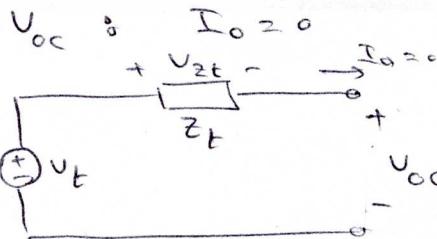
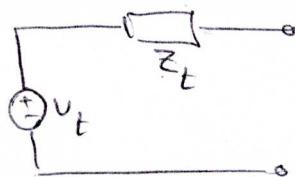


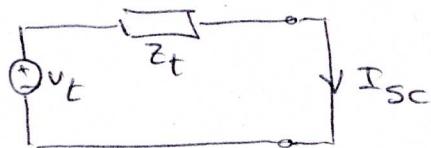
## Solutions to Assigned Problems from Appendix C

C.1)



$$V_{oc} \text{ is } I_o = 0 \\ + V_{Zt} - \xrightarrow{I_o = 0} \\ V_{oc} = V_t - V_{Zt} = V_t - 0 \times Z_t \\ \Rightarrow V_{oc} = V_t$$

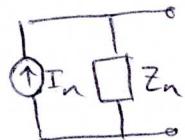
$I_{sc}$  is  $V_o = 0$



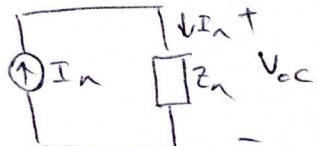
$$I_{sc} = \frac{V_t}{Z_t}$$

$$\Rightarrow Z_t = \frac{V_{oc}}{I_{sc}}$$

C.2)

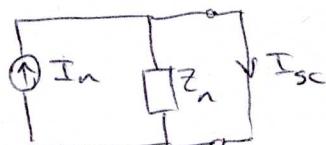


$V_{oc}$  is  $I_o = 0$



$$V_{oc} = Z_n I_n$$

$I_{sc}$  is  $V_o = 0$

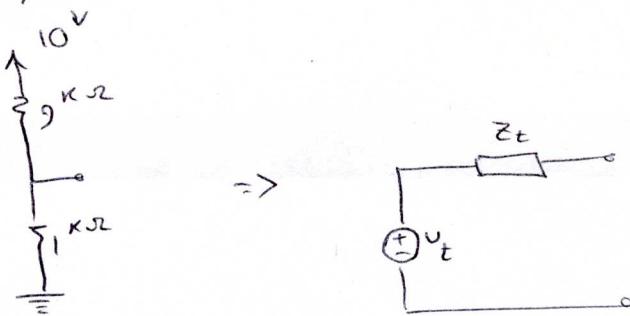


$$I_{sc} = \frac{Z_n}{Z_n + 0} I_n = I_n$$

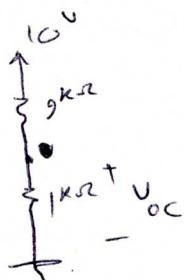
$$\Rightarrow Z_n = \frac{V_{oc}}{I_{sc}}$$

## Solutions to Assigned Problems from Appendix C

C. 3 )

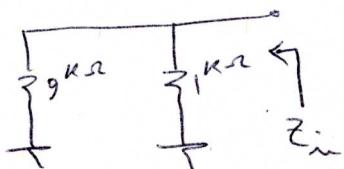


$$V_t = V_{OC}$$

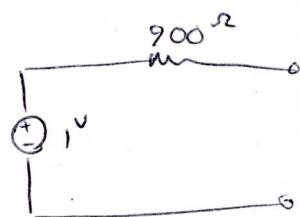


$$V_{OC} = \frac{1}{1 + 9} \times 10 = 1 \text{ V}$$

$Z_t$  : independent sources  $\rightarrow 0$

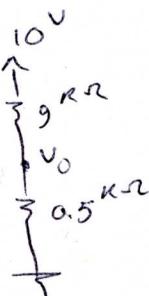
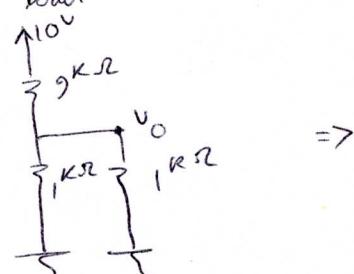


