CSE350

DIGITAL ELECTRONICS AND PULSE TECHNIQUES

# LAB ASSIGNMENT 06

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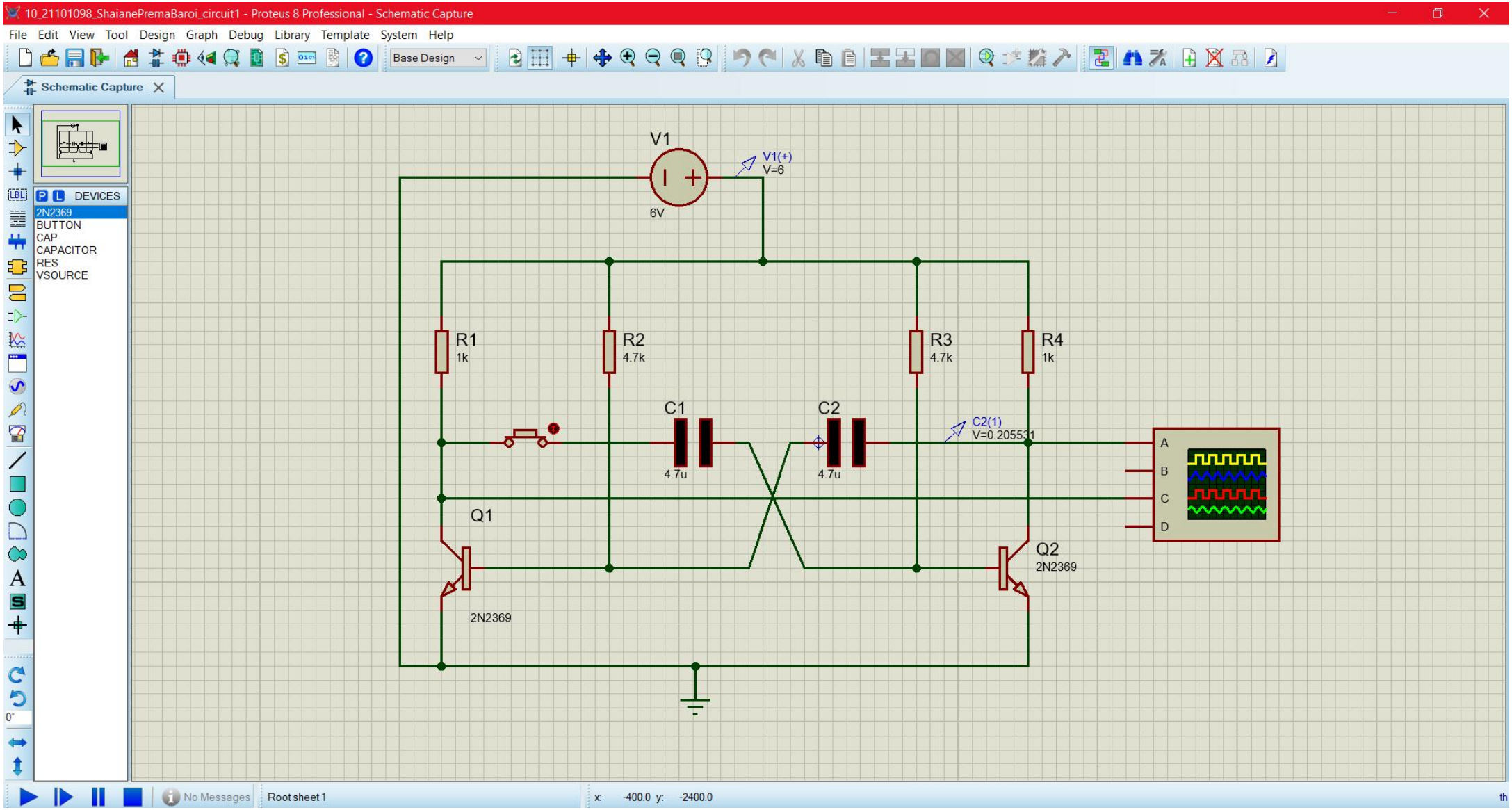
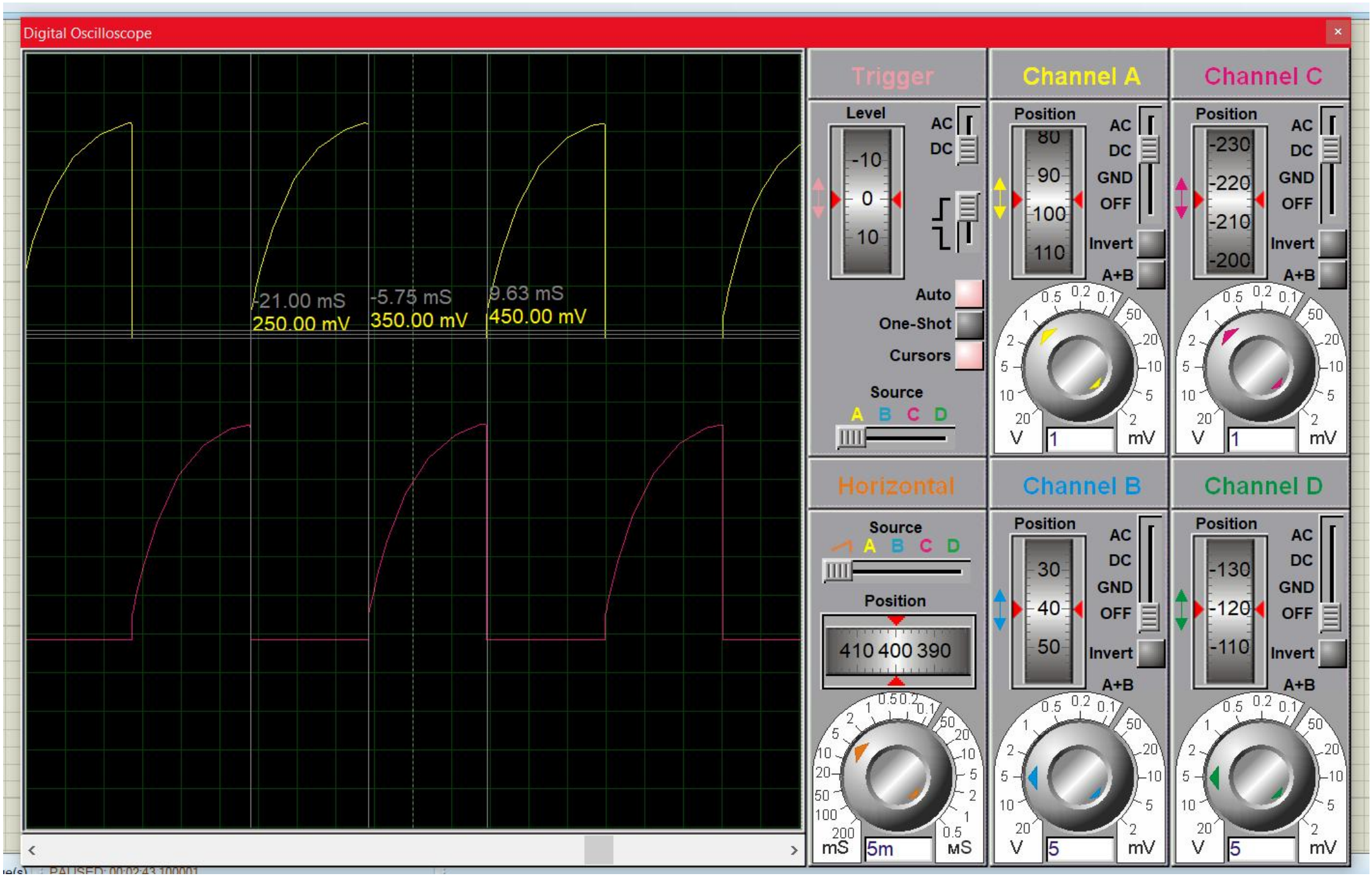
SECTION: 10

