

Task ①
Dr. Onsy " Wireless Communications Part ① "

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Question

- Draw the L_{FS} graph as a function of d @ 10 MHz
Using d in semi log scale Paper
- "Hint" → it's a linear relation

Solⁿ

$$L_{FS} = 32.44 + 20 \log d + 20 \log f$$

$$L_{FS} = 52.44 + 20 \log d$$

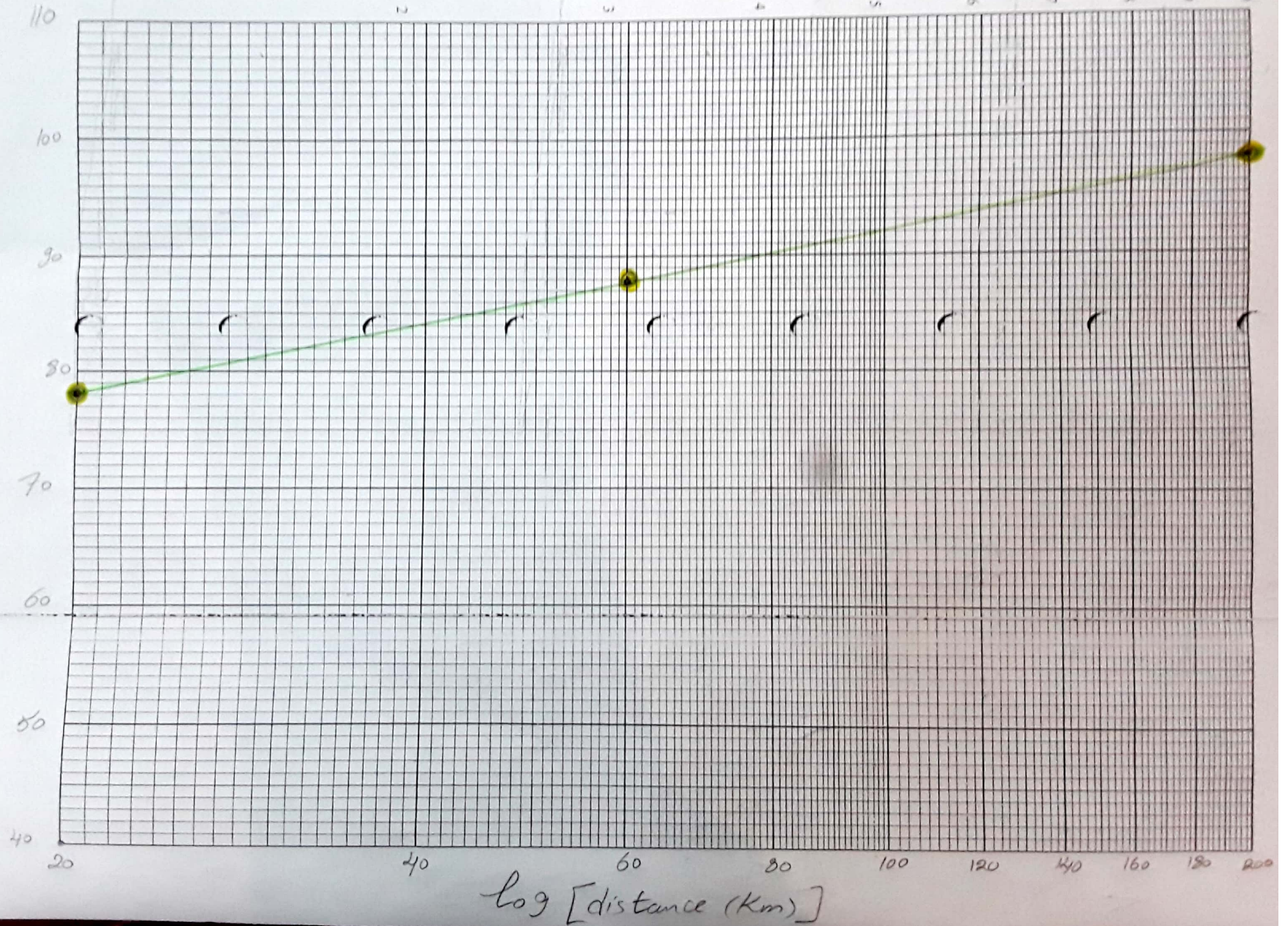
① $d=20 \rightarrow L_{FS} = 78 \text{ dB}$

② $d=60 \rightarrow L_{FS} = 88 \text{ dB}$

③ $d=200 \rightarrow L_{FS} = 98 \text{ dB}$

Sketching
in the
next
Semi-log
scale
Paper

Free Space Path Loss (dB)



Repeat if $f = 600 \text{ MHz}$

$$L_{FS} = 32.44 + 20 \log(d) + 20 \log(f) \text{ dB}$$

Task: Draw the graph of L_{FS} as a function of d at 600 MHz.

Hints: $d \rightarrow$ semilog scale

line \rightarrow straight line

Solution

$$\begin{aligned} L_{FS} &= 32.44 + 20 \log(d) + 20 \log f \\ &= 88.003 + 20 \log d \end{aligned}$$

(dB) \downarrow km \downarrow MHz \nearrow 600

$$L_{FS} \approx 88 + 20 \log d$$

$d \text{ (km)}$	10^0	10^1	10^2	10^3	10^4	10^5	10^6
$L_{FS} \text{ (dB)}$	88	108	128	148	168	186	208

