**Chapter 4 Supplement: Reliability**

**Test Bank**

**Multiple Choice**

1. \_\_\_\_\_\_ can be defined as the probability that a component, product, or system can perform its intended function over a period of time under a given set of normal operating conditions of use.

a. Reliability

b. Maintainability

c. Availability

d. Redundancy

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

2. The key phrase in the definition of reliability is\_\_\_\_\_\_.

a. probability that a component, product, or system can perform its function

b. under a given set of normal operating conditions of its use

c. perform its intended function

d. conditions of use

Ans: B

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

3. The overall reliability of the system is the \_\_\_\_\_\_.

a. sum of the reliabilities of the individual components

b. minimum reliability of the individual components

c. product of the reliabilities of the individual components

d. maximum reliability of the individual components

Ans: C

Cognitive Domain: Comprehension (Understand)

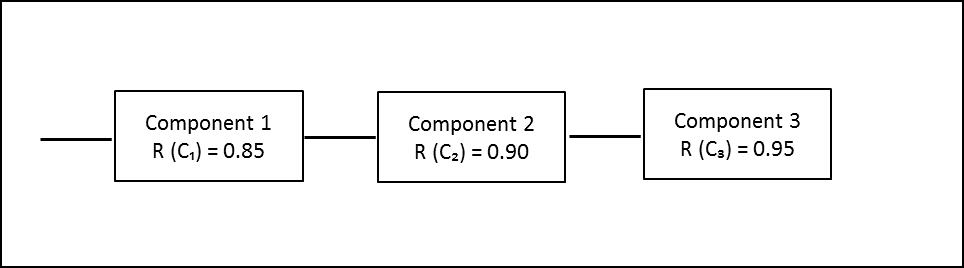
Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

4. Consider a product that has three components arranged in series as shown in the following figure:



Calculate and indicate the overall reliability of the system.

a. 0.857

b. 0.986

c. 0.727

d. 0.675

Ans: C

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

5. The computation of the reliability of the system assumes that the reliabilities of the individual components are \_\_\_\_\_\_ events.

a. mutually exclusive

b. dependent

c. joint

d. independent

Ans: D

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-2. Distinguish among the concepts of reliability, maintainability, and availability.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

6. The concept of independence in context of reliability implies \_\_\_\_\_\_.

a. the working or failing of one component does not affect the probability of working or failing of any other component

b. the working or failing of one component affects the probability of working or failing of the successive component

c. the working or failing of one component affects the probability of working or failing of all components in sequence

d. the working or failing of one component does not affect the probability of working or failing of only the preceding component

Ans: A

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

7. The duplication of critical components that serve as backup if the original component or subsystem fails is called \_\_\_\_\_\_.

a. availability

b. redundancy

c. maintainability

d. reliability

Ans: B

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

8. In the context of redundancy, the duplicate systems operate \_\_\_\_\_\_ the original component.

a. independently from

b. prior to

c. in parallel with

d. in a sequence with

Ans: C

Cognitive Domain: Knowledge (Remember)

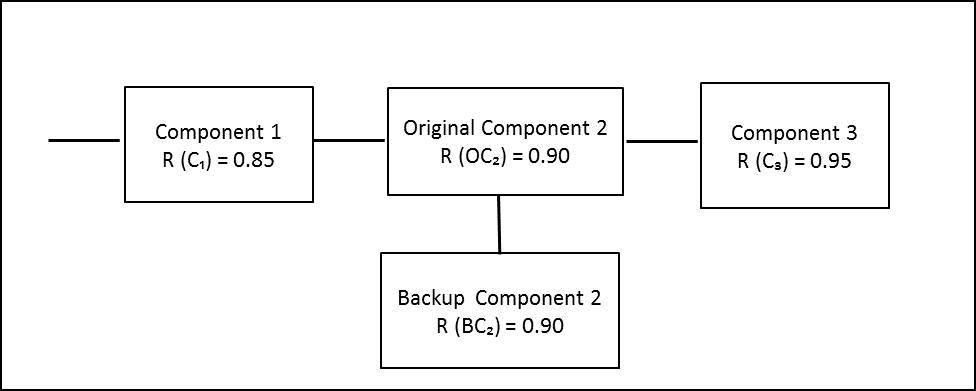
Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

9. Calculate and indicate the composite reliability of Component 2 for the system shown in the following figure:



a. 0.90

b. 0.95

c. 0.99

d. 0.97

Ans: C

Cognitive Domain: Application (Apply)

