ECE 303 - Homework # 10 Solutions.

(By Farhan Rana)

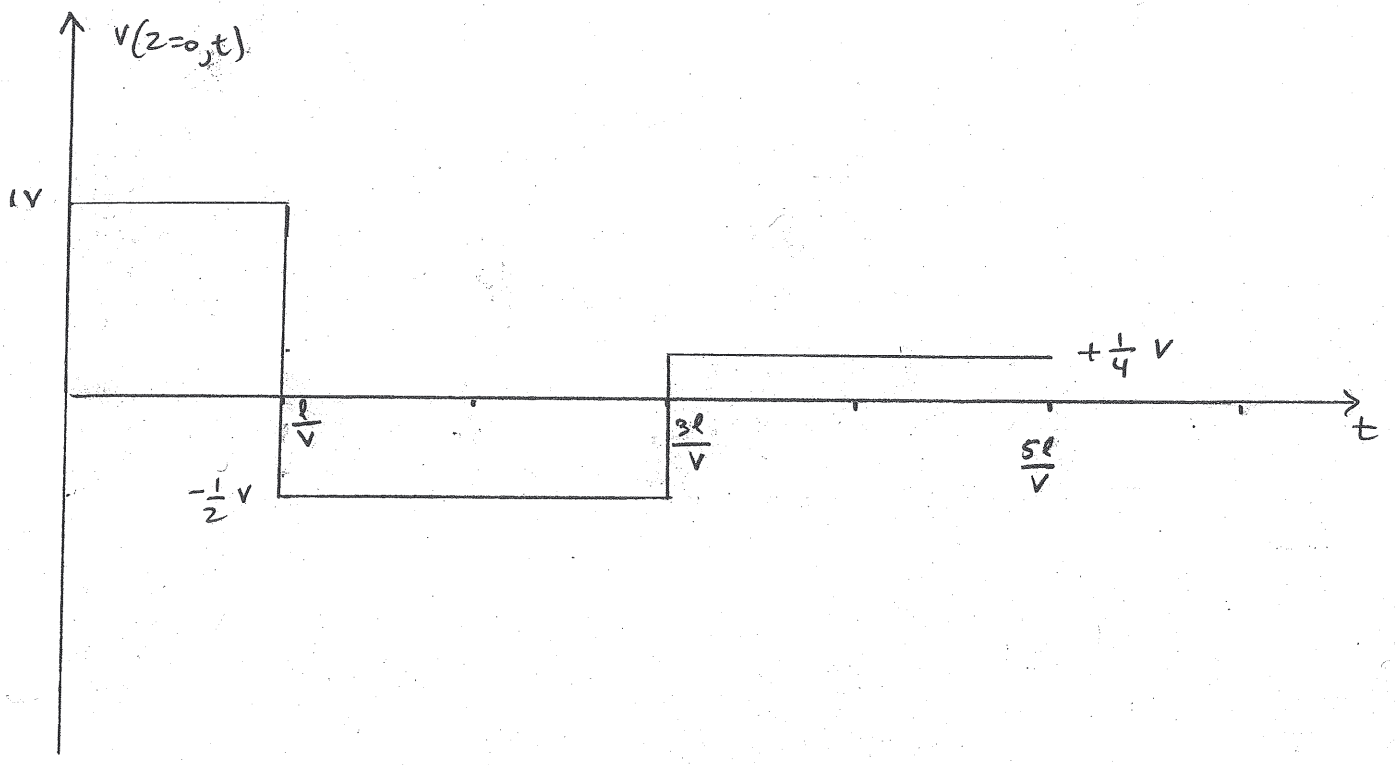
10.1

a) – d) See attached plots.

