Solutions Manual

# Chapter 4 Supplement: Reliability

1. 

Cognitive Domain: Knowledge

Difficulty Level: Easy

2.  Cognitive Domain: Knowledge

Difficulty Level: Easy

3.



Cognitive Domain: Knowledge

Difficulty Level: Easy

4.

|  |  |  |  |
| --- | --- | --- | --- |
| *Component* | *Supplier A* | *Supplier B* | *Supplier C* |
| 1 | 0.95 | 0.88 | 0.90 |
| 2 | 0.90 | 0.92 | 0. 85 |
| 3 | 0.93 | 0.95 | 0.98 |
| 4 | 0.89 | 0.97 | 0. 93 |
|  | .95 x .90 x .93 x .89 = .71 | .88 x .92 x .95 x .97 = .75 | .90 x .85 x .98 x .93 = .88 |

Supplier C is the supplier with the most reliable series system.

Cognitive Domain: Knowledge

Difficulty Level: Easy

5.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *A* | *B* | *C* | *D* |
| Reliability | 0.9025 | 0.913 | 0.94 | 0.985 |
| Failure rate | 0.0975 | 0.087 | 0.06 | 0.015 |
| # of 0.92 components |  |  | 2 |  |
| # of 0.93 components |  |  |  | 6 |
| # of 0.95 components | 2 |  | 3 |  |
| # of 0.97 components |  | 3 |  |  |
|  |  |  |  |  |
| Cost of failure | $1,462.50 | $1,305 | $900 | $225 |
| Cost of components | $5,000 | $9,000 | $10,500 | $12,000 |
| Total costs | $6,462.50 | $10,305 | $11,400 | $12,225 |

A should be chosen, as it has the lowest total costs.

Cognitive Domain: Comprehension

Difficulty Level: Medium

6.

1. 0.98 x 0.98 x 0.99 = 0.95
2. (0.98 + (1 – 0.98)0.98) x (0.98 + (1 – 0.98)0.98) x (0.99 + (1 – 0.99)0.99) = 0.9991

Cognitive Domain: Knowledge

Difficulty Level: Easy

7.  Time to purchase a new printer

Cognitive Domain: Knowledge

Difficulty Level: Easy

8.



Horizon is the most reliable.

Cognitive Domain: Knowledge

Difficulty Level: Easy

9.



Cognitive Domain: Knowledge

Difficulty Level: Easy