$$Z_{in} = Z_t = 1 \parallel 9 = 0.9 \text{ k}\Omega$$



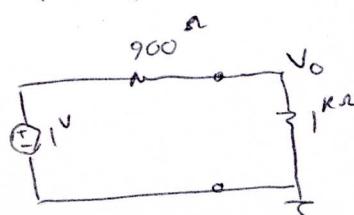
$$Z_{load} = 1 \text{ k}\Omega$$

①



$$V_0 = \frac{0.5}{9 + 0.5} \times 10 = 0.526 \text{ V}$$

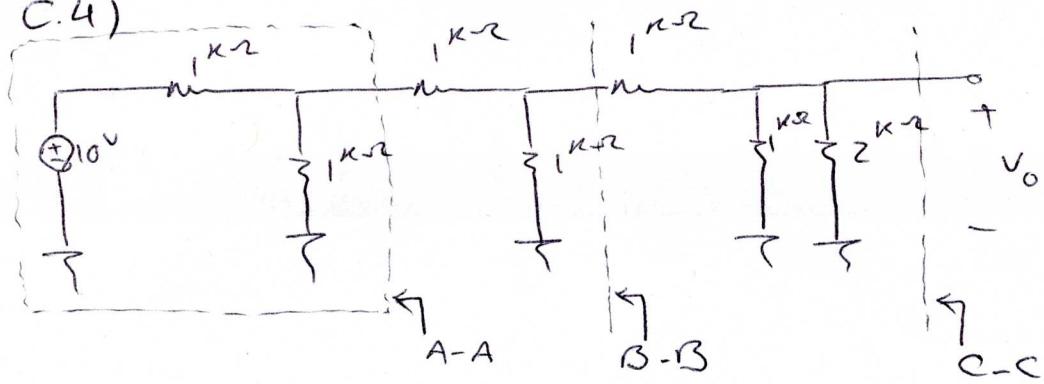
②



$$V_0 = \frac{1}{1 + 0.9} \times 1 = 0.526 \text{ V}$$

## Solutions to Assigned Problems from Appendix C

C.4)



A-A :

$$1 - V_{OC1} :$$

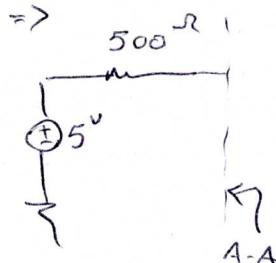
$$\text{Circuit diagram for } A-A \text{ shows a } 10\text{V source in series with a } 1\text{k}\Omega \text{ resistor. This is followed by a dependent current source } I = 1\text{k}\Omega \cdot v_A. The output voltage } V_{OC1} \text{ is the voltage across the first two resistors.}$$

$$V_{OC1} = \frac{1\text{k}\Omega}{1\text{k}\Omega + 1\text{k}\Omega} \times 10\text{V} = 5\text{V}$$

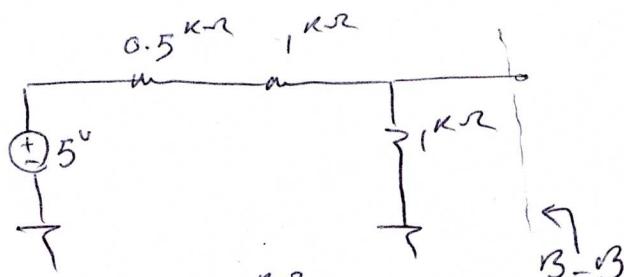
$Z_{T_1}$  :

$$\text{Circuit diagram for } Z_{T_1} \text{ shows the first two resistors in series. The total resistance is } 1\text{k}\Omega + 1\text{k}\Omega = 0.5\text{k}\Omega.$$

$$Z_{T_1} = 1\text{k}\Omega \parallel 1\text{k}\Omega = 0.5\text{k}\Omega$$



B-B :



$$V_{OC2} :$$

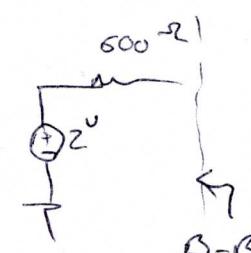
$$\text{Circuit diagram for } B-B \text{ shows a } 5\text{V source in series with a } 1\text{k}\Omega \text{ resistor. This is followed by a dependent current source } I = 0.5\text{k}\Omega \cdot v_B. The output voltage } V_{OC2} \text{ is the voltage across the first two resistors.}$$

$$V_{OC2} = \frac{1\text{k}\Omega}{1\text{k}\Omega + 1.5\text{k}\Omega} \times 5\text{V} = 2\text{V}$$

$Z_{T_2}$  :

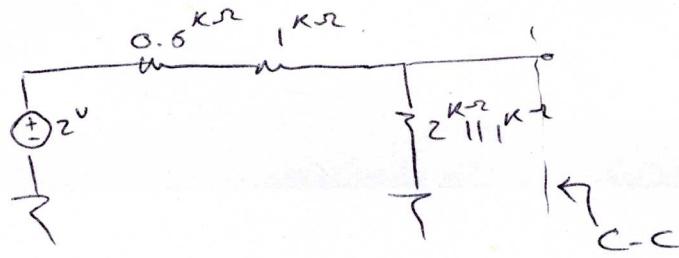
$$\text{Circuit diagram for } B-B \text{ shows the first two resistors in series. The total resistance is } 1\text{k}\Omega + 1.5\text{k}\Omega = 0.6\text{k}\Omega.$$

$$Z_{T_2} = 1\text{k}\Omega \parallel 1.5\text{k}\Omega = 0.6\text{k}\Omega$$

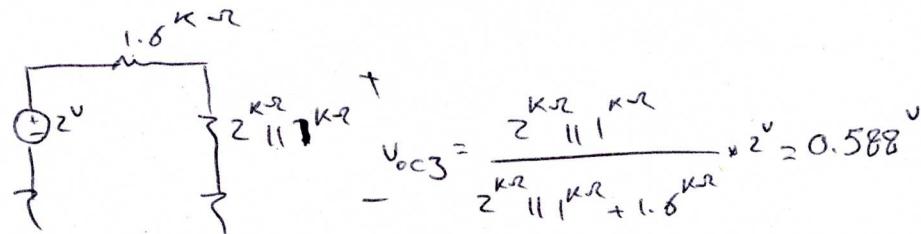


## Solutions to Assigned Problems from Appendix C

C-C :



$V_{OC3}$  :



$Z_{T3}$  :