10.2

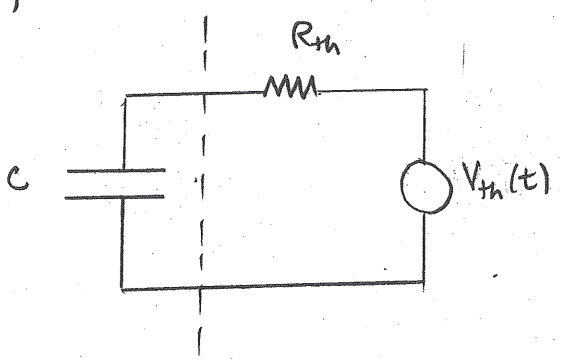
a) – c) See attached plots.

10.3



10.4

a)



$R_{th} = Z_0 = 50\ \Omega$.

$V_{th}(t) = 0$ for $0 \le t \le 2\frac{\ell}{v}$. — this is because there was no $V_-(z,t)$ on the line before the switch was opened.

b) — e) See attached plots.

10.6

a) $\omega_{m=2}(TE_2) = \omega_{m=2}(TM_2) = \frac{1}{\sqrt{\mu_0 \varepsilon}} \frac{2\pi}{d} = \frac{c}{2} \cdot \frac{2\pi}{5\times10^{-3}} = 1.89 \times 10^{11}$ rad/sec

$= 30$ GHz.

b) See attached plot.

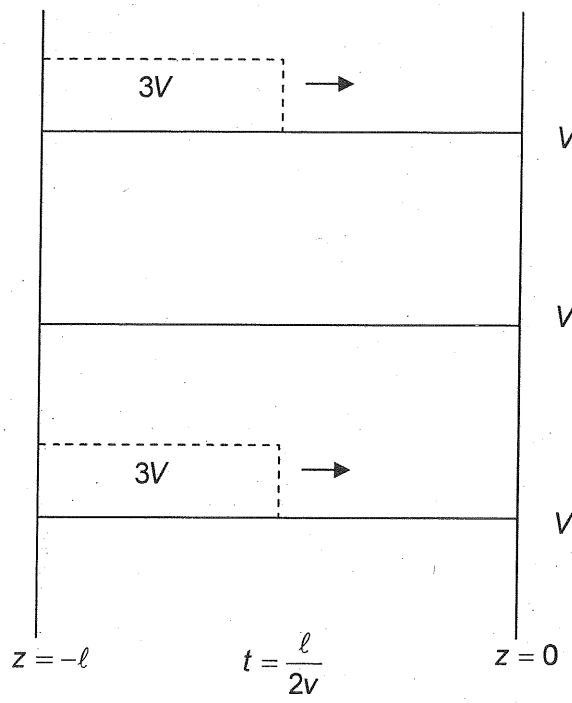
c) See attached plot.

10.5

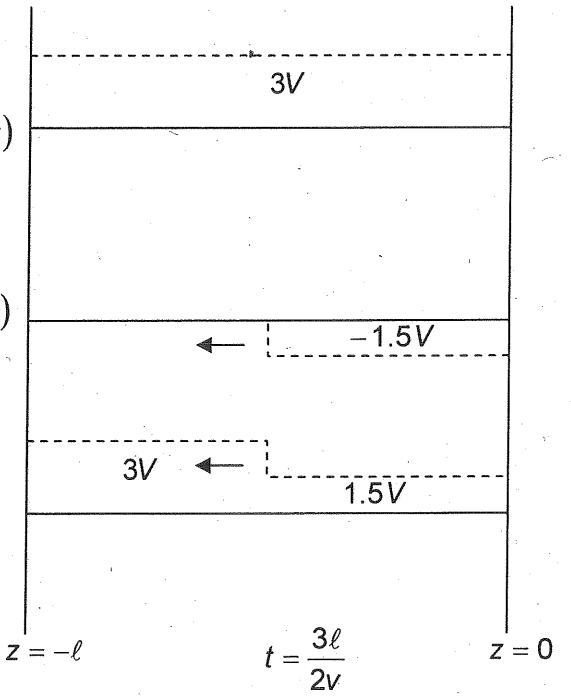
a) Same figure as in 10.4 (a) except that Vth(t) = +2 V for 0<t<2ℓ/v. This is because V_(z,t) was +1 V before the switch was opened woud reflect as +1 V from the open end of the transmission line.

b) - e) See attached plots.

