CSE350

LAB: 5

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Section: 12

Here,

Frequency (theoratical): $\frac{1}{4 * R_1 * C} \times \frac{R_2}{R_3}$

Given that,

$R_1 = 10k\Omega$

$R_2 = 10k\Omega$

$R_3 = 4k\Omega$

$C = 0.4\mu F$

$= \frac{1 \times 10 \times 10^3}{4 \times 10 \times 10^3 \times 0.4 \times 10^{-6} \times 4 \times 10^3}$

$= 156.25$ Hz

Now, From proteus:

Frequency (practical):

Experimental time period, $t = (150 - 143.3) \times 10^{-3}$

$= 6.7$ mS

Now, frequency, $f = \frac{1}{t} = \frac{1}{6.7 \times 10^{-3}} = 149.254$ Hz

Data table:

Theoretical frequency	Experimental time period, T(ms)	Experimental Frequency F (Hz)
156.25	6.7	149.254

Report:

① Output wave shape at point A:

