

# GAQM

## CLSSMBB-001

### Lean Six Sigma Master Black Belt

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# Latest Version: 6.0

## Question: 1

Which of the following best differentiates a special cause from a common cause in a process behavior chart?

- A. Variation that is inherent to the process, appearing as a stable predictable pattern
- B. A non-random variation that can be assigned to a specific source
- C. Variation due to operator error only
- D. Variation that improves the process only

**Answer: B**

Explanation:

A special cause is a variation that is non-random and can be traced to a specific, identifiable source outside the normal process, whereas common cause variation is inherent, stable, and predictable within the process.

## Question: 2

Cpk=1.67 centered, but Ppk=1.33 after 6mo dat

a. Indicates:

- A.  $0.5\sigma$  drift
- B. A&B
- C. Normal
- D. Instability

**Answer: B**

Explanation:

Ppk lower signals between-subgroup variation/drift  $\sim 0.5\sigma$  equiv.

## Question: 3

Battery fab constraint variability  $\sigma=21\%$ . LSS-TOC buffer/RL for  $\sigma=5\%$ ?

- A. RL-optimized 1.3x + DOE
- B. DOE
- C. Buffer fixed
- D. RL sim

**Answer: D**

Explanation:

RL min Var( $\sigma$ )=5%, throughput +37%.

### Question: 4

A Lean Six Sigma Master Black Belt is prioritizing solutions with the steps: score each solution on impact, effort, and risk, then multiply scores by corresponding weights. What best describes this technique?

- A. Failure Modes and Effects Analysis
- B. Pareto Chart Analysis
- C. Weighted Multi-Criteria Decision Analysis
- D. Root Cause Analysis

**Answer: C**

Explanation:

Assigning scores and weights to multiple criteria and calculating weighted sums is characteristic of Weighted Multi-Criteria Decision Analysis used in solutions prioritization.

### Question: 5

Healthcare diagnostic scan times model 3-parameter Weibull ( $\beta=2.8$ ,  $\eta=25$  min,  $\gamma=3$  min),  $R(40$  min)=0.41 links to patient throughput <80%, \$250,000 overtime. Estimate kurtosis and design Control phase EWMA for scan variability to throughput KPIs.

- A. 2.8, limits based on Weibull quantiles for wait <15 min
- B. 3.2, exponentially weighted charts on tech fatigue for 90% utilization
- C. 5.0, adaptive thresholds for peak hour adjustments
- D. 5.9, integration with ARIMA for forecasting bottlenecks

**Answer: A**

Explanation:

Weibull kurtosis =  $6 + [\Gamma(1+1/\beta)]^4 / [\Gamma(1+2/\beta) - \Gamma^2(1+1/\beta)]^2 - 4\Gamma(1+1/\beta)^2 / [\Gamma(1+2/\beta) - \Gamma^2(1+1/\beta)]$ , for  $\beta=2.8$ . Leptokurtic tails exacerbate delays. Control EWMA with Weibull-derived UCL/LCL detects shifts, maintaining variability <10%, lifting throughput to 90% and cutting \$250,000 overtime via staffing optimizations.

### Question: 6

Which of the following best describes the primary purpose of the project charter in Lean Six Sigma?

- A. To serve as a formal agreement outlining team member responsibilities
- B. To document the detailed process maps and control plans

- C. To provide a high-level overview of project objectives, scope, and resources
- D. To record the tactical steps for project execution

**Answer: C**

Explanation:

The project charter offers a high-level summary that defines objectives, scope, and resource commitments, guiding the team and aligning stakeholders throughout the project lifecycle.

### Question: 7

Skewed left defect rates data: 0.1%, 0.2%, 0.5%, 1.0%, 5.0% (outlier). Team plots boxplot identifying 5.0% as outlier ( $>Q3+3IQR$ ). MBB advises retain for dispersion calc using what advanced metric over IQR?

- A. Gini mean difference
- B. Bowley's skewness coefficient
- C. Adjusted Boxplot (Tukey fence)
- D. Coefficient of variation (CV)

**Answer: A**

Explanation:

Gini coefficient measures dispersion robust to outliers/skew via pairwise absolute differences/mean, ideal for rates.  $CV=sd/mean$  sensitive to skew. Bowley for asymmetry. Adjusted fences for ID only. Retain outlier if valid special cause; Gini ensures accurate Y variation for Poisson regression in Analyze.

### Question: 8

New service platform: Methodology?

- A. DFSS IDOV
- B. DMAIC
- C. Lean
- D. PDCA

**Answer: A**

Explanation:

IDOV for service design optimization.

### Question: 9

Which is a critical assumption underlying the validity of factorial experiment results?

- A. Independence of experimental runs due to randomization
- B. Homogeneity of experimental units across blocks
- C. Zero interaction between factors
- D. Equal sample size for each factor level

**Answer: A**

Explanation:

Independence of runs through randomization is fundamental to ensure unbiased, valid statistical inference.

### Question: 10

In a logistics route optimization, multiple linear regression on delivery time (Y) vs. distance X1, traffic index X2, vehicle age X3 yields collinear X1-X2 (VIF=6.2). For robust Analyze conclusions:

- A. Apply PCA to combine X1-X2 into principal component
- B. Center X1 and X2 (subtract means) to reduce multicollinearity
- C. Eliminate X2 based on higher p-value
- D. Proceed ignoring VIF threshold

**Answer: A**

Explanation:

High VIF inflates SEs; PCA derives PC1 (80% variance from distance-traffic) as substitute predictor, refitting  $\hat{Y}=20 + 1.1PC1 + 0.5X3$  with  $VIF<2$  and comparable  $R^2=0.85$ , preserving causal insight without bias. This verifies combined route factors' impact, guiding Improve's GPS rerouting for 20% time savings, advanced technique for Analyze in correlated logistics data.

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