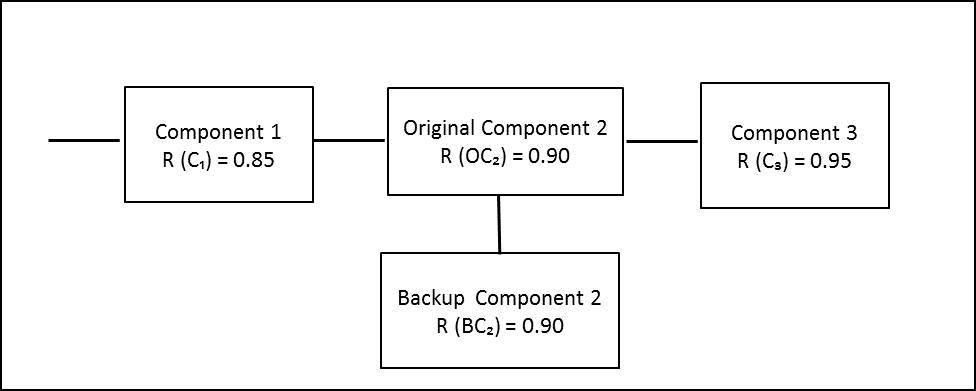
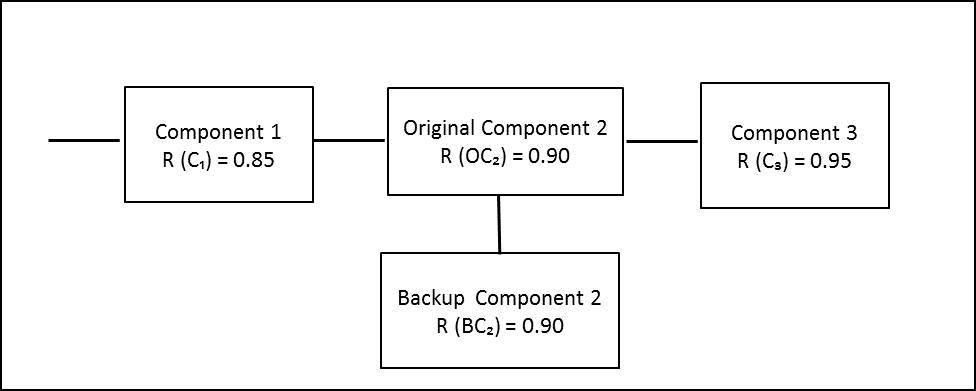
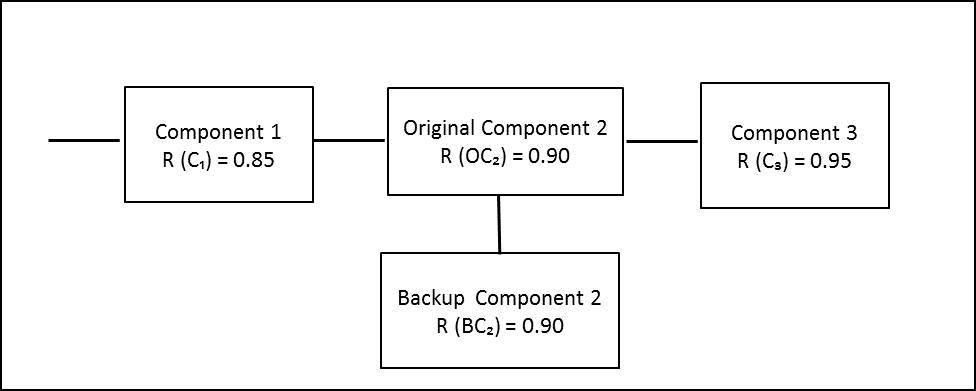
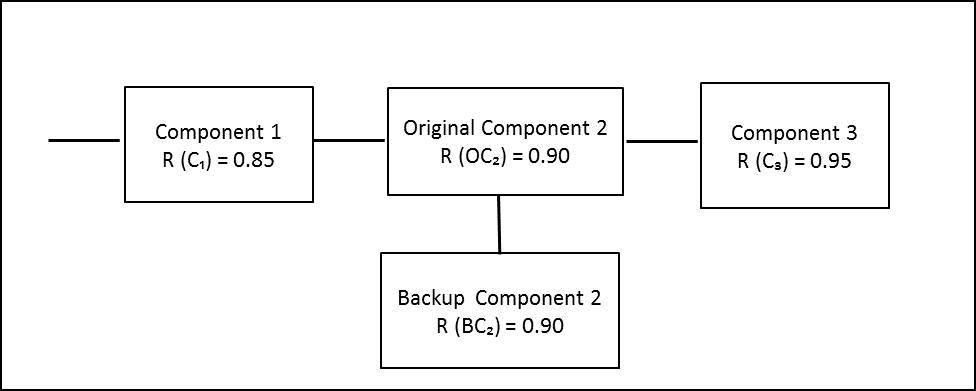
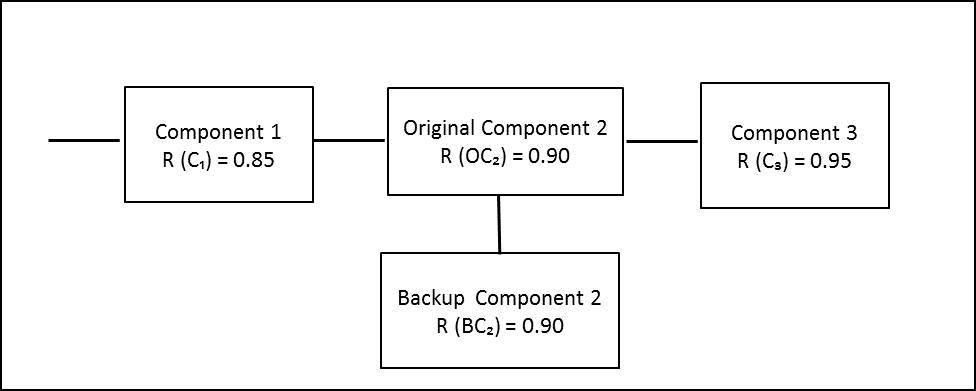
