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36	A	B	C	D	E
37	A	B	C	D	E
38	A	B	C	D	E
39	A	B	C	D	E

PRACTICE QUESTIONS

ASQ PAPER-BASED EXAM – KOREA

CREEN

Certified Reliability Engineer

EDITION

Demo

QUESTIONS

9

FORMAT

Limited Edition PDF

Before you begin

What this is

9 practice questions for ASQ PAPER-BASED EXAM – KOREA CREEN , 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, CREEN
- the question number
- the email address on your order

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

QUESTION 1

SINGLE CHOICE

A product's failure rate, as a function of operating time, decreases sharply during the first few hundred hours of operation and then stabilizes at a nearly constant value. Which region of the classic bathtub curve does this behavior characterize?

- ☐ A Useful life / random failure region
- ☐ B Wear-out region
- ☒ C Infant mortality / early failure region
- ☐ D Burn-in region only when burn-in is performed at elevated stress

ANSWER C

WHY The early-life (infant mortality) region is characterized by a decreasing failure rate caused by manufacturing defects, substandard components, and assembly errors. Once those substandard units have failed and been removed, the population enters the useful-life region with a roughly constant failure rate. The wear-out region shows an increasing failure rate due to degradation mechanisms such as fatigue, corrosion, and wear. Option D is a distractor describing a process, not a region of the bathtub curve.

QUESTION 2

SINGLE CHOICE

A reliability engineer is modeling the time to failure of an electronic component that exhibits a constant hazard rate and has no memory of its operating history. Which probability distribution is most appropriate for the time-to-failure random variable?

- ☐ A Weibull distribution with shape parameter less than 1
- ☐ B Normal distribution
- ☒ C Exponential distribution
- ☐ D Lognormal distribution

ANSWER C

WHY The exponential distribution is the standard model for components with a constant hazard (failure) rate and the memoryless property, meaning the probability of failure in the next interval does not depend on how long the component has already operated. A Weibull with shape less than 1 also has a decreasing hazard but is not the textbook choice for a strictly constant hazard. The normal and lognormal distributions apply to processes that are sums/products of many small effects and do not enforce constant hazard.

QUESTION 3

SINGLE CHOICE

Two identical, independent components, each with reliability R , are arranged in parallel. The system functions if at least one component functions. Which expression correctly gives the system reliability?

- ☐ A $R_s = R^2$
- ☒ B $R_s = 1 - (1 - R)^2$
- ☐ C $R_s = 2R$
- ☐ D $R_s = 1 - R^2$

ANSWER B

WHY For a parallel configuration of two independent, identical components, system failure occurs only when both components fail, with probability $(1 - R)(1 - R) = (1 - R)^2$. System reliability is one minus that probability: $R_s = 1 - (1 - R)^2 = 2R - R^2$. Option A describes a series configuration. Options C and D are algebraically incorrect rearrangements.

QUESTION 4

SINGLE CHOICE

An accelerated life test uses elevated temperature to speed up a thermally activated failure mechanism modeled by the Arrhenius equation. If the test is run at a higher absolute temperature, the acceleration factor compared to use conditions will:

- ☐ A Decrease because higher temperature increases the activation energy
- ☐ B Remain the same because the activation energy is a material constant
- ☒ C Increase because the reaction rate grows exponentially with temperature
- ☐ D First increase, then decrease, due to competing failure mechanisms

ANSWER C

WHY The Arrhenius model expresses the reaction rate as $k = A \cdot \exp(-E_a / kT)$. Increasing the absolute temperature T increases the exponent $-E_a / kT$ toward zero, so the rate k grows exponentially with temperature and the acceleration factor (ratio of use-condition rate to test-condition rate) increases. The activation energy E_a is treated as a material constant, not a variable of T . Option D describes behavior outside the Arrhenius single-mechanism assumption.

QUESTION 5

SINGLE CHOICE

In the parts-count reliability prediction method, the overall equipment failure rate is obtained by summing the failure rates of individual components, each modified by factors that account for:

- ☒ A The component's quality level, application environment, and stress conditions
- ☐ B The supplier's financial strength, country of origin, and shipping distance
- ☐ C The component's color, package shape, and date code only
- ☐ D The component's position on the printed circuit board and silkscreen label

ANSWER A

WHY The parts-count method uses generic base failure rates for each component category and then multiplies by pi factors that capture quality level, environment, and stress (temperature, electrical, etc.). This produces an aggregated equipment failure rate without detailed stress analysis of each part. The other options list attributes that are not part of the standard prediction methodology.

QUESTION 6

SINGLE CHOICE

A reliability demonstration test must show, with a specified confidence level, that the mean time between failures (MTBF) of a system meets a target value using a chi-square based test on observed failure times. The chi-square test statistic depends on which of the following inputs?

- ☒ **A** Number of failures observed, cumulative test time, and the target MTBF
- ☐ **B** Number of suppliers in the approved vendor list only
- ☐ **C** Color and labeling scheme of the test equipment
- ☐ **D** The ambient humidity during the test, regardless of test time

ANSWER A

WHY For an MTBF demonstration under an exponential time-to-failure assumption, the classical chi-square procedure uses the relationship between observed failures r , total test time T , and the specified MTBF requirement θ_0 . The test statistic $2rT/\theta_0$ is compared to chi-square with $2r$ degrees of freedom to accept or reject the MTBF claim at the chosen confidence level. The other options are unrelated to the statistical test inputs.

QUESTION 7

SINGLE CHOICE

In a traditional FMEA, the risk priority number (RPN) is computed as the product of three ratings. Which set of ratings is used to compute RPN in the conventional FMEA approach?

- ☒ **A** Severity, occurrence, and detection
- ☐ **B** Cost, schedule, and performance
- ☐ **C** Mean, variance, and skewness of the failure distribution
- ☐ **D** Temperature, humidity, and vibration

ANSWER A

WHY The conventional RPN is calculated as Severity x Occurrence x Detection, each typically scored on a 1-10 scale. Severity rates the consequence of failure, occurrence rates the likelihood of the failure mode, and detection rates the ability of current controls to detect the failure mode before it reaches the customer. Options B, C, and D are not the FMEA RPN inputs.

QUESTION 8

SINGLE CHOICE

A system has MTBF = 800 hours and MTTR = 2 hours, and preventive maintenance downtime is negligible. Which value best approximates the inherent availability of the system?

- ☐ A 0.0025
- ☒ B 0.9975
- ☐ C 0.8000
- ☐ D 0.0200

ANSWER B

WHY Inherent availability is defined as $A_i = \text{MTBF} / (\text{MTBF} + \text{MTTR}) = 800 / (800 + 2) = 800 / 802 = 0.9975$. Option A is the unavailability $2/802$, but rounded to four decimals it is 0.0025, which is not the inherent availability. Option C is the ratio of MTBF to MTTR (incorrect), and option D is MTTR divided by MTBF (incorrect).

QUESTION 9

SINGLE CHOICE

A manufacturer rates the reliability of a household appliance as the probability that it will perform its intended function under stated conditions for a specified period of time. According to ASQ's reliability terminology, which term best describes this rating?

- ☐ A Availability
- ☐ B Durability
- ☒ C Reliability (probability-of-success definition)
- ☐ D Mean time to failure (MTTF)

ANSWER C

WHY ASQ defines reliability as the probability that a product, piece of equipment, or system will perform its intended function under stated conditions, without failure, for a stated period of time. This is the classic probability-of-success definition of reliability. Availability involves both reliability and maintainability. Durability is a related but distinct concept about useful life under specified conditions. MTTF is an expected value, not a probability rating.