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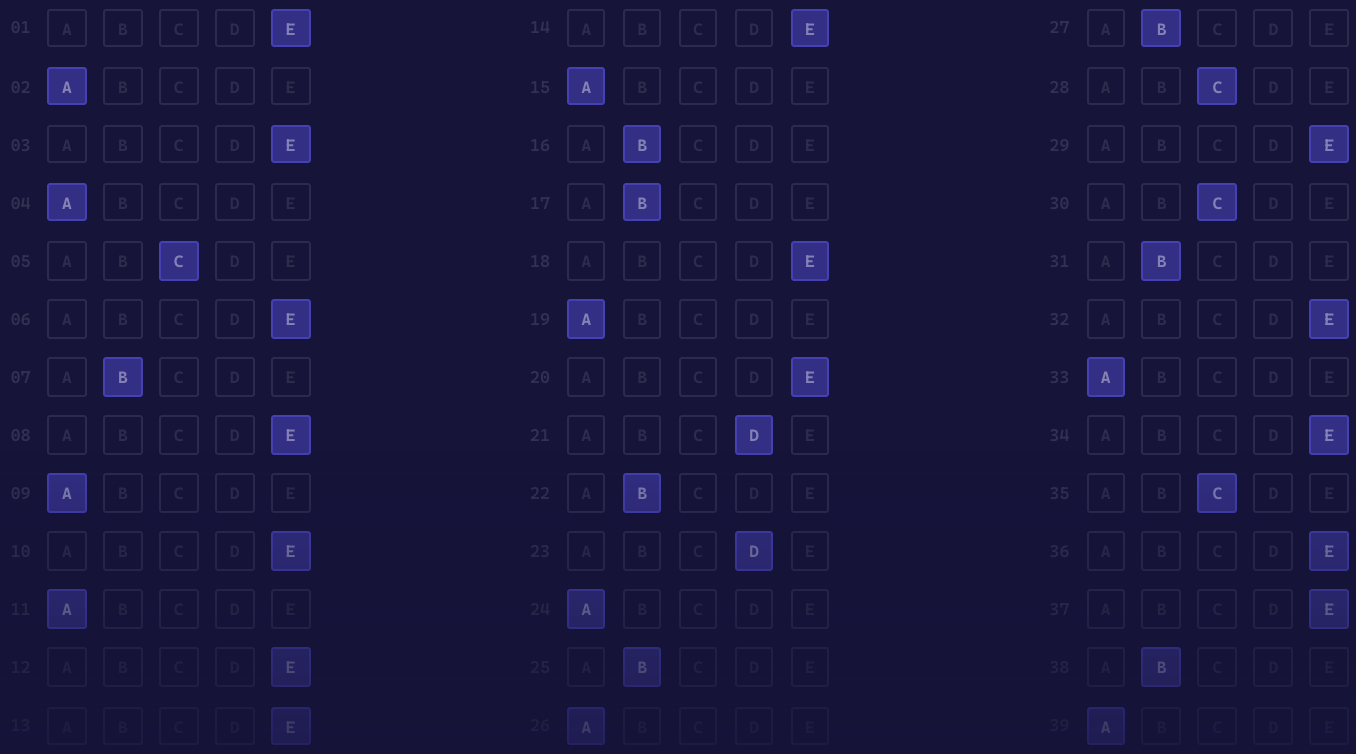

PRACTICE QUESTIONS

American Society For Quality (ASQ)

CQEKO

Certified Quality Engineer (PBT)

EDITION	QUESTIONS	FORMAT
Demo	9	Limited Edition PDF

Before you begin

What this is

9 practice questions for American Society For Quality (ASQ) `CQEKO`, each with its answer key and an explanation. Answer a question before you read its key — the explanation is worth more once you have committed.

If something looks wrong

Send us three things and we will check it:

- the exam code, `CQEKO`
- the question number
- the email address on your order

Write to **support@mometrix.net**. We reply within one business day.

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QUESTION 1 MULTIPLE CHOICE

When designing a full factorial experiment with three factors, each at four levels, which of the following statements about the design are true? (Choose two.)

A **The design requires 64 experimental runs.**

B The design cannot estimate interaction effects.

C **The design can estimate the main effect of each factor independently of the others.**

D The design is a Resolution III fractional factorial design.

ANSWER **A · C**

WHY A full factorial with three factors at four levels each requires 4^3 = 64 runs (option A is correct). Full factorial designs can estimate all main effects and interaction effects; in fact, with multiple levels per factor, the main effects are estimated free of confounding from interactions at higher levels only when interactions are negligible (option C is correct). Full factorials are not Resolution III designs; Resolution III is a term used for certain fractional factorials (option D is wrong). Full factorials do estimate interactions (option B is wrong).

QUESTION 2 MULTIPLE CHOICE

A quality engineer is analyzing process capability and the customer specification limits are 10.00 mm and 10.50 mm. The process has a mean of 10.20 mm and a standard deviation of 0.05 mm. Which of the following statements are correct? (Choose two.)