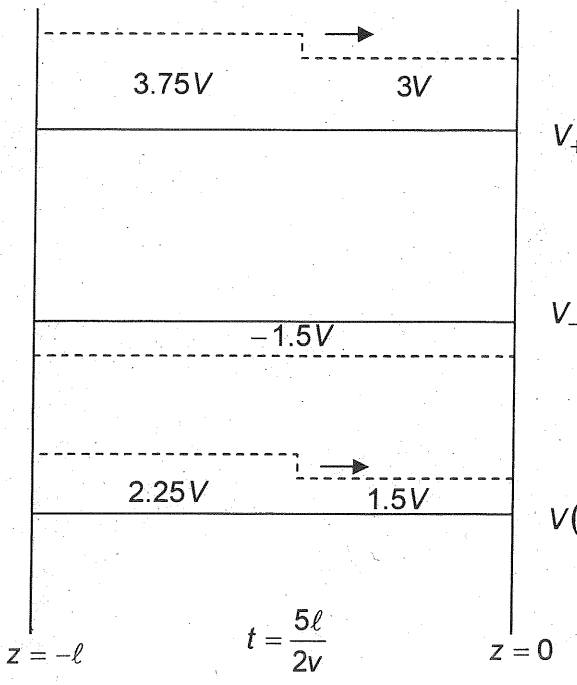
Problem and Part Number: 10.1(a)



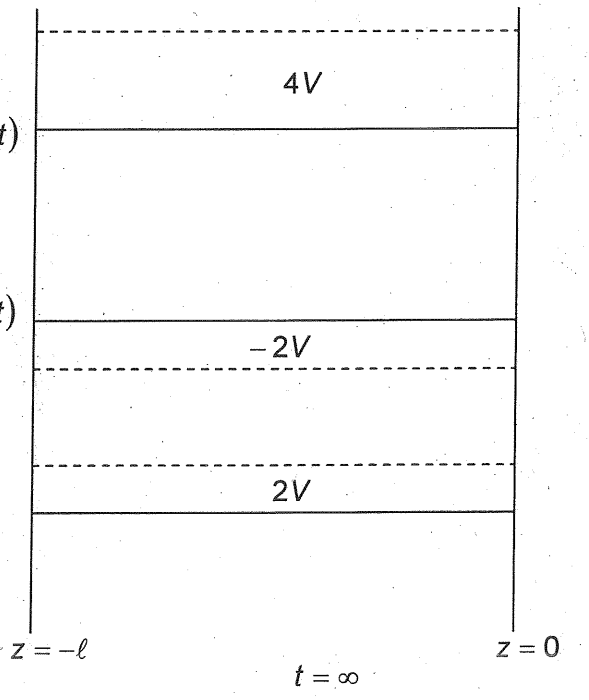
Problem and Part Number: 10.1(b)



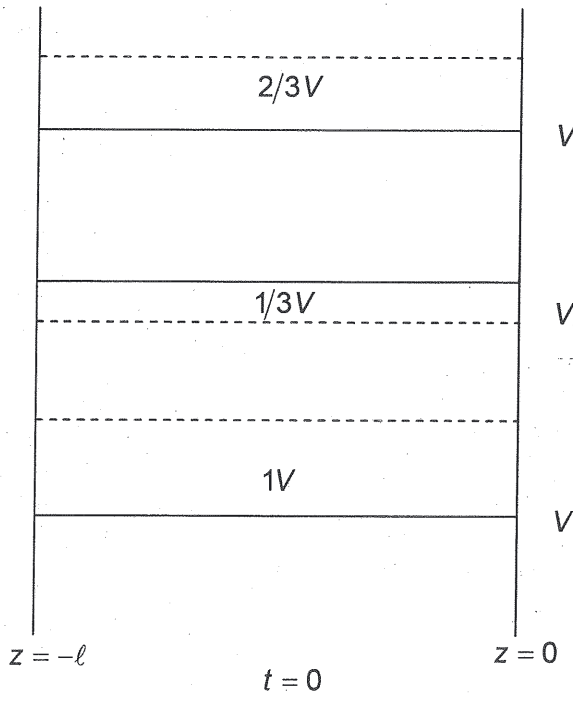
Problem and Part Number: 10.1(c)



