the causal interpretation of results. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

33. A — To estimate experimental error and improve confidence in effects. Replication provides repeated evidence and helps distinguish real factor effects from ordinary variation. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

34. B — Grouping similar experimental units to reduce known nuisance variation. Blocking isolates predictable sources of variation so treatment comparisons become more precise. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

35. A — Anticipating failure modes and prioritizing actions to reduce risk. FMEA examines potential failures, their effects, causes, and controls before customers experience the problem. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

36. D — The seriousness of the effect if a failure occurs. Severity measures impact, separate from how often the failure happens or whether controls detect it. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

37. C — The likelihood that a failure cause will occur. Occurrence estimates the frequency or probability of a cause under current process conditions. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

38. B — The likelihood that existing controls will detect the problem before impact. Detection evaluates control effectiveness in finding a failure before it reaches the next customer. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this

idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

39. D — A documented method for monitoring critical measures and responding to signals. Control plans specify measures, methods, frequency, owners, and reaction plans to sustain the improved process. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

40. C — Predefined action when a monitored measure indicates an unacceptable condition. Reaction plans turn signals into prompt, consistent action and prevent uncertainty about who responds. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

41. B — A limited deployment used to evaluate a solution before broad rollout. Pilots reduce implementation risk and reveal unintended consequences while changes are still easy to adjust. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

42. A — Maintaining the process and its ongoing performance after project closure. The process owner accepts the improved process, monitors results, and leads response when performance changes. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

43. A — Providing organizational support, resources, and barrier removal. Sponsors align projects with strategy and help resolve issues beyond the improvement team's authority. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

44. D — Lead or support data-driven improvement projects using DMAIC tools. Green Belts apply structured problem solving, analysis, and change leadership while collaborating with process experts and sponsors. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

45. C — Preparing people to adopt, use, and sustain a new way of working. Technical solutions must be understood, accepted, trained, and reinforced to produce lasting results. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

46. B — Understanding affected parties, their needs, influence, and communication requirements. Stakeholder analysis helps a project team build support and anticipate resistance early in the work. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

47. A — A plan for what information is shared, with whom, when, and how. Communication plans keep stakeholders informed and align expectations through the project lifecycle. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

48. D — A role chart identifying who is responsible, accountable, consulted, and informed. RACI clarifies decision and work roles, reducing duplicate effort and missed ownership across the team. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

49. B — Using several aligned measures to avoid optimizing one result at another's expense. Balanced measures consider multiple dimensions, such as quality, delivery, cost, and people, when evaluating change. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

50. C — A measure that signals conditions likely to influence future results. Leading indicators give teams early warning and time to take preventive action before outcomes deteriorate. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

51. A — A measure that reports outcomes after they occur. Lagging indicators report results such as defects, cost, or customer complaints after performance is already realized. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

52. D — A focused, short-term cross-functional effort to improve a defined process. Kaizen events combine observation, rapid experimentation, and implementation to create concentrated improvement momentum. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

53. C — Visible cues that communicate standards, status, and abnormalities at a glance. Visual management reduces information delays and helps people recognize and respond to changing conditions quickly. The remaining options describe unrelated practices or misuse a quality-improvement concept. A

Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

54. B — A concise visual display of selected performance measures for decision making. A dashboard should present relevant measures, targets, trends, and signals without overwhelming users with unnecessary data. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

55. C — The rationale explaining why a project matters to the organization. The business case links the problem to strategic, financial, customer, safety, or operational consequences. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

56. B — A formal review point for confirming progress and readiness to continue. Tollgates allow sponsors and teams to assess evidence, decisions, risks, and resource needs at DMAIC transitions. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

57. A — A structured capture of useful knowledge for future work. Lessons learned document successes, failures, and recommendations so the organization can reuse improvement knowledge. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

58. D — Comparing performance or practices with a relevant reference point. Benchmarking can identify gaps and ideas, but teams must adapt insights to their own customers and process conditions. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

59. C — A map linking customer touchpoints with frontstage and backstage process work. Service blueprints make support processes and handoffs visible, helping teams improve the complete customer experience. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

