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**Exam** : **CRE**

**Title** : **Certified Reliability  
Engineer (CRE)**

**Vendor** : **ASQ**

**Version** : **DEMO**

**QUESTION NO: 1**

Which mathematical method provides a solution, has a time dimension and is solved numerically?

Response:

- A. Analytic solution.
- B. Simulation model.
- C. Strength and stress model.
- D. None of the above.

**Answer:** B

**QUESTION NO: 2**

In an elevated-temperature test on an electronic system, which of the following models is used to calculate the acceleration factor?

Response:

- A. Exponential model.
- B. Inverse power law model.
- C. Lognormal model.
- D. Arrhenius model.

**Answer:** D

**QUESTION NO: 3**

The MOST desirable outcome of an FMEA is

Response:

- A. A recommended action
- B. An estimated of the detection number.
- C. An estimated of the occurrence number.
- D. A risk priority number

**Answer:** A

**QUESTION NO: 4**

A component has a constant failure rate of 0.0005 failures per hour. What is the reliability for 1,000 hours of operation assuming wearout is not a factor?

Response:

- A. 0.995
- B. 0.607
- C. 0.500
- D. 0.373

**Answer:** B

**QUESTION NO: 5**

An aggregate preventive maintenance program can greatly increase the overall availability of a system because of the Response:

- A. Improved control of inventory levels.

- B. Ability to improve observed reliability.
- C. Emphasis on budgeting operational expenses.
- D. Ability to improve product safety.

**Answer:** B

**QUESTION NO: 6**

A "fail-safe" requirement means:

Response:

- A. The system is safe from failure.
- B. The system will fall in a safe state.
- C. The safety systems cannot fail.
- D. The system has safety devices.

**Answer:** B

**QUESTION NO: 7**

A company has produced a new module. The failure data on 40 returns are shown below.

Time to Failure (in hours)	Number of Returns
1	5
5	5
10	15
12	10
20	5

Which of the following is the first step in the review of this situation ?

Response:

- A. Determine the location in which the failure occurred.
- B. Identify the field service personnel who handled the returns.
- C. Find the median of the data set.
- D. Categorize the data by using a Pareto analysis.

**Answer:** A

**QUESTION NO: 8**

For equipment consisting of three components connected in series whose respective reliabilities are

0.95, 0.94, 0.96, which could be used to calculate total probability?

Response:

- A. Bayes Theorem.
- B. Addition law.
- C. Product rule.

D. Exponential failure law.

**Answer:** C

**QUESTION NO: 9**

In which of the following situation is it NOT advantageous to use Bayesian in reliability calculation?

Response:

- A. When each piece of new information will arrive in random error.
- B. When no prior information is available.
- C. When both continuous and discrete data will be used.
- D. When both objective and subjective information must be used

**Answer:** B

**QUESTION NO: 10**

A random sample of 100 bars of aluminum shows a tensile strength mean of 30,000 psi and a standard deviation of 3,000 psi. On the basis of this sample, what is the 95 percent confidence interval for the average tensile strength?

Response:

- A.  $30,000 \pm 768$  psi
- B.  $30,000 \pm 600$  psi
- C.  $30,000 \pm 588$  psi
- D.  $30,000 \pm 528$  psi

**Answer:** C

**QUESTION NO: 11**

Measures of availability include:

- I. Effectiveness.
- II. Inherent.
- III. Achieved.
- IV. Dependability.
- V. Capability.

Response:

- A. II and III only
- B. I, III and IV
- C. III, IV and V
- D. II, III and IV

**Answer:** A

**QUESTION NO: 12**

Availability of a system is roughly the:

Response:

- A. Sum of the individual system availabilities.
- B. The quotient of the individual subsystem availability.
- C. The difference of the individual subsystem.

D. Product of the individual subsystem availabilities.

**Answer:** D

**QUESTION NO: 13**

For complex electronics systems, the major contributor to repair time is generally:

Response:

- A. Remove/replace.
- B. Final checkout.
- C. Disassembly/reassembly.
- D. Diagnosis.