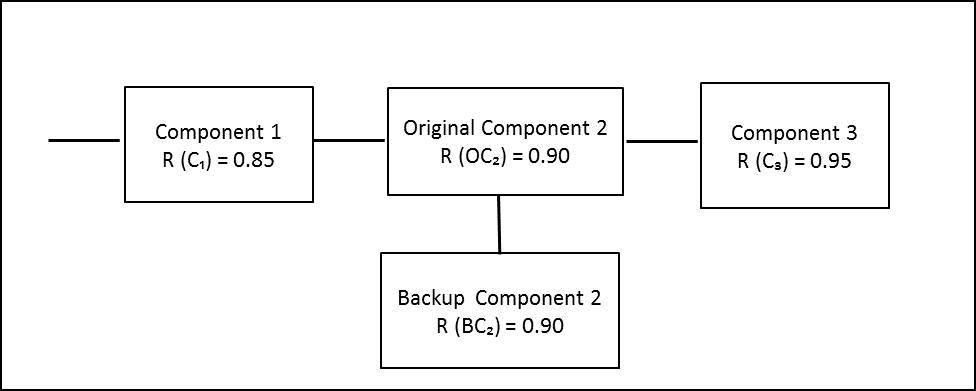
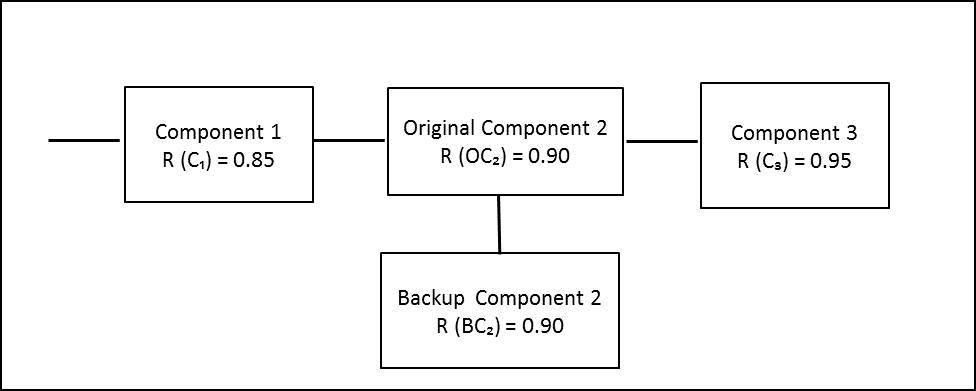
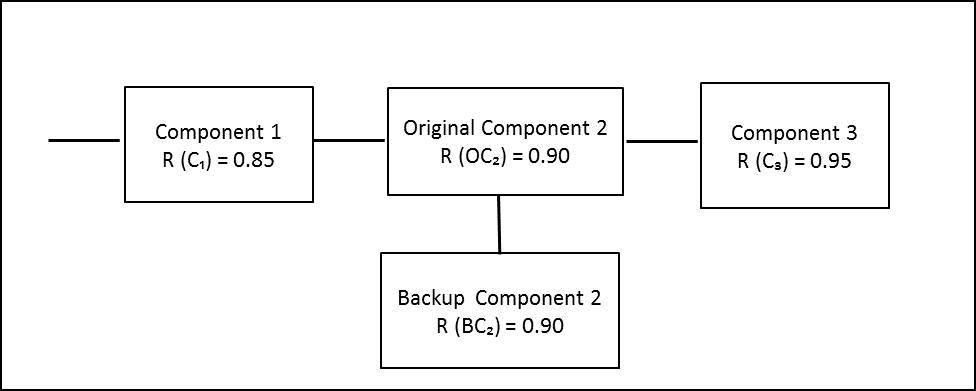
Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice

