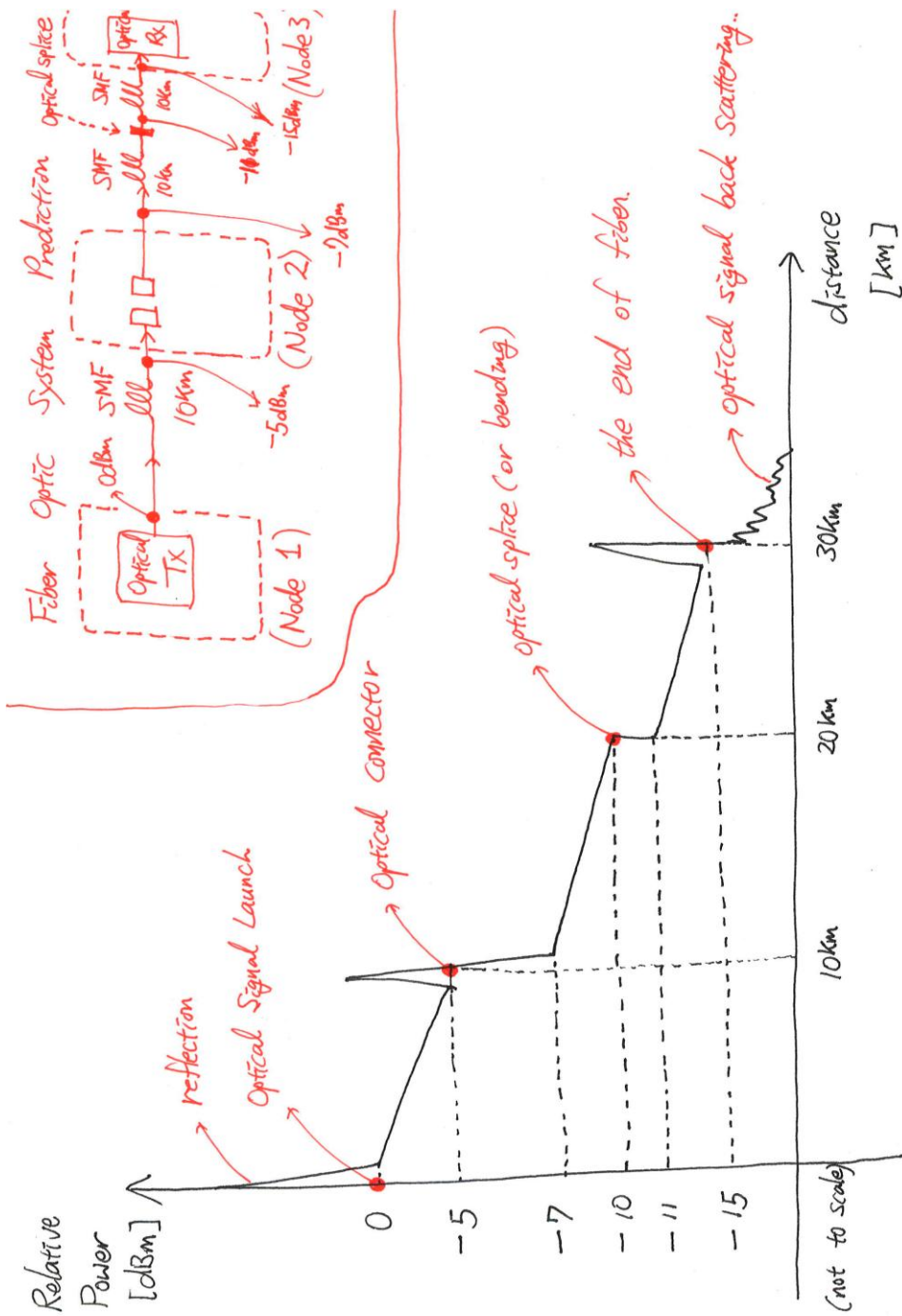


EECE 598, Homework 04, **SOULTIONS**

1. Consider a OTDR (Optical Time Domain Reflectormeter) trace below. Predict possible fiber optic network system which will results in below figure.
 - (a) Explain possible optical components at each point (or between two points)
 - (b) Indicate loss [dB], attenuation parameters [dB/km] for the components.