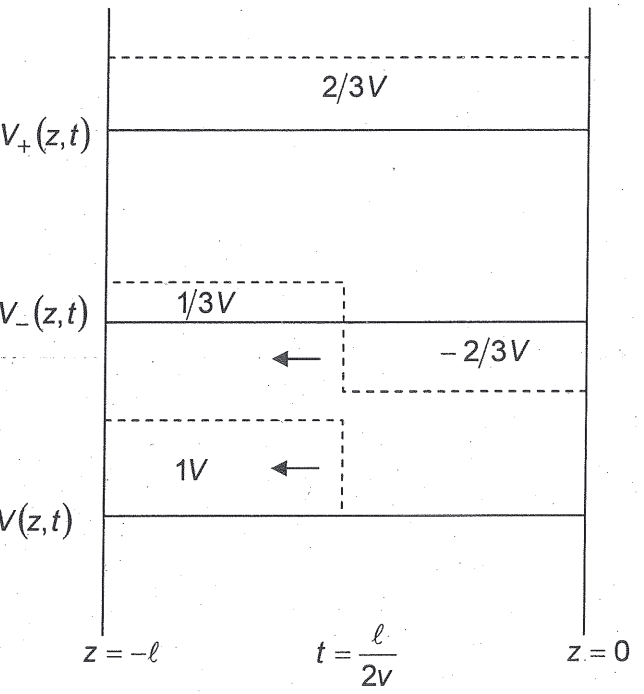
Problem and Part Number: 10.1(d)



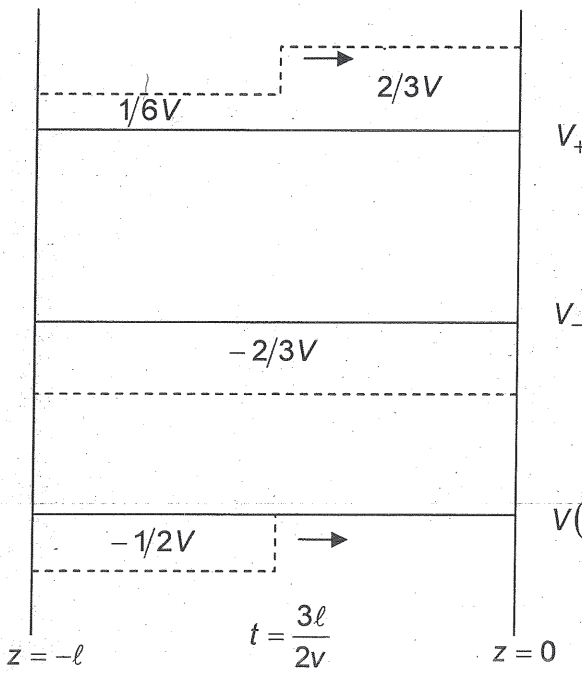
Problem and Part Number: 10.2(a)



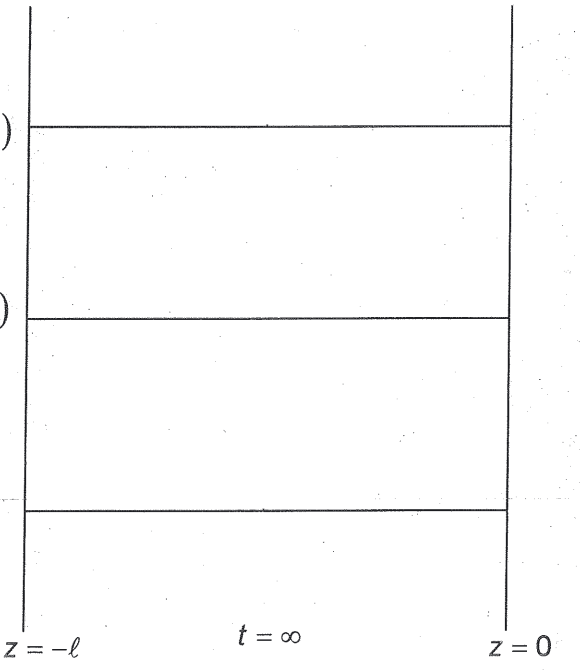
Problem and Part Number: 10.2(b)



