COMP7005

Assn03

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# Section A

Q3.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | T | U | V | W | X | Y | Z |
| Start |  |  | 3 | 6 | - | 6 | 8 |
| Step 1 | 7 | 6 | - | 6 |  | 6 | 8 |
| Step 2 | 7 | - |  | 6 |  | 6 | 8 |
| Step 3 | 7 |  |  | - |  | 6 | 8 |
| Step 4 | 7 |  |  |  |  | - | 8 |
| Step 5 | - |  |  |  |  |  | 8 |
| Step 6 |  |  |  |  |  |  | - |

Lowest Cost

|  |  |  |
| --- | --- | --- |
| From: | To: | Cost: |
| X | T | 7 |
| X | U | 6 |
| X | V | 3 |
| X | W | 6 |
| X | X | - |
| X | Y | 6 |
| X | Z | 8 |

# Section B

((4 \* pi \* 2450000000hz \* 1000m) / 3 x 10 ^ 8) ^ 2

L(p) = 10531964518.673577797

100.225093873dB

100.2dB

P(t) = 15dBm - 30

= -15dB

G(t) = 9dBi

G(r) = 9dBi

L(ct) = 3dB

L(cr) = 3dB

RSL = -15dB + 9dBi - 100.2dB + 9dBi - 3dB - 3dB

RSL = -103.2dB

RSL = -103.2dB + 30

= -73.2dBm

No, there is not enough of a margin for the system to work reliably, because the access point requires at least -50dBm for reliable function.

1. (a)

((4 \* pi \* 2450000000hz \* 200m) / 3 x 10 ^ 8) ^ 2

L(p) = 10531964518.673577797

421278580.746943112

86.25dB

P(t) = 13dBm - 30 = -17dB

G(t) = 1.5dBi

G(r) = -1.5dBi

P(r) = -17dB + 1.5dBi + (-1.5dBi) - 86.25dB

= -103.25dB + 30

= -73.25dBm

= 10^(-73.25 / 10)

= 0.000000047315 mW

= 4.7 \* 10 ^ -8 mW

1. (b)

((4 \* pi \* 2450000000hz \* 2000m) / 3 x 10 ^ 8) ^ 2

L(p) = 10531964518.673577797

42127858074.694311189

106.25dB

P(t) = 13dBm - 30 = -17dB

G(t) = 1.5dBi

G(r) = -1.5dBi

P(r) = -17dB + 1.5dBi + (-1.5dBi) - 106.25dB

= -123.25dB + 30

= -93.25dBm

= 10^(-93.25 / 10)

= 0.00000000047315 mW

= 4.7 \* 10 ^ -10 mW

1. (c)

The receiver in question (a) with distance 200m will work.

However the receiver in question (b) with distance 2000m will NOT work.

1. (d)

a.

((4 \* pi \* 2450000000hz \* 200m) / 3 x 10 ^ 8) ^ 2

L(p) = 10531964518.673577797

421278580.746943112

86.25dB

P(t) = 13dBm - 30 = -17dB

G(t) = 15dBi

G(r) = -1.5dBi

P(r) = -17dB + 15dBi + (-1.5dBi) - 86.25dB

= -89.75dB + 30

= -59.75dBm

= 10^(-59.75 / 10)

= 0.000001059 mW

= 1.06 \* 10 ^ -6 mW

b.

((4 \* pi \* 2450000000hz \* 2000m) / 3 x 10 ^ 8) ^ 2

L(p) = 10531964518.673577797

42127858074.694311189

106.25dB

P(t) = 13dBm - 30 = -17dB

G(t) = 15dBi

G(r) = -1.5dBi

P(r) = -17dB + 15dBi + (-1.5dBi) - 106.25dB

= -109.75 + 30

= -79.75dBm

= 10^(-79.75 / 10)

= 0.00000001059 mW

= 1.06 \* 10 ^ -8 mW

c.

The modified receiver from question a. at 200m will work as well as the

modified receiver from question b. at 2000m. They both function at a reliable rate.