**Answer:** D

**QUESTION NO: 14**

High cycle fatigue would MOST likely result in

Response:

- A. Constant failure.
- B. Mid-life failure.
- C. Wear out failure.
- D. Early failure.

**Answer:** C

**QUESTION NO: 15**

Inherent reliability can be increased by:

Response:

- A. Training in the manufacturing area.
- B. Good maintenance techniques.
- C. Inspection techniques.
- D. Design change.

**Answer:** D

**QUESTION NO: 16**

Basic sources of reliability data are:

- I. In-plant testing.
- II. Field testing.
- III. Operation by user.

Response:

- A. I and III only
- B. I and II only
- C. II and III only
- D. I, II, and III

**Answer:** D

**QUESTION NO: 17**

For human factors testing, the reliability engineer should understand and consider which of

the following?

- I. Sight capabilities.
- II. Touch capabilities.
- III. Audio capabilities.
- IV. Thermal capabilities.
- V. Vibration capabilities.

Response:

- A. I, II, III, IV
- B. I, II, III
- C. II, III IV, V
- D. I, II, III, IV, V

**Answer:** D

**QUESTION NO: 18**

Typical statistical distributions or confidence limits can be determined for accelerated tests. In the case of a step-stress test, the proper estimated distribution would be which of the following?

Response:

- A. Lognormal
- B. None, not meaningful.
- C. Exponential
- D. Weibull

**Answer:** B

**QUESTION NO: 19**

All of the following statements concerning statistical inference are true EXCEPT:

Response:

- A. The confidence interval is a range of values which may include the true value of a population parameter.
- B. Estimation is the process of analyzing a sample result in order to predict the value of the population parameter
- C. The confidence interval is normally the statistical tolerance limits of the population parameter.
- D. The point estimate is a single value used to estimate the population parameter.

**Answer:** C

**QUESTION NO: 20**

An off road trip is contemplated using a utility vehicle equipped with five tires. The probability of failure for each tire on this trip follows the binomial distribution and is estimated to be 0.5. What is the probability that the trip can be completed successfully with the five available tires?

Response:

- A. 0.0625
- B. 0.3125

C. 0.5000

D. 0.1875

**Answer:** D

**QUESTION NO: 21**

A fractional design is said to be saturated when the design only allow the estimation of which of the following?

Response:

A. Main effects, confounded, with all interactions.

B. Main effects and two-way interaction, confounded.

C. Main effects, unconfounded.

D. Main effects, unconfounded, and two-way interactions, confounded.

**Answer:** A

**QUESTION NO: 22**

A component has a strength of 8000 psi and a standard deviation of 1200 psi. It needs to withstand a load with a mean value of 5000 psi and a standard deviation of 500 psi. Both strength and load are normally distributed.

What is the probability of failure for the component?

Response:

A. 0.0014

B. 0.0059

C. 0.0104

D. 0.0174

**Answer:** C

**QUESTION NO: 23**

Risk management includes which of the following?

I. Integration of risk evaluation in all design phases.

II. Knowledge and consideration of liability law.

III. Adopting procedures, policies and practices to control risks.

IV. Providing product labels and operator manuals where appropriate.

Response:

A. I, II, III and IV

B. II and IV only

C. I, II and III only

D. I, II and IV only

**Answer:** A

**QUESTION NO: 24**

Design reviews should have sufficient information available to make their meetings worthwhile. Formal controls (specifications, drawing controls, etc.) should begin with the first design review. This approach is referred to as:

Response:

- A. Quality systems documentation.
- B. Documentation control.
- C. Configuration control.
- D. Standards organization.

**Answer:** C

**QUESTION NO: 25**

A key distinction between Taguchi designed experiments and classical designed experiments is that Taguchi designs Response:

- A. Include 2-level factors and classical design do not.
- B. Are not orthogonal and classical designs are.
- C. Do not rely on randomization and classical experiments do.
- D. Are full-factorial and classical designs are not.

**Answer:** C

**QUESTION NO: 26**

Random sampling plans are based on which of the following assumption?

Response:

- A. The process is unstable.
- B. The data are accurate.
- C. A specific dependency model has been selected.
- D. Every item has an equal chance of being selected.