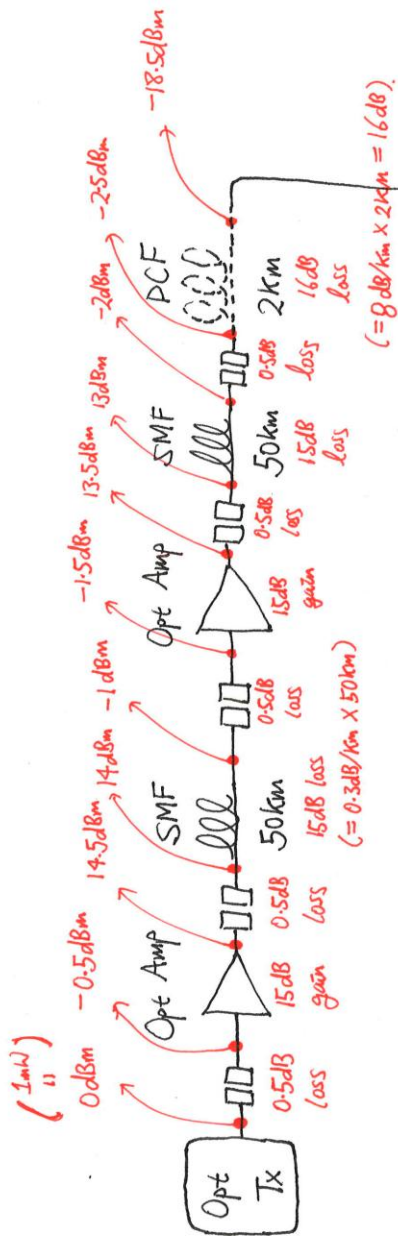


2. Assume you have a fiber optic communication system as shown below.

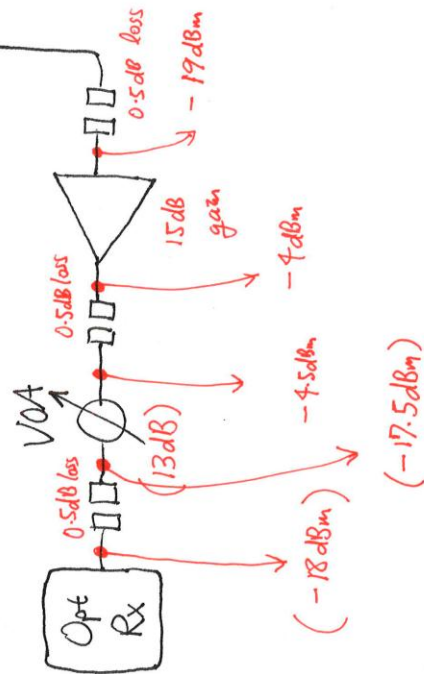
- (a) Indicate “before” and “after” **Optical Power** for each fiber optic components using the attenuation (loss/gain) parameters shown in below table.
(indicate the power levels (numbers in “**dBm**”) on the system diagram figure)

Opt Tx	Optical Transmitter	Tx Power = 1 mW
Opt Conn	Optical Connector	Loss = 0.5 dB
Opt Amp	Optical Amplifier	Gain = 15 dB
SMF	Optical Fiber (Sgl Mode)	Attenuation Parameter = 0.3 dB/km
DCF	Optical Fiber (Disp Comp)	Attenuation Parameter = 8 dB/km
VOA	Variable Optical Attenuator	Loss = Adjustable

SEE NEXT PAGE for Optical Power at before/after each fiber optic components.



—□□— : Opt Connector.



Varying...

(b) Calculate **BER Power Penalty** if the fiber optic communication system has below BER performances.

- a. Fill in the **table** below (Fill in “**Optical Rx Power**”)
- b. **Plot BER curve** on a semi-log paper.

VOA Attenuation [dB]	Optical Rx Power [dBm]	BER [Error Rate]
13.0	-18	1.0×10^{-4}
12.0	-17	2.0×10^{-5}
11.0	-16	4.0×10^{-6}
10.0	-15	9.0×10^{-7}
9.0	-14	2.0×10^{-7}
8.0	-13	4.0×10^{-8}
7.0	-12	1.0×10^{-8}

SEE NEXT PAGE for Resulting BER Plot

BER

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