10. Calculate and indicate the overall reliability of the system shown in the following figure:



a. 0.7994

b. 0.8764

c. 0.7896

d. 0.9874

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

11. An electrical power system consists of four major components with reliabilities of 0.99, 0.90, 0.80, and 0.95. Compute and indicate the overall reliability of the electrical power system.

a. 0.8125

b. 0.9856

c. 0.7645

d. 0.6772

Ans: D

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

12. An electrical power system consists of four major components with reliabilities of 0.99, 0.90, 0.80, and 0.95. If the designers want to improve the reliability of the system by adding a backup component, which component should get the backup to achieve the highest reliability?

a. Component 1

b. Component 2

c. Component 3

d. Component 4

Ans: C

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

13. An electrical power system consists of four major components with reliabilities of 0.99, 0.94, 0.92, and 0.95. In order to improve the reliability, a backup component of reliability 0.92 is added to Component 3. Compute and indicate the composite reliability of Component 3.

a. 0.89

b. 0.99

c. 0.98

d. 0.92

Ans: B

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

14. An electrical power system consists of four major components with reliabilities of 0.99, 0.94, 0.92, and 0.95. In order to improve the reliability, a backup component of reliability 0.92 is added to Component 3. Compute and indicate the overall reliability of the system.

a. 0.87

b. 0.88

c. 0.99

d. 0.88

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

15. \_\_\_\_\_\_ is the reliability of a product or component expressed as the average length of time elapsed before the product or component fails.

a. Mean time to repair (MTTR)

b. Mean time to failure (MTTF)

c. Mean time between failures (MTBF)

d. Mean time between repairs (MTBR)

Ans: C

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

16. Consider a lawn mower that fails six times in 240 hours of operation. The failure rate of the lawn mower is \_\_\_\_\_\_.

a. 0.025

b. 0.040

c. 0.020

d. 0.030

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

17. Consider a lawn mower that fails six times in 240 hours of operation. The mean time between failures (MTBF) of the lawn mower is \_\_\_\_\_\_.

a. 33 hours

b. 45 hours

c. 50 hours

d. 40 hours

Ans: D

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

18. \_\_\_\_\_\_ is the percentage of times that a system or equipment is operating properly when it is needed for use.

a. Availability

b. Maintainability

c. Redundancy

d. Reliability

Ans: A

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-2. Distinguish among the concepts of reliability, maintainability, and availability.

Answer Location: Availability and Maintainability

Difficulty Level: Easy

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

19. \_\_\_\_\_\_ is the ease with which an equipment or system can be repaired or serviced.

a. Availability

b. Maintainability

c. Redundancy

d. Reliability

Ans: B

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-2. Distinguish among the concepts of reliability, maintainability, and availability.

Answer Location: Availability and Maintainability

Difficulty Level: Easy

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

20. Which of the following statements is false?

a. When a system has availability, it doesn’t necessarily mean that it also has high reliability.

b. Reliability considers the time it takes for a component or system to fail while it is operating.

c. Reliability takes into account any downtime associated with the repairs the system may need.

d. Reliability does not take into account the time it takes to make the component or system available for use.

Ans: C

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-2. Distinguish among the concepts of reliability, maintainability, and availability.

Answer Location: Availability and Maintainability

Difficulty Level: Medium

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

21. Availability is related to \_\_\_\_\_\_.

a. reliability only

b. maintainability only

c. reliability and maintainability

d. redundancy and reliability

Ans: C

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-2. Distinguish among the concepts of reliability, maintainability, and availability.

Answer Location: Availability and Maintainability

Difficulty Level: Hard

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

22. Mean time between failures (MTBF) is a quantitative measure of \_\_\_\_\_\_.

a. availability

b. maintainability

c. redundancy

d. reliability

Ans: D

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-2. Distinguish among the concepts of reliability, maintainability, and availability.

Answer Location: Availability and Maintainability

Difficulty Level: Medium

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

23. Mean time to repair (MTTR) is a quantitative metric for \_\_\_\_\_\_.

a. availability

b. maintainability

c. redundancy

d. reliability

Ans: B

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-2. Distinguish among the concepts of reliability, maintainability, and availability.

Answer Location: Availability and Maintainability

Difficulty Level: Medium

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

24. In order to increase the availability of an equipment or system for use, reliability has to \_\_\_\_\_\_ with \_\_\_\_\_\_ maintainability.

a. decrease, constant

b. be constant, decreasing

c. increase, constant

d. be constant, constant

Ans: C

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-2. Distinguish among the concepts of reliability, maintainability, and availability.

Answer Location: Table 4S.1: Relationship Among Reliability, Maintainability, and Availability

Difficulty Level: Hard

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

25. The availability of an equipment or system is given by \_\_\_\_\_\_.

a. MTBF / MTTR

b. MTTR / MTBF

c. MTTR (MTBF – MTTR)

d. MTBF / (MTBF + MTTR)

Ans: D

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-2. Distinguish among the concepts of reliability, maintainability, and availability.

