

Experiment # 04 (Transmission Lines)

- Object:-** (a) Determine the velocity of propagation of HF pulses through the given Transmission line. Calculate the inductance per meter (L) and the capacitance per meter length (C) of the given line.
- (b) Trace the reflections observed at the other end of the given line terminated into different loads.

Observations:-

Part (a) :- Propagation Characteristics of the “ open-circuited “ transmission line:-

Specifications of the HF pulses transmitted:- PRR = MHz; Amplitude = volts,
Pulse-duration = 0.2 μs

Specifications of the transmission line used:- Length (*l*) = 30 meters; $Z_o = 50 \Omega$

Time-delay between the transmitted & reflected pulses, $t_d = (1.6/5)\mu s = 0.32 \mu s$

$$V_p = (2l) / t_d = 1.8 \times 10^8 \text{ m/s}$$

$$L = Z_o / V_p = \dots\dots\dots \text{ micro-Henry/meter};$$

$$C = 1 / Z_o V_p = \dots\dots\dots \mu\text{F/meter}$$

Part (b) :- Reflections due to different load terminations (a load connected to the line)

Use three tracing papers only to trace the reflections in the following way:-

Use single tracing paper to trace the Reflections corresponding to “Resistive load terminations” of **0 Ω, 50 Ω and 100 Ω** ; (show the reflected pulses by the dotted lines) ;

Use one tracing paper to trace the Reflections corresponding to any one “capacitive load termination” and use one tracing paper to trace the Reflections corresponding to “Inductive load termination”