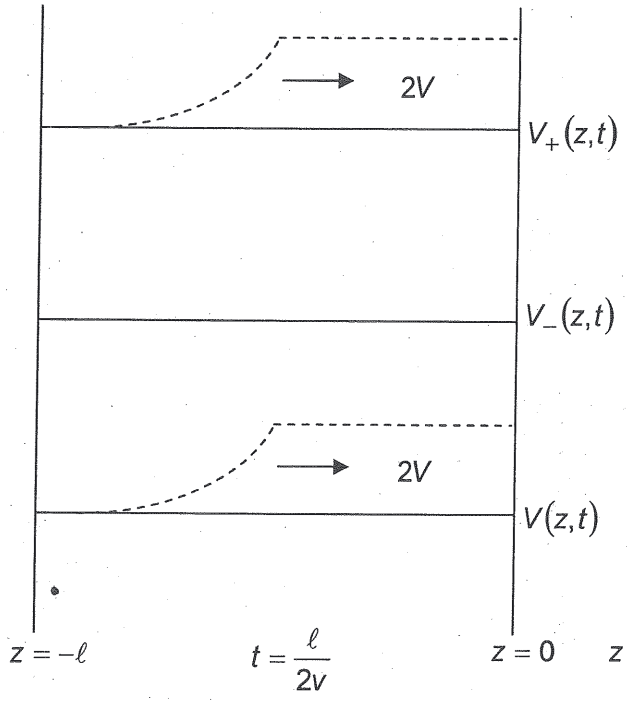
Problem and Part Number: 10.2(c)



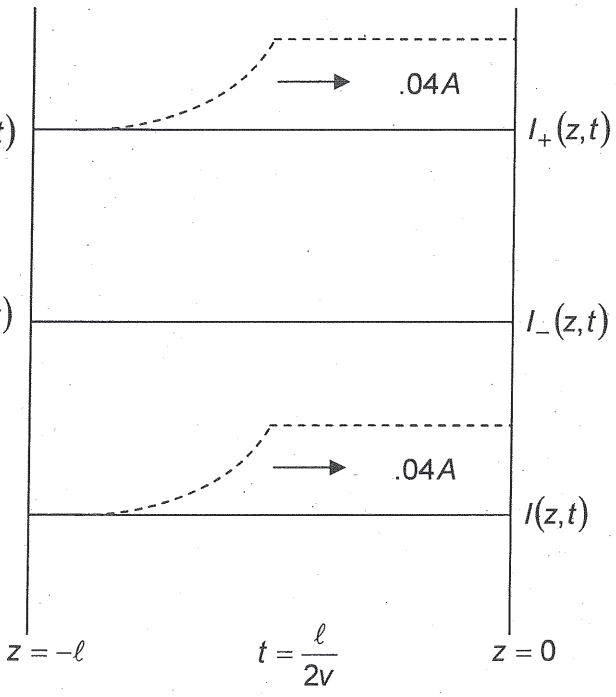
Problem and Part Number:



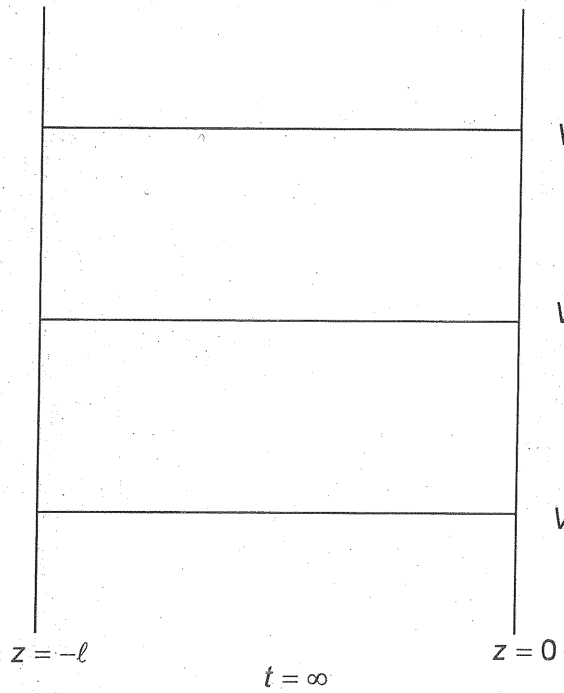
Problem and Part Number: 10.4(c)



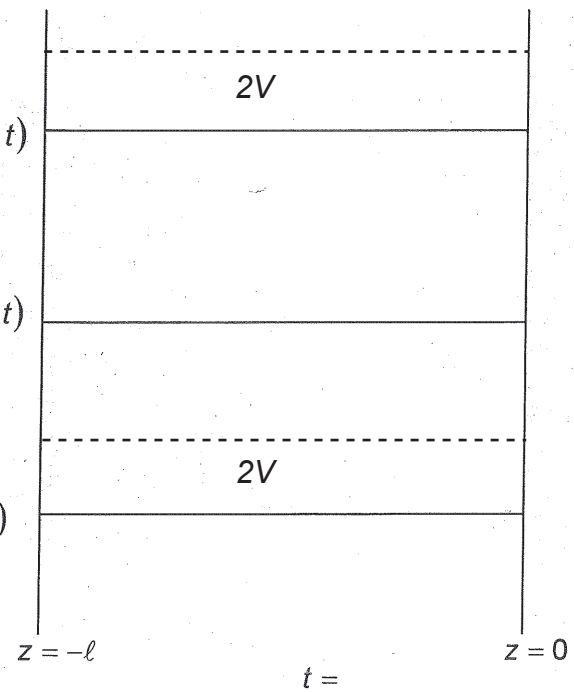
Problem and Part Number: 10.4(d)



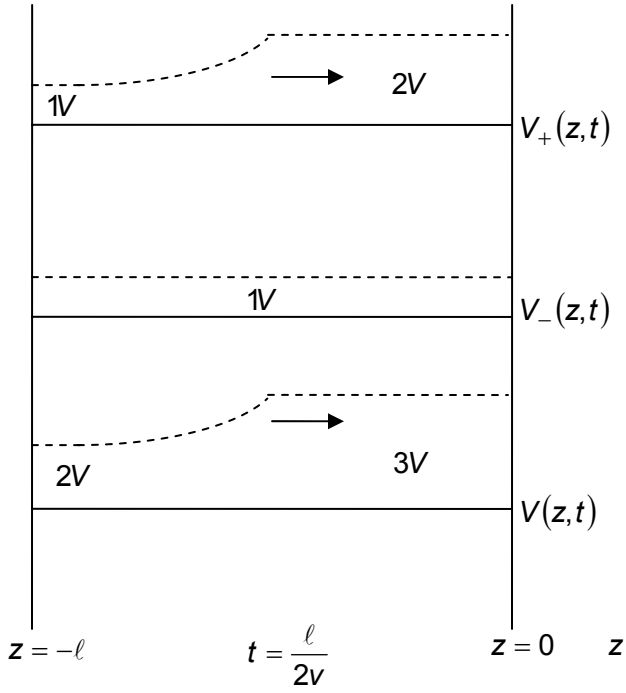
Problem and Part Number: 10.4(e)