60. A — Anything that limits a system from achieving more of its goal. Constraints may involve capacity, policy, information, skills, or equipment and warrant focused improvement attention. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

61. D — Elapsed time that work waits before the next processing activity starts. Queue time increases total lead time without transforming the product or service for the customer. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

62. B — The time needed to complete one unit at a process step. Cycle time measures processing pace and differs from total lead time, which includes waiting and delays. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

63. D — Total elapsed time from customer request to delivery. Lead time includes processing, waiting, handoffs, transport, and other delays that customers experience. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

64. C — Loss, delay, or misunderstanding when work moves between people or steps. Handoffs deserve attention because information and accountability can degrade when work crosses boundaries. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

65. B — The cost caused by defects, rework, scrap, failures, and lost opportunities. COPQ makes quality losses visible and helps justify investments that prevent errors rather than repair them. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

66. A — Work that consumes resources without changing the output in a way the customer values. Non-value-added work should be eliminated, reduced, or simplified unless a genuine requirement makes it necessary. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team

67. A — Producing more, sooner, or faster than downstream demand requires. Overproduction drives excess inventory and hides quality, flow, and capacity problems in the system. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

68. C — A visual design of the improved value stream after targeted changes. Future-state mapping turns analysis into a shared improvement vision with better flow, pull, and information signals. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt

should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

69. B — Define, by establishing the problem, business case, scope, and goal. Define aligns the work with a real business need before the team commits resources. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

70. D — Establish a reliable baseline of current process performance. Measure creates credible evidence about the current state and the quality of the data. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

71. D — Verify the vital causes that drive the performance gap. Analyze distinguishes plausible causes from causes supported by process and data evidence. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

72. C — Develop and test solutions that address verified causes. Improve changes the process only after the team understands what is actually causing the gap. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

73. A — Sustain improved performance through monitoring, ownership, and response plans. Control embeds the new method into routine work and prevents performance from drifting back. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

74. B — A defined team to work on an approved problem within stated boundaries. The charter gives the team direction, scope, sponsorship, and a basis for accountability. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

75. C — The current measurable performance gap and where it occurs. A good problem statement describes the existing condition without assuming the solution or root cause. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

76. A — A measurable requirement that strongly affects customer satisfaction. CTQs turn customer needs into measurable process or output requirements for the project. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

77. B — To provide a high-level view of suppliers, inputs, process, outputs, and customers. SIPOC helps a team agree on process boundaries and the key relationships before detailed mapping. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

78. D — The sequence, decisions, handoffs, and rework loops in a process. A detailed map exposes how work actually moves, including delays and hidden decision points. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

79. C — An unambiguous rule for measuring or classifying data. Operational definitions improve consistency so multiple people collect and interpret data the same way. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

80. A — Whether the measurement process is adequate for decision making. MSA evaluates the reliability of the data source before the team bases conclusions on it. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

81. D — Consistency of repeated measurements by the same appraiser. Repeatability focuses on variation produced when one person measures the same item repeatedly. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

82. B — Consistency of measurements across different appraisers. Reproducibility addresses whether different people obtain similar results using the same method. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the customer, and sustain

83. D — Closeness of a measured value to the accepted true value. Accuracy concerns bias from the true value, whereas precision concerns repeated consistency. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational

definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

84. A — Closeness of repeated measurements to one another. Precision reflects the amount of spread among repeated observations, whether or not they are accurate. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

85. C — Measurements that can take any value within an interval. Continuous data include values such as time, weight, distance, and temperature measured on a scale. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

86. B — Counts or classifications such as pass-fail or defect-no defect. Attribute data sort observations into categories or count occurrences rather than measuring a continuum. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

87. A — To collect representative evidence efficiently from a larger population. A sampling plan states how items will be selected so conclusions are not driven by convenience or bias. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

88. D — The list or source from which a sample is drawn. The frame defines the accessible population and must be appropriate to avoid coverage bias. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

89. C — Selection bias in the choice of observations. Random selection gives eligible population members a fair chance of inclusion and improves representativeness. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

90. B — Separates data into meaningful subgroups for comparison. Stratifying by shift, product, supplier, or location can reveal patterns concealed in aggregated data. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