Answer Location: Availability and Maintainability

Difficulty Level: Medium

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

26. A laser printer is able to operate 400 hours between two repairs, and the mean time to repair the printer is 4 hours. Compute and indicate the availability of the printer.

a. 0.99

b. 0.96

c. 0.98

d. 0.97

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Availability and Maintainability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

27. Products should be designed to ensure \_\_\_\_\_\_ time between failures.

a. short

b. equal

c. long

d. unequal

Ans: C

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Availability and Maintainability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

28. The implication for product designers is that as MTBF \_\_\_\_\_\_ and MTTR \_\_\_\_\_\_, availability also increases.

a. increases, increases

b. decreases, decreases

c. decreases, increases

d. increases, decreases

Ans: D

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Availability and Maintainability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

29. Mars Industries assembles industrial machines using four components in series. Customers who purchases these machines require a reliability of 0.95. In order to achieve a reliability of 0.95, what should be the individual reliability of the individual components?

a. 0.987

b. 0.897

c. 0.768

d. 0.934

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Hard

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

30. A consumer wants to choose a highly reliable TV service provider with minimum service disruptions. Based on the data given in the following table, determine which TV provider the consumer should choose.

|  |  |  |
| --- | --- | --- |
| *TV Provider* | *MTBF* | *MTTR* |
| Crescent | 200 | 10 |
| Horizon | 300 | 15 |
| Perseus | 400 | 15 |
| Direct | 500 | 15 |

a. Crescent TV Network

b. Horizon TV Network

c. Perseus TV Network

d. Direct TV Network

Ans: D

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Availability and Maintainability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

31. A product consists of six parts. The reliability of these parts are 0.82, 0.73, 0.79, 0.00, 0.98, and 0.85, respectively. Based on this information, we can say \_\_\_\_\_\_.

a. the product has a low probability of failure

b. the product will never fail

c. the product will always fail

d. the product has a low-to-medium probability of failure

Ans: C

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

32. A product consists of five parts. The reliability of these parts are 0.51, 0.58, 0.94, 0.77, and 0.92, respectively. Calculate and indicate product reliability.

a. 20%

b. 30%

c. 40%

d. 50%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

33. A product consists of six parts. The reliability of these parts are 0.94, 0.9, 0.56, 0.99, 0.77, and 0.96. Calculate and indicate product reliability.

a. 34.7%

b. 23.2%

c. 14.1%

d. 90.3%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

34. A product consists of three parts. The reliability of these parts are 0.97, 0.98, and 0.86. Calculate and indicate product reliability.

a. 81.8%

b. 73.2%

c. 75.2%

d. 99.1%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

35. A product consists of two parts. The reliability of these parts are 0.98 and 0.86. Calculate and indicate product reliability.

a. 84.3%

b. 75.2%

c. 69.1%

d. 73.2%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

36. A product consists of six parts. The reliability of these parts are 0.97, 0.95, 0.99, 0.93, 0.91, and 0.85. Calculate and indicate product reliability.

a. 65.6%

b. 85.2%

c. 86.1%

d. 77.2%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

37. A product consists of four parts. The reliability of these parts are 0.96, 0.86, 0.74, and 0.44. Calculate and indicate product reliability.

a. 26.9%

b. 34.3%

c. 23.2%

d. 63.0%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

38. A product consists of four parts. The reliability of these parts are 0.98, 0.28, 0.99, 0.99, and 0.99. Calculate and indicate product reliability.

a. 0.27%

b. 0.32%

c. 0.43%

d. 0.21%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

39. A product consists of four components with reliability of 0.85, 0.99, 0.88, and 0.89, respectively. The third and fourth components have backups with corresponding reliability of 0.88 and 0.89. Calculate and indicate product reliability.

a. 0.82%

b. 0.78%

c. 0.63%

d. 0.93%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

40. A product consists of three components with reliability of 0.95, 0.95, and 0.95, respectively. The second component has a backup with reliability of 0.95. Calculate and indicate product reliability.

a. 0.90%

b. 0.87%

c. 0.76%

d. 0.83%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

41. A product consists of four components with reliability of 0.85, 0.87, 0.89, and 0.91, respectively. The first and third components each have a backup with reliability of 0.95 and 0.90, respectively. Calculate and indicate product reliability.

a. 77.71%

b. 62.80%

c. 39.40%

d. 89.10%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

42. A product consists of four components with reliability of 0.89, 0.90, 0.91, and 0.92, respectively. Each component has a backup with the same reliability. Calculate and indicate product reliability.