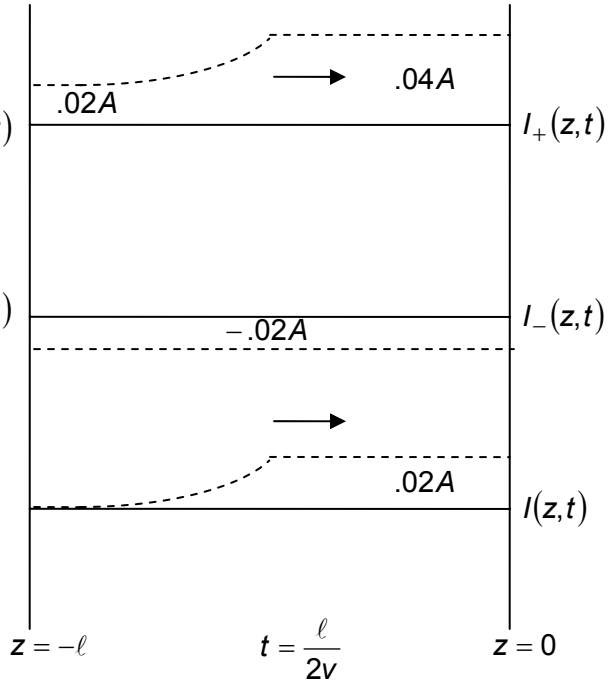
Problem and Part Number: 10.4(b)



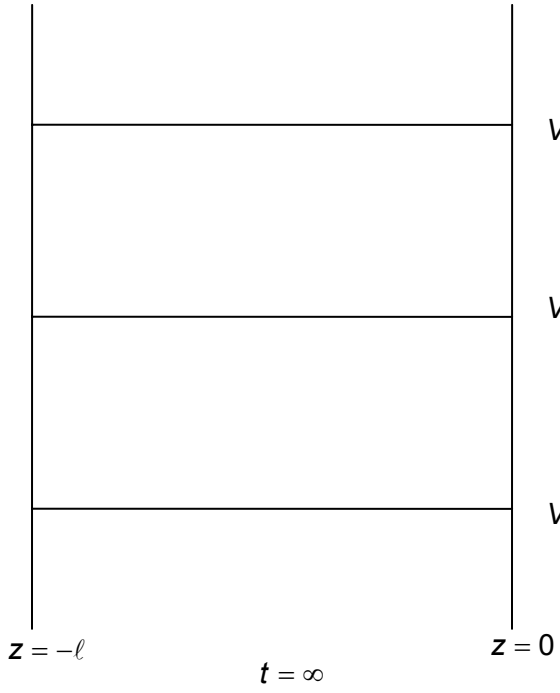
Problem and Part Number: 10.5(c)



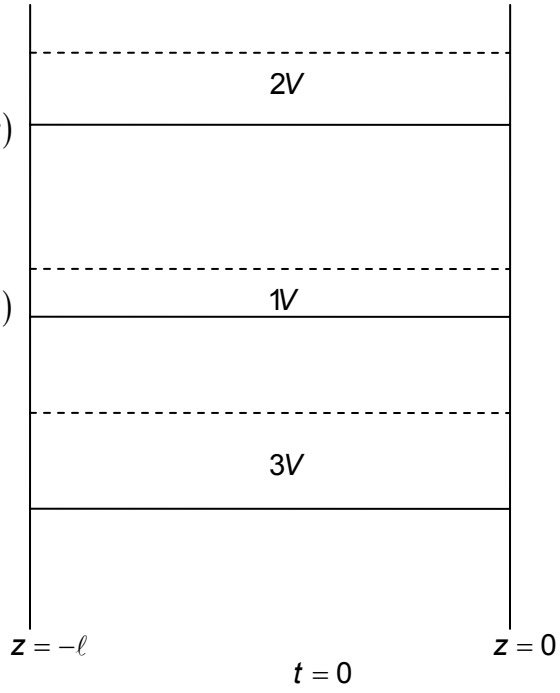
Problem and Part Number: 10.5(d)

