Week 1 Solutions

1. Printed circuit boards (PCBs)

2. $\Delta z \ll \lambda_{\text{short}}$

3. Wave travelling along $+z$ direction

4. Depends only on line parameters $L$ and $C$, independent of frequency of the wave

5. $\pi$

6. Only $+z$ travelling voltage wave exists & the ratio of voltage to current is constant

7. The characteristic impedance is purely real & the characteristic impedance is $\sqrt{L/C}$

8. Voltage is maximum at the load, the magnitude of the reflection coefficient is unity & a standing wave pattern exists on the transmission line

9. Current is maximum at the load, the magnitude of the reflection coefficient is unity & a standing wave pattern exists on the transmission line

10. The load can be replaced with an infinite length line of same characteristic impedance without affecting waves on the transmission line, the magnitude of the reflection coefficient is zero & a standing wave pattern does not exist on the transmission line

11. $+j$

12. $-j$

13. $\tau = 0.57$

14. $I_L = -0.385$

15. $|V_o^+| = 3.75 \, V$