a. 96.40%

b. 86.31%

c. 94.11%

d. 79.32%

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

43. Consider a chainsaw that fails five times in 100 hours of operation. The failure rate of the chainsaw is \_\_\_\_\_\_.

a. 0.050

b. 0.034

c. 0.022

d. 0.031

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

44. A widget fails 12 times in 600 hours of operation. The failure rate of the widget is \_\_\_\_\_\_.

a. 0.02

b. 0.03

c. 0.01

d. 0.05

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

45. A complicated widget fails 12 times in 600 hours of operation. The failure rate of the widget is \_\_\_\_\_\_.

a. 0.02

b. 0.03

c. 0.01

d. 0.05

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

46. A system fails 20 times in 800 hours of operation. The failure rate of the system is \_\_\_\_\_\_.

a. 0.025

b. 0.035

c. 0.015

d. 0.051

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

47 A system fails 10 times in 100 hours of operation. The failure rate of the system is \_\_\_\_\_\_.

a. 0.10

b. 0.20

c. 0.30

d. 0.40

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

48. Consider a chainsaw that fails five times in 100 hours of operation. The MTBF is \_\_\_\_\_\_.

a. 20 hours

b. 30 hours

c. 40 hours

d. 15 hours

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

49. A widget fails 12 times in 600 hours of operation. The MTBF of the widget is \_\_\_\_\_\_.

a. 50 hours

b. 45 hours

c. 32 hours

d. 31 hours

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

50. A system fails 20 times in 800 hours of operation. The MTBF of the system is \_\_\_\_\_\_.

a. 40 hours

b. 29 hours

c. 32 hours

d. 55 hours

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

51. A system fails 10 times in 100 hours of operation. The failure rate of the system is \_\_\_\_\_\_.

a. 10 hours

b. 29 hours

c. 32 hours

d. 55 hours

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

52. The field of study that analyzes the likelihood of product and system failures over time is known as \_\_\_\_\_\_.

a. confidence analysis

b. reliability

c. redundancy

d. backup analysis

Ans: B

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: 4S.1 Understanding Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

53. Redundancy refers to \_\_\_\_\_\_.

a. the duplication of critical components such that the duplicate systems operate in parallel to the original components

b. the duplication of components across the entire system such that each component in the system is duplicated

c. the creation of a second system to mimic the first system if every component of the first system should fail

d. the creation of unnecessary backup systems to provide a level of operational reliability that is not really required

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

54. The overall reliability of a system is \_\_\_\_\_\_.

a. the product of the reliabilities of its individual components

b. the sum of the reliabilities of its individual components

c. the minimum of the reliabilities of its individual components

d. the maximum of the reliabilities of its individual components

Ans: A

Cognitive Domain: Application (Apply)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Application of knowledge (able to translate knowledge of business and management into practice)

55. The computation of the reliability of a system assumes that the reliability of a component in that system is \_\_\_\_\_\_.

a. independent of the reliabilities of all the other components

b. dependent on the reliabilities of some of the other components

c. dependent on the reliability of one of the other component

d. dependent on the reliabilities of all the other components

Ans: A

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

56. In a system with multiple components, the overall reliability of the system \_\_\_\_\_\_.

a. is equal to the reliability of the component with the lowest reliability

b. is equal to the reliability of the component with the highest reliability

c. is significantly less than the reliability of the individual components

d. is significantly more than the reliability of the individual components

Ans: C

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

57. In product design, simpler designs with fewer components are \_\_\_\_\_\_.

a. more likely to fail

b. likely to function with the same reliability as designs with more components

c. likely to improve reliability

d. more expensive to repair

Ans: C

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

58. A system has four components: A, B, C, and D. These components have reliability of 0.85, 0.90, 0.95, and 0.99, respectively. Which component should have a backup?

a. Component A

b. Component B

c. Component C

d. Component D

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

59. The reliability of a product or component can also be expressed as the \_\_\_\_\_\_.

a. maximum length of time elapsed before the product or component fails

b. average length of time elapsed before the product or component fails

c. minimum length of time elapsed before the product or component fails

d. range (difference between lowest and highest times) of time elapsed before the product or component fails

Ans: B

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

60. The average length of time elapsed before the product or component fails is known as \_\_\_\_\_\_.

a. MTBF (mean time between failures)

b. MTBF (mean time of breakdown frequency)

c. MTTR (mean time to repair)

d. MTDT (mean time of downtime)

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

61. Given the failure rate of a component, we can calculate MTBF as \_\_\_\_\_\_.

a. the range of the failure rate across many tested components

b. the standard deviation of the failure rate across many tested components

c. the square of the failure rate

d. the reciprocal of the failure rate

Ans: D

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

62. Which of the following is NOT one of the usual methods by which manufacturers of new products can develop MTBF measures?