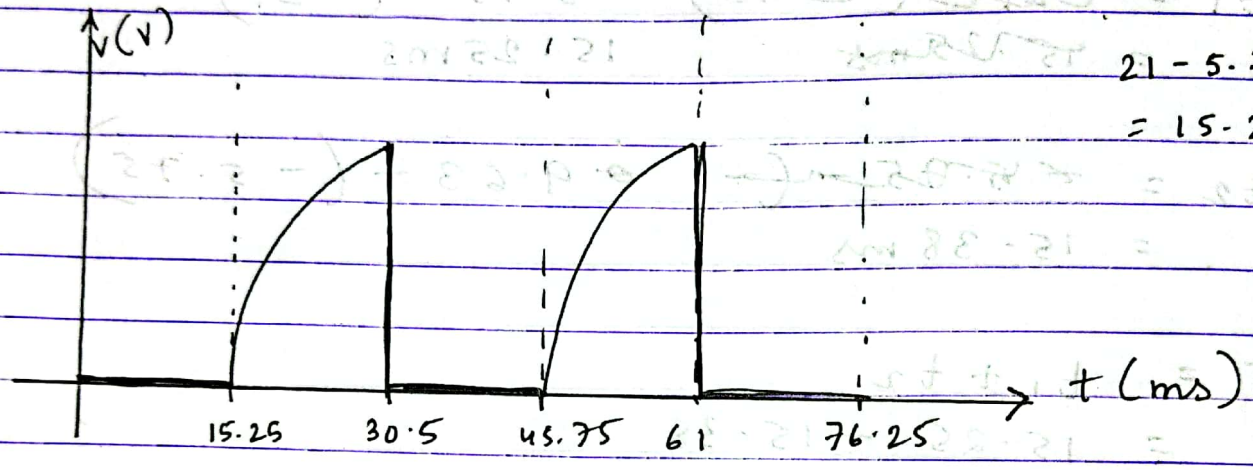

10_21101098_ShaianePremaBaroi_circuit1 - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
DEVICES
2N2369
BUTTON
CAP
CAPACITOR
RES
VSOURCE
V1
6V
V1(+)
V=6
R1
1k
R2
4.7k
R3
4.7k
R4
1k
C1
4.7u
C2
4.7u
C2(1)
V=0.205531
Q1
2N2369
Q2
2N2369
A
B
C
D
No Messages
Root sheet 1
x: -400.0 y: -2400.0