91. A — The distribution, center, spread, and shape of numerical data. Histograms group numerical values to make variation and unusual distribution features visible to the team. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

92. B — Center, spread, skew, and potential outliers across data sets. Box plots summarize distributions compactly and are useful for comparing groups on the same scale. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

93. C — Prioritize categories contributing the greatest frequency or impact. Pareto analysis focuses attention on the few categories that account for much of the observed problem. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

94. D — The relationship between two numerical variables. Scatter plots display paired data and can show association, clusters, nonlinear patterns, or no relationship. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

95. D — Association, but not proof that one variable causes the other. Correlation can guide investigation, but confounding and coincidence must be ruled out before causal claims. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

96. A — Data plotted in time order without calculated control limits. Run charts help detect trends, shifts, or cycles and often precede more formal control-chart analysis. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

97. C — The arithmetic average of a set of observations. The mean uses every value and is useful for center, but it can be sensitive to extreme observations. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

98. B — The middle observation after values are ordered. The median is a resistant measure of center that is less affected by extreme values than the mean. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational

definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

99. A — A measure of typical spread around the mean. Standard deviation summarizes dispersion and is essential for understanding process variation and capability. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

100. C — Investigation to determine whether it is error, special cause, or a valid rare event. Outliers should not be discarded automatically because they can contain valuable information about the process. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team

101. B — Common-cause variation from special-cause signals over time. Control charts combine time order and statistical limits to assess whether a process is stable. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

102. D — Routine variation inherent in a stable process system. Common causes arise from the usual process design and require system-level improvement rather than point reactions. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

103. D — Variation from an unusual, identifiable event outside the routine system. Special causes signal that something different occurred and should be investigated before broad process adjustment. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

104. A — The observed variation of a process over time. Control limits describe expected process behavior and are not customer requirements or specification limits. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

105. C — Customer, design, contractual, or regulatory requirements. Specifications define acceptable output; they are distinct from limits calculated from process behavior. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the customer, and

106. B — The process spread with the width of the specification limits. Cp is a potential capability measure and does not account for whether the process is centered. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

107. D — How centered the process mean is within the specification limits. Cpk reflects both process spread and centering, making it a more realistic capability indicator. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

108. A — After the process is demonstrated to be statistically stable. Capability indices can mislead when special causes are present because the process behavior is not predictable. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

109. B — A map of material and information flow from request to delivery. Value stream mapping exposes lead time, process time, inventories, and information signals across the entire value stream. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make

110. C — The required production pace to meet customer demand. Takt links available work time to demand and helps teams identify mismatch between capacity and need. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

111. A — The resource or step that limits total system throughput. Improving the bottleneck can improve system performance, while improving nonconstraints may not increase output. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

112. D — Work in process, throughput, and lead time in a stable system. Little's Law highlights why excess work in process generally increases lead time when throughput is unchanged. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

113. B — A system that releases work in response to downstream demand. Pull avoids premature production and controls work in process through visible demand signals. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with

operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

114. C — A visual authorization to replenish or move work. Kanban is a practical pull-system mechanism that limits inventory and makes replenishment needs visible. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

115. A — A workplace that is organized, visual, safe, and sustainable. 5S reduces searching and ambiguity while making abnormal conditions easier to notice and correct. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

116. B — The currently best known method for performing a task consistently. Standard work provides a stable baseline for training, auditing, improvement, and reliable execution. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

117. D — A device or method that prevents errors or makes them immediately detectable. Mistake-proofing changes the work so common errors are difficult to make or cannot pass unnoticed. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

118. C — Organizing potential causes of a defined effect. The fishbone diagram broadens team thinking and organizes causes for later data-based verification. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the customer,

119. B — Progressive questioning from a symptom toward an underlying causal mechanism. Five Whys is useful when supported by evidence; it should not substitute for testing assumptions. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

120. A — Testing whether a suspected cause actually drives the observed problem. Verification separates plausible explanations from causes that demonstrably influence the response or defect. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

121. D — Assessing whether observed evidence is consistent with a stated statistical claim. Hypothesis testing quantifies whether an observed difference is unlikely to be explained by sampling variation alone. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

