

# Latest Version: 13.0

## Question: 1

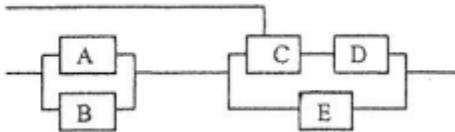
A go/no-go device is tested until it fails. If  $X$  is the number of tests to first failure with no wear out present, and the probability of success on each test is .99, then the probability that  $X$  is greater than 5 is:  
Response:

- A. 0.9510
- B. 0.9410
- C. 0.9310
- D. 0.9610

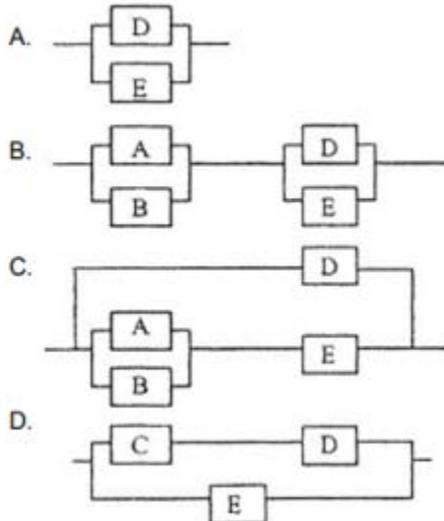
**Answer: A**

## Question: 2

A system is defined by the following reliability block diagram.



Which of the following block diagrams MOST simply represents the system reliability when Unit C is functioning?



Response:

- A. option A
- B. option B

- C. option C
- D. option D

**Answer: C**

### Question: 3

Which of the following is the GREATEST benefit of a fault-tree analysis?  
Response:

- A. It is easy to perform and does not require a computer program.
- B. It is comprehensive and readily converted to a computer program.
- C. It is systematic and identifies ways to avoid failures.
- D. It is bottom-up and provides detailed accident scenario.

**Answer: C**

### Question: 4

The first phase in the operation life history of a population of product units is typically called:  
Response:

- A. Debugging phase.
- B. Wear out phase.
- C. Transition phase.
- D. Chance failure phase.

**Answer: A**

### Question: 5

In the area of risk assessment, hazard severity categories are used to provide a measure of the seriousness involved. A system failure causing major environmental damage would be classified as:  
Response:

- A. Catastrophic.
- B. Critical
- C. Marginal
- D. Negligible

**Answer: B**

### Question: 6

Which of the following activities is MOST effective in increasing reliability during a product's life cycle?

Response:

- A. Improving gage repeatability and reproducibility
- B. Developing an aggressive testing strategy.
- C. Developing capable processes.
- D. Developing robust design.

**Answer: D**

### Question: 7

Which of the following is a model used for monitoring reliability growth?

Response:

- A. Duane
- B. Arrhenius
- C. Normal
- D. Lognormal

**Answer: A**

### Question: 8

For a reliability plan to be most effective, the reliability tasks should be integrated with which of the following plan?

Response:

- A. Reliability centered maintenance.
- B. Product sales.
- C. Product distribution
- D. Product design and development.

**Answer: D**

### Question: 9

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

**Answer: D**

### Question: 10

A 2 level 5 factor experiment is being conducted to optimize the reliability of an electronic control module. A half replicate of the standard full factorial experiment is proposed. The number of treatment combinations will be

Response:

- A. 10
- B. 12
- C. 16
- D. 32

**Answer: C**

### Question: 11

Human factors in product safety planning are assessed for which of the following reasons?

- I. To allocate the proper balance between man and machine.
- II. To address the limitations of human beings.
- III. To determine the user hardware interaction.

Response:

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

**Answer: D**

## Question: 12

Derating a component to 50 percent of its operating value will generally decrease its failure rate by a factor of:

Response:

- A. Greater than 50 percent.
- B. Greater than 30 percent.
- C. Greater than 10 percent but less than 30 percent.
- D. Less than 10 percent.

**Answer: B**

## Question: 13

Probability ratio sequential tests are used for products designed to operate for a long period of time. This test is primarily based on:

Response:

- A. The ratio of an acceptable MTBF to an unacceptable MTBF.
- B. Accept regions versus reject regions.
- C. Type I versus type II errors.
- D. Truncation of test results.

**Answer: A**

## Question: 14

The reliability of a device comprised of various parts functioning in series is the:

Response:

- A. Product of the reliability.
- B. Sum of the probabilities of the unreliability.
- C. Product of the unreliability
- D. Sum of the reliability.

**Answer: A**

## Question: 15

The maintenance action rate (MAR) may be mandated by contract. If an extruder is run continuously and experiences 24 maintenance actions (downtown) in one year, what is the MAR?

Response:

- A. 0.0054 actions/hr.
- B. 0.0417 actions/hr
- C. 0.0027 acions/hr.
- D. 0.00135 actions/hr.

**Answer: C**

### Question: 16

Which of the following is the key component in continuously providing a reliable product?

Response:

- A. Improve supplier acceptance testing.
- B. Adequately train the work force.
- C. Reduce product variability.
- D. Scheduled equipment maintenance actions.

**Answer: C**

### Question: 17

When requesting "worst case" design analysis, you expect the reliability group to:

Response:

- A. Analyze the worst rejects.
- B. Analyze only those products failing to meet specification requirements.
- C. Determine whether product requirements can be met with subassemblies assumed at their worst combination of tolerances.
- D. Assume all subassembly tolerances are at their maximum limit.

**Answer: C**

### Question: 18

An employee is injured on the job. The employer has proven to have a good safety and health program.

Generally the employee has which of the following options available to him/her?

Response:

- A. Contributory negligence.
- B. Caveat emptor.
- C. Workman's compensation.
- D. Caveat venditor.

**Answer: C**

### Question: 19

The two principal measures of failure during risk assessment are which of the following?  
Response:

- A. Failure severity and failure probability.
- B. Failure analysis and failure effects.
- C. Failure method and failure mode.
- D. Failure mode and failure mechanism.

**Answer: A**

### Question: 20

What is the minimum number of failure free trips that one must make in their car to be at least 95% confident it is 95% reliable?  
Response:

- A. 22
- B. 45
- C. 58
- D. 102

**Answer: C**

### Question: 21

Of the following, which is the MOST important reliability principle?  
Response:

- A. Use only proven designs.
- B. Specify only high reliability components.
- C. Consider reliability early in the design phase.
- D. Use redundancy throughout the design.

**Answer: C**

**Question: 22**

Which of the following is the MOST effective technique for prioritizing critical factors for problem-solving?

Response:

- A. Venn diagram
- B. Scatter diagram.
- C. Pareto diagram
- D. Cause-and-effect diagram

**Answer: C**