EXPERIMENT 6

CHARACTERISTICS OF RC CIRCUITS

OBJECTIVE: The object of the experiment is to learn the timing characteristics of RC circuits.

PRELIMINARY WORK

P1

a) For the RC circuit shown in Figure 6.1 **find** and **plot** $V_C(t)$ for charging and discharging periods for the component values R_1=33KΩ, R_2=27KΩ R_3=15KΩ and C=2200µF. Switch is in position 1 for the time intervals 0<t<200 and it is in position 2 for the time intervals 200<t<500. Assume capacitor is initially uncharged

Charging period (t = 0, 5, 10, 15, 20, 25, 30, 40, 50, 60, 80, 100, 120, 150, 200 sec.)

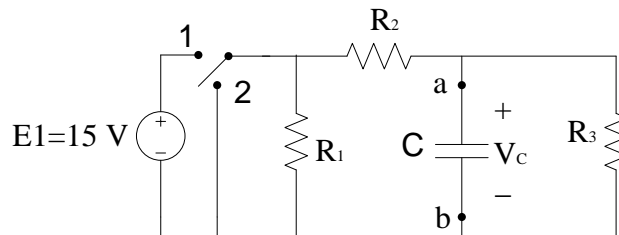Discharging period (t = 205, 210, 215, 220, 240, 250, 260, 280, 300, 300, 320, 350, 400, 450, 500 sec.)

Figure 6.1

b) Find the Thevenin Equivalent circuit with respect to terminals a-b and find and plot $V_C(t)$ for the charging and discharging time intervals. Same time intervals as given in P1 a)

P2 Calculate the energy stored in the capacitor given in P1 at charging and discharging time intervals. Charging phase is 0-200 sec. Discharging phase is 200-500 sec.

EQUIPMENT

Digital Multimeter (DMM)

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Avometer (AVO8)

Power Supply

Resistors

EXPERIMENTAL WORK

E1 Set up the circuit given in Figure 6.1 using the same time intervals obtain and plot the capacitor voltage $V_C(t)$

E2 Set up the circuit given in Figure 6.2. After steady state is reached, calculate the leakage resistance of the capacitor. $C=2200\mu F$
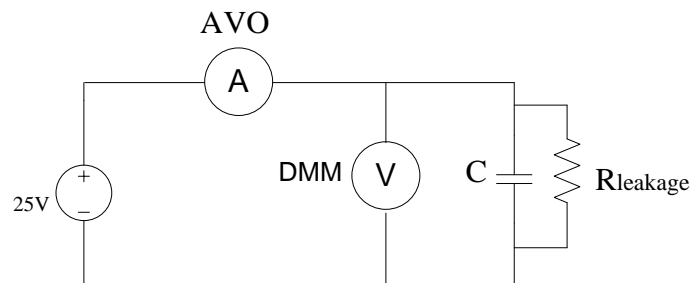

Figure 6.2

CONCLUSION

C1 Compare the plots you obtained in P1 and E1. Comment for any discrepancies

C2 Obtain the time constant of the circuit from the plots you obtained in E1. Is it same as in P1 or not? Why?

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