**Answer:** D

**QUESTION NO: 27**

When a new system is being developed, which of the following will be LEAST effective in speeding up the system reliability growth process?

Response:

- A. Performing systems testing and component testing simultaneously.
- B. Attaining components reliability prior to the system test.
- C. Performing accelerating testing.
- D. Testing the system first to find the failed components.

**Answer:** D

**QUESTION NO: 28**

A mission profile is:

- I. Time-phased.
- II. A summary of events and environments.
- III. All activities from initiation to completion of a mission.

Response:

- A. III only
- B. I, II and III
- C. II and III only

D. I and III only

**Answer:** B

**QUESTION NO: 29**

The function below has a density distribution where  $X$  is a continuous random variable. What is the probability that  $X = 4.0$ ?

$$1 \leq X \leq 5$$

Response:

A. 0.00

B. 0.20

C. 0.30

D. 0.40

**Answer:** A

**QUESTION NO: 30**

A data collection, analysis, and reporting system should:

- I. Permit detailed failure and failure rate analysis for varying environments, time periods, storage conditions, etc.
- II. Provide distinction between items that failed and item that were wrongly removed.
- III. Report data on successes as well as failures.

Response:

A. I and III only

B. II and III only

C. I, II and III

D. I only

**Answer:** C

**QUESTION NO: 31**

The mean of the normal logarithms of the repair times is 4.3 hours with a standard deviation of 0.7 hours. What is the maintainability for an allowed repair time of 120 hours?

Response:

A. 0.243

B. 0.976

C. 0.187

D. 0.757

**Answer:** D

**QUESTION NO: 32**

In the bath curve model, which one of the sections represents the period when catastrophic failure are likely to occur?

Response:

A. Constant failure rate period.

B. Infant mortality

- C. All periods.
- D. Wear out period.

**Answer:** C

**QUESTION NO: 33**

It is of primary importance that the choice of the time-to-failure distribution to represent a particular reliability situation be based on:

Response:

- A. Simplicity of use.
- B. Empirical grounds.
- C. Representation of the failure mechanism.
- D. Convenience

**Answer:** C

**QUESTION NO: 34**

Pascal's triangle presents a simple means of determining which of the various terms of the binomial expansion?

Response:

- A. Exponents
- B. Permutations
- C. Combinations
- D. Coefficients

**Answer:** D

**QUESTION NO: 35**

What functions can normally be expected to be assigned to the Reliability Engineering Department of a company that emphasizes product reliability?

- I. Maintain a failure reporting system.
- II. Establish reliability growth.
- III. Oversee use of statistical tools.
- IV. Evaluate customer surveys regarding product costs.
- V. Establish and maintain a corrective action system.

Response:

- A. II and III only
- B. I and II only
- C. I, II and III only
- D. I, III, IV and V only

**Answer:** C

**QUESTION NO: 36**

A failure that occurs without being caused by the failure of any other item is known as:

Response:

- A. An independent failure.
- B. A pattern failure.

- C. An intermittent failure.
- D. A dependent failure.

**Answer:** A

**QUESTION NO: 37**

For single-failure modes, the probability plotting methods used to derive time-to-failure distribution parameters are applicable only when the data are Response:

- A. Independently and normally distributed.
- B. Independently and identically distributed.
- C. Exponentially distributed.
- D. Gathered for repairable systems.

**Answer:** B

**QUESTION NO: 38**

The variations which the normal distribution curve describes are due to:  
Response:

- A. Non assignable causes.
- B. Catastrophic failure
- C. Assignable causes
- D. Degradation failure.

**Answer:** A

**QUESTION NO: 39**

A consideration for proper part selection is:

- I. Parts application and specifications.
- II. Selection, control and integration.
- III. Derating.

Response:

- A. I only
- B. I, II and III
- C. I and III only
- D. II and III only

**Answer:** B

**QUESTION NO: 40**

Which of the following is NOT an objective of a data collection program?

Response:

- A. To validate vendor supplied items.
- B. To demonstrate internal reliability.
- C. To demonstrate reliability to customers.
- D. To produce reliability reports.

**Answer:** D