A **Cp is greater than Cpk.**

B Cpk equals Cp because the process is centered.

C **The process mean is closer to the lower specification limit.**

D Cpk is approximately 1.00.

ANSWER **A · C**

WHY Cp = (USL - LSL) / (6 sigma) = 0.50 / 0.30 = 1.67. Cpk = min[(mean - LSL)/(3 sigma), (USL - mean)/(3 sigma)] = min[(0.20/0.15), (0.30/0.15)] = min[1.33, 2.00] = 1.33. So Cp (1.67) > Cpk (1.33) (option A correct, option B wrong). The mean of 10.20 is 0.20 from the LSL of 10.00 but 0.30 from the USL of 10.50, so the process is shifted toward the lower spec limit (option C correct). Cpk ≈ 1.33, not 1.00 (option D wrong).

QUESTION 3 SINGLE CHOICE

In hypothesis testing, the probability of rejecting the null hypothesis when it is actually true is called the:

A power of the test

B significance level (alpha risk)

C Type II error (beta)

D confidence level

ANSWER B

WHY The significance level, alpha, is the probability of a Type I error—rejecting a true null hypothesis (option B correct). Power (1 - beta) is the probability of correctly rejecting a false null hypothesis (option A wrong). Type II error (beta) is failing to reject a false null hypothesis (option C wrong). The confidence level is 1 - alpha, which is the probability of correctly not rejecting a true null hypothesis (option D wrong).

QUESTION 4 SINGLE CHOICE

A company identifies costs associated with warranty claims, returned products, and field repairs after shipment to customers. These costs are classified as:

A prevention costs

B appraisal costs

C internal failure costs

D external failure costs

ANSWER D

WHY Costs incurred after a product reaches the customer—including warranty claims, returns, and field repairs—are external failure costs per the PAF (Prevention-Appraisal-Failure) cost model (option D correct). Prevention and appraisal costs are incurred before defects occur or are detected (options A and B wrong). Internal failure costs are scrap, rework, and reinspection detected before shipment (option C wrong).

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QUESTION 5 SINGLE CHOICE

In MIL-STD-105E (ANSI/ASQ Z1.4) attribute sampling, when the acceptable quality level (AQL) is 1.0 and the lot size is 2,000 units, increasing the inspection level from General Level II to General Level III will:

A decrease the sample size required

B leave the sample size unchanged

C increase the sample size required

D require switching from normal to reduced inspection

ANSWER C

WHY Higher inspection levels in Z1.4 require larger sample sizes for the same lot size and AQL. Moving from Level II to Level III increases the sample size (option C correct). The change in level does not by itself switch between normal, tightened, or reduced inspection (option D wrong). Options A and B contradict the standard's sample size tables.

QUESTION 6 SINGLE CHOICE

On an X-bar and R control chart, the central line on the R chart represents the:

A average of the subgroup means

B average of the subgroup ranges

C upper control limit for the range

D process standard deviation

ANSWER B

WHY The central line on the R chart is the average range (R-bar) of the subgroups (option B correct). The central line on the X-bar chart is the average of the subgroup means (option A wrong). UCL and LCL are separate limits; UCL is not the central line (option C wrong). The chart's central line does not directly represent the standard deviation; that is computed via d2 (option D wrong).

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QUESTION 7 SINGLE CHOICE

A product's failure rate follows the classic bathtub curve. The high failure rate observed early in the product's life is primarily caused by:

A wear-out failures

B infant mortality due to manufacturing defects

C random external shocks

D design changes during production

ANSWER B

WHY The descending portion of the bathtub curve (the early-life period) represents infant mortality, dominated by manufacturing or assembly defects and material flaws that manifest shortly after the product is placed in service (option B correct). Wear-out failures dominate the rising right side of the curve, not the early period (option A wrong). Random external shocks correspond to the constant middle portion, not the early decline (option C wrong). Design changes are unrelated to the shape of the curve (option D wrong).

QUESTION 8 SINGLE CHOICE

In a 2^k factorial design, the effect of an interaction AB is calculated by:

A averaging the response at the (1) and a treatment combinations only

B computing the difference between the average response at the high level of both factors and the average response at the low level of both factors

C comparing main effect A with main effect B

D plotting the response against factor A only

ANSWER B

WHY In a 2^k factorial, the interaction effect AB is computed as the average response when both A and B are high minus the average response when both are low, divided by 2n (where n is the number of replicates), which simplifies to the difference between the appropriate treatment combinations (option B correct). Using only (1) and a is the definition of main effect A (option A wrong). The other options do not define an interaction.

QUESTION 9 SINGLE CHOICE

During a quality system audit, the auditor discovers that operators have not been following the documented work instruction for a critical process step. This condition is best classified as:

A **a nonconformity**

B an observation

C an opportunity for improvement

D a preventive action

ANSWER **A**

WHY Departure from a documented requirement of the quality system is a nonconformity (option A correct). Observations are typically noted when no requirement is violated. Opportunities for improvement are suggestions, not findings. A preventive action is a response to a potential cause of nonconformity, not the finding itself.

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