The optic power, after propagating through a fibre that is 500 m long is reduced to 25% of its original value. Calculate the fibre loss in dB/km.

Solution:

The loss of the power in a fibre (in dB/km) is given by

$$\frac{10\lg\frac{\text{output power}}{\text{input power}}}{\text{distance}}$$

So, in our case the fibre loss

$$\frac{10\lg\frac{1/4P_0}{P_0}}{0.5} = 20\lg\frac{1}{4} = -12\frac{\text{dB}}{\text{km}}.$$

Answer: $-12\frac{\text{dB}}{\text{km}}$.