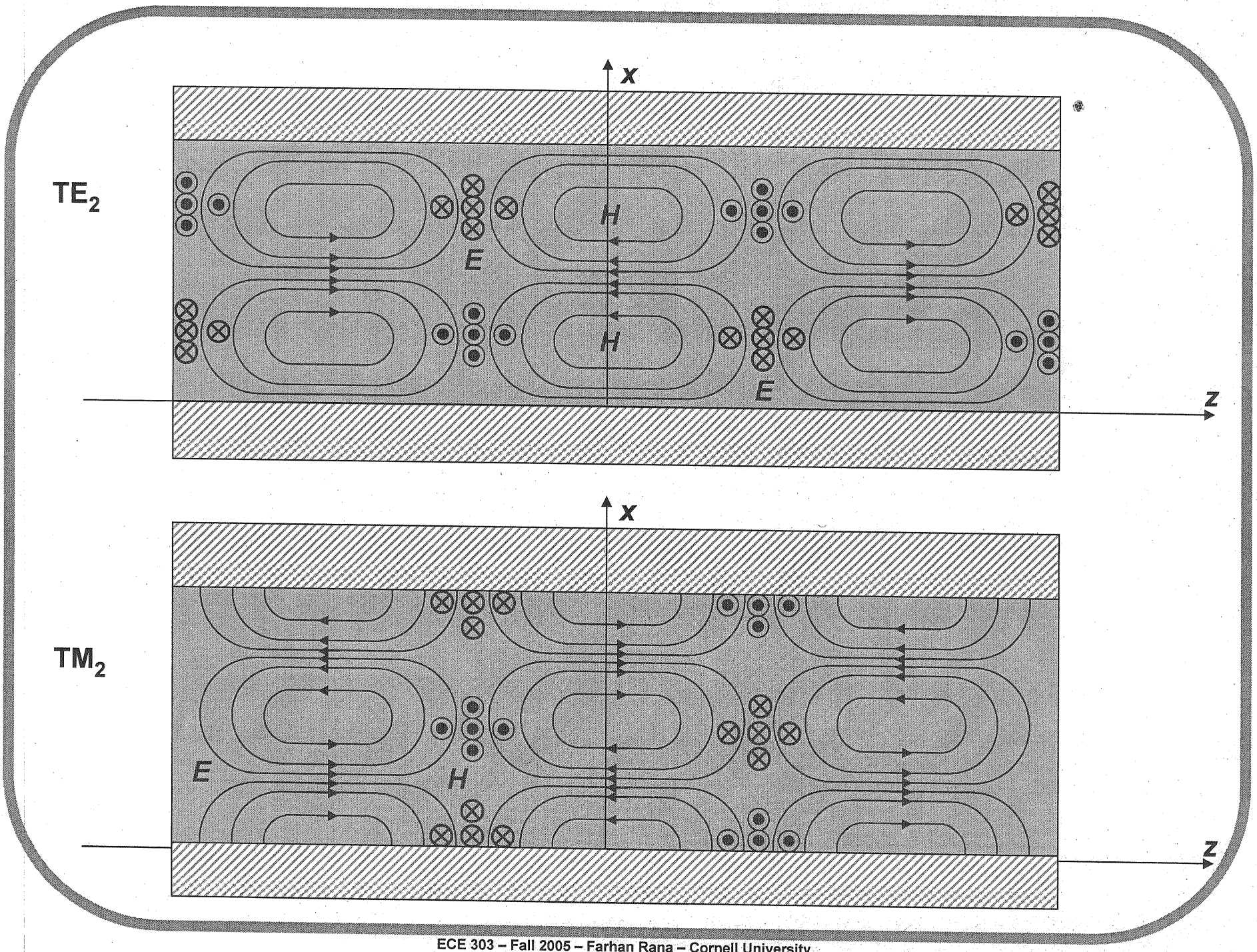


Problem and Part Number: 10.5(e)



Problem and Part Number: 10.5(b)




TE2
x
H
E
H
E
z
TM2
x
E
H
z