a. by conducting intensive product testing

b. by analyzing actual past experience of similar products

c. by analyzing known factors that cause product failures

d. by doing a consumer survey

Ans: D

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

63. Which of the following is NOT one of the benefits of setting reliability goals?

a. contributes to success of the product in the marketplace

b. contributes to production efficiency

c. reduces equipment failures and waste

d. changes elasticity of supply

Ans: D

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

64. Availability of a system refers to the \_\_\_\_\_\_.

a. percentage of the time that a system is operating properly when it is needed for use

b. percentage of the time that a system is down for maintenance

c. percentage of components in the system that have a backup component

d. percentage of the time that a system is available for use by the department that owns it (and is not being used by other departments)

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

65. Which of the following statements is true with regard to the terms *reliability* and *availability*?

a. If a system has high availability, it also has high reliability.

b. If a system has high availability, it then has low reliability.

c. Availability and reliability of a system refer to the same concept.

d. If a system has high availability, it does not necessarily mean that it also has high reliability.

Ans: D

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

66. Which of the following terms only considers the time it takes for a system to fail *while it is operating* but does not take into account any downtime associated with the repairs the system may need?

a. reliability

b. availability

c. redundancy

d. maintainability

Ans: A

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

67. Maintainability refers to \_\_\_\_\_\_.

a. the ease with which an equipment or system can be repaired or serviced

b. the meantime between failures

c. the time a system is available for use when needed

d. the downtime experienced by a system

Ans: A

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Easy

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

68. Which of the following statements is true with regard to relationships between reliability, maintainability, and availability?

a. If maintainability is constant and reliability increases, then availability decreases.

b. If maintainability is constant and reliability decreases, then availability increases.

c. If maintainability is constant and reliability decreases, then availability decreases.

d. If maintainability increases, then reliability decreases but availability increases.

Ans: C

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

69. If MTBF represents mean time between failures, and MTTR represents mean time to repair, then availability is given by \_\_\_\_\_\_.

a. MTBF / MTTR

b. MTBF / (MTBF + MTTR)

c. MTBF / (MTBF – MTTR)

d. MTTR / MTBF

Ans: B

Cognitive Domain: Knowledge (Remember)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution

70. A sewing machine has a mean time between failures of 296 hours and mean time to repair of 11 hours. In this case, the availability is \_\_\_\_\_\_.

a. 96.4%

b. 92.1%

c. 89.3%

d. 78.9%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

71. A drilling machine has a mean time between failures of 368 hours and mean time to repair of 9 hours. In this case, the availability is \_\_\_\_\_\_.

a. 97.6%

b. 89.7%

c. 78.9%

d. 93.8%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

72. A computer has a mean time between failures of 235 hours and mean time to repair of 9 hours. In this case, the availability is \_\_\_\_\_\_.

a. 96.3%

b. 79.3%

c. 78.9%

d. 93.8%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

73. A typewriter has a mean time between failures of 420 hours and mean time to repair of 14 hours. In this case, the availability is \_\_\_\_\_\_.

a. 96.8%

b. 89.6%

c. 77.3%

d. 88.1%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

74. A widget has a mean time between failures of 218 hours and mean time to repair of 14 hours. In this case, the availability is \_\_\_\_\_\_.

a. 94.0%

b. 89.6%

c. 77.3%

d. 88.1%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

75. A hair dryer has a mean time between failures of 822 hours and mean time to repair of 1 hour. In this case, the availability is \_\_\_\_\_\_.

a. 99.9%

b. 93.6%

c. 87.3%

d. 98.1%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

76. A welding machine has a mean time between failures of 289 hours and mean time to repair of 10 hours. In this case, the availability is \_\_\_\_\_\_.

a. 96.7%

b. 93.6%

c. 87.3%

d. 98.1%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

77. An industrial boiler has a mean time between failures of 344 hours and mean time to repair of 8 hours. In this case, the availability is \_\_\_\_\_\_.

a. 97.7%

b. 93.6%

c. 87.3%

d. 98.1%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

78 A forklift has a mean time between failures of 193 hours and mean time to repair of 20 hours. In this case, the availability is \_\_\_\_\_\_.

a. 90.6%

b. 62.3%

c. 81.7%

d. 97.8%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

79. A table saw has a mean time between failures of 313 hours and mean time to repair of 2 hours. In this case, the availability is \_\_\_\_\_\_.

a. 95.1%

b. 99.4%

c. 81.7%

d. 97.8%

Ans: B

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

80. A machine has a mean time between failures of 514 hours and mean time to repair of 19 hours. In this case, the availability is \_\_\_\_\_\_.

a. 96.4%

b. 99.2%

c. 81.7%

d. 97.8%

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

81. Products should be designed \_\_\_\_\_\_.

a. to ensure long time between failures

b. to ensure long time to repair

c. to ensure long downtimes

d. to ensure long develop times

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Easy

AACSB: Analytical thinking (able to analyze and frame problems)