Digital Oscilloscope
-21.00 mS
250.00 mV
-5.75 mS
350.00 mV
9.63 mS
450.00 mV
Trigger
Level
-10
0
10
AC
DC
Auto
One-Shot
Cursors
Source
A B C D
Channel A
Position
80
90
100
110
AC
DC
GND
OFF
Invert
A+B
V
1
mV
Channel C
Position
-230
-220
-210
-200
AC
DC
GND
OFF
Invert
A+B
V
1
mV
Horizontal
Source
A B C D
Position
410 400 390
mS
5m
MS
Channel B
Position
30
40
50
AC
DC
GND
OFF
Invert
A+B
V
5
mV
Channel D
Position
-130
-120
-110
AC
DC
GND
OFF
Invert
A+B
V
5
mV

Report

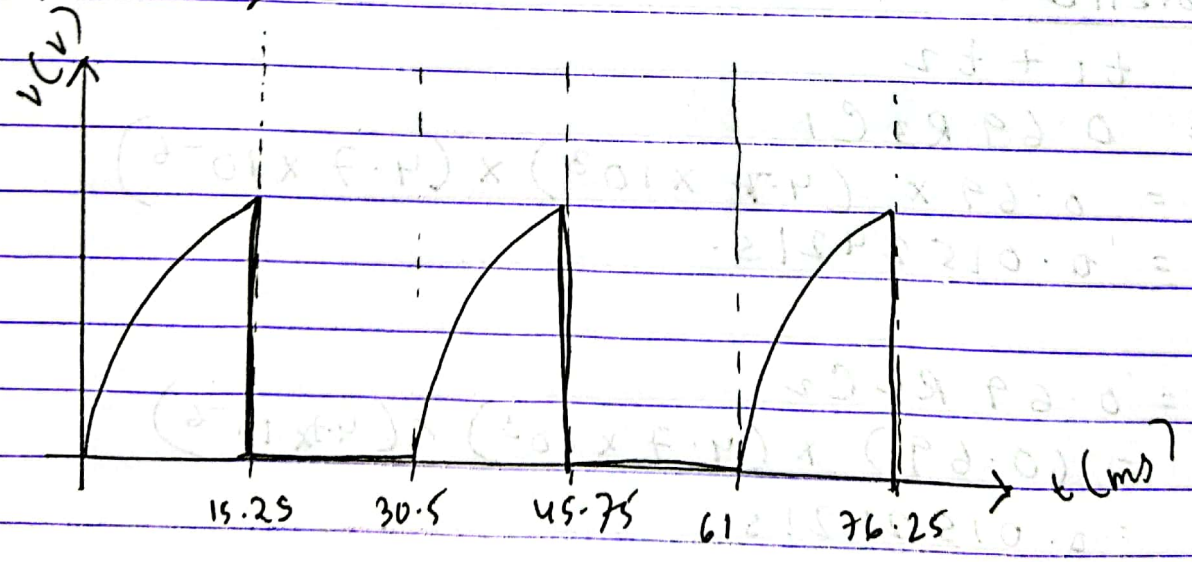
1. output waveforms

Channel A




21 - 5.75
= 15.25

Channel B & C



2) Yes, there is significant deviation. This is because in the experiment, the capacitor requires time to charge and discharge, hence its curve is more curved.

Experimental

3) $t_1 = -5.75 - (-21)$

$= 15.25\,ms$

$t_2 = 9.63 - (-5.75)$

$= 15.38\,ms$

$T = t_1 + t_2$

$= 15.25 + 15.38$

$= 30.63\,ms$

Theoretical

$T = t_1 + t_2$

$t_1 = 0.69 R_3 C_1$

$= 0.69 \times (4.7 \times 10^3) \times (4.7 \times 10^{-6})$

$= 0.0152421\,s.$

$t_2 = 0.69 R_2 C_2$

$= (0.69) \times (4.7 \times 10^3) \times (4.7 \times 10^{-6})$

$= 0.0152421\,s$

$T = t_1 + t_2 = 0.0152421 \times 2 = 0.03048 = 30.48\,ms$

$\therefore$ Yes time periods are similar.

4. Yes it is possible if the frequency is changed using the capacitors or resistors

$$T = 0.69R_3C_1 + 0.69R_2C_2$$

$$f = \frac{1}{t} = \frac{1}{0.69R_3C_1 + 0.69R_2C_2}$$

5 Duty cycle $= \dfrac{0.69R_3C_1}{0.69R_3C_1 + 0.69R_2C_2}$

$$= \frac{0.69(4.7)(4.7)}{0.69(4.7)(4.7) + 0.69(4.7)(4.7)}$$

$$= 50\%$$

So, duty cycle can be changed using capacitors or resistors.