122. C — The default statement of no difference or no effect. The null is the claim tested against the data and is rejected only when evidence is sufficiently strong. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions

123. D — The probability of data at least this extreme if the null hypothesis were true. A p-value measures compatibility with the null; it is not the probability that the null is true. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps

124. C — The preselected risk of a Type I error. Alpha sets the decision threshold for rejecting a true null hypothesis, commonly before data analysis begins. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

125. A — Rejecting a true null hypothesis. Type I error is a false positive decision and its probability is controlled by the chosen alpha level. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

126. B — Failing to reject a false null hypothesis. Type II error is a false negative decision and is related to statistical power and sample size. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

127. C — The probability of detecting a real effect when one exists. Power increases when effect size grows, variation decreases, alpha increases, or sample size increases. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

128. A — A range of plausible values for an estimated population parameter. Confidence intervals communicate estimate uncertainty and are generally more informative than a significance decision alone. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

129. B — The means of two independent groups. A two-sample t test evaluates whether the difference between two group means is larger than expected from variation. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

130. D — Matched observations measured in pairs, such as before and after results. Pairing removes between-subject differences by analyzing the change within each matched pair. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

131. A — Whether at least one mean differs among three or more groups. ANOVA compares group variation with within-group variation; follow-up analysis identifies which groups differ. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

132. D — Association or differences involving categorical count data. Chi-square methods compare observed category counts with expected counts under a stated assumption. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the customer,

133. B — Modeling and predicting a response using one or more predictors. Regression estimates how the response changes with predictors while quantifying uncertainty and residual variation. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

134. C — The proportion of response variation explained by the fitted model. R-squared is descriptive and should be considered with residual checks, prediction needs, and practical significance. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

135. B — The differences between observed responses and model predictions. Residual analysis checks whether model assumptions are reasonable and whether important patterns remain unexplained. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

136. D — A planned method for changing inputs to learn their effects on outputs. DOE enables efficient, causal learning about factors and interactions rather than changing one factor at a time. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should

apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team

137. C — An input variable deliberately changed or studied for its effect. Factors are controllable or observed inputs that may influence the process response. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

138. A — A specific setting of a factor used in an experiment. Levels define the planned conditions, such as low and high settings, for each studied factor. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

139. A — A condition where the effect of one factor depends on another factor's setting. Interactions matter because one-factor conclusions can be misleading when factors work together. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

140. C — To protect conclusions from time-related and nuisance-variable bias. Randomization spreads unknown influences across treatments and strengthens the causal interpretation of results. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

141. B — To estimate experimental error and improve confidence in effects. Replication provides repeated evidence and helps distinguish real factor effects from ordinary variation. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect

142. D — Grouping similar experimental units to reduce known nuisance variation. Blocking isolates predictable sources of variation so treatment comparisons become more precise. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

143. A — Anticipating failure modes and prioritizing actions to reduce risk. FMEA examines potential failures, their effects, causes, and controls before customers experience the problem. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system,

144. B — The seriousness of the effect if a failure occurs. Severity measures impact, separate from how often the failure happens or whether controls detect it. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

145. D — The likelihood that a failure cause will occur. Occurrence estimates the frequency or probability of a cause under current process conditions. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the system, protect the

146. C — The likelihood that existing controls will detect the problem before impact. Detection evaluates control effectiveness in finding a failure before it reaches the next customer. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address

147. C — A documented method for monitoring critical measures and responding to signals. Control plans specify measures, methods, frequency, owners, and reaction plans to sustain the improved process. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

148. D — Predefined action when a monitored measure indicates an unacceptable condition. Reaction plans turn signals into prompt, consistent action and prevent uncertainty about who responds. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address the

149. A — A limited deployment used to evaluate a solution before broad rollout. Pilots reduce implementation risk and reveal unintended consequences while changes are still easy to adjust. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that

150. B — Maintaining the process and its ongoing performance after project closure. The process owner accepts the improved process, monitors results, and leads response when performance changes. The remaining options describe unrelated practices or misuse a quality-improvement concept. A Black Belt should apply this idea with operational definitions, appropriate data, and process knowledge. Doing so helps the team make decisions that address