82. A system fails 200 times in 8,000 hours of operation. The MTBF of the system is \_\_\_\_\_\_.

a. 40 hours

b. 29 hours

c. 32 hours

d. 55 hours

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

83. A component fails 100 times in 6,000 hours of operation. The MTBF of the system is \_\_\_\_\_\_.

a. 40 hours

b. 60 hours

c. 32 hours

d. 55 hours

Ans: B

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

84. A component fails 50 times in 500 hours of operation. The MTBF of the system is \_\_\_\_\_\_.

a. 10 hours

b. 60 hours

c. 32 hours

d. 55 hours

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

85. One way to reduce the time to repair a product is by \_\_\_\_\_\_.

a. incorporating modular design

b. designing products with more complex components

c. increasing number of separate components in a product

d. using special parts or components

Ans: A

Cognitive Domain: Comprehension (Understand)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Table 4S.1: Relationships Among Reliability, Maintainability, and Availability

Difficulty Level: Medium

AACSB: Economic, political, regulatory, legal, technological, and social contexts of organizations in a global society

86. An electrical power system consists of three major components with reliabilities of 0.99, 0.94, and 0.90. In order to improve the reliability, a backup component of reliability 0.90 is added to Component 3. Compute and indicate the composite reliability of Component 3.

a. 0.93

b. 0.92

c. 0.99

d. 0.92

Ans: B

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

87. A system of computer servers has three parts with reliabilities of 0.89, 0.79, and 0.79. In order to improve the reliability, Parts 2 and 3 have backups with corresponding of reliability of 0.95 and 0.96. Compute the composite reliability of the server system.

a. 0.78

b. 0.68

c. 0.87

d. 0.44

Ans: C

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

88. An system has three major parts with reliabilities of 0.68, 0.68, and 0.57. In order to improve the reliability, each component has a backup each with reliability of 0.98. Compute and indicate the composite reliability of the system.

a. 0.979

b. 0.872

c. 0.831

d. 0.731

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

89. A printing press has a mean time between failures of 175 and mean time to repair of 8. In this case, the availability is \_\_\_\_\_\_.

a. 0.956

b. 0.895

c. 0.789

d. 0.678

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

90. A refrigerator has a mean time between failures of 314 and mean time to repair of 17. In this case, the availability is \_\_\_\_\_\_.

a. 0.949

b. 0.930

c. 0.980

d. 0.930

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

91. A microwave has a mean time between failures of 157 and mean time to repair of 17. In this case, the availability is \_\_\_\_\_\_.

a. 0.902

b. 0.920

c. 0.960

d. 0.930

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

92. A water supply system has a mean time between failures of 270 and mean time to repair of 5. In this case, the availability is \_\_\_\_\_\_.

a. 0.982

b. 0.920

c. 0.950

d. 0.890

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

93. A polling machine has a mean time between failures of 408 and mean time to repair of 16. In this case, the availability is \_\_\_\_\_\_.

a. 0.962

b. 0.900

c. 0.920

d. 0.890

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

94. An electric car has a mean time between failures of 233 and mean time to repair of 10. In this case, the availability is \_\_\_\_\_\_.

a. 0.959

b. 0.940

c. 0.900

d. 0.960

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

95. A wind turbine has a mean time between failures of 196 and mean time to repair of 11. In this case, the availability is \_\_\_\_\_\_.

a. 0.947

b. 0.890

c. 0.960

d. 0.930

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

96. An electrical generator has a mean time between failures of 167 and mean time to repair of 17. In this case, the availability is \_\_\_\_\_\_.

a. 0.908

b. 0.900

c. 0.980

d. 0.960

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

97. A pulley system has a mean time between failures of 273 and mean time to repair of 16. In this case, the availability is \_\_\_\_\_\_.

a. 0.945

b. 0.970

c. 0.900

d. 0.910

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

98. A crane has a mean time between failures of 186 and mean time to repair of 15. In this case, the availability is \_\_\_\_\_\_.

a. 0.925

b. 0.930

c. 0.920

d. 0.890

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

99. A hydraulic lift has a mean time between failures of 245 and mean time to repair of 20. In this case, the availability is \_\_\_\_\_\_.

a. 0.925

b. 0.970

c. 0.940

d. 0.930

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)

100. A hydraulic lever has a mean time between failures of 6,500 and mean time to repair of 600. In this case, the availability is \_\_\_\_\_\_.

a. 0.915

b. 0.960

c. 0.930

d. 0.910

Ans: A

Cognitive Domain: Analysis (Analyze)

Learning Objective: 4s-1. Define reliability and compute the reliability of a product system.

Answer Location: Estimating Reliability

Difficulty Level: Medium

AACSB: Analytical thinking (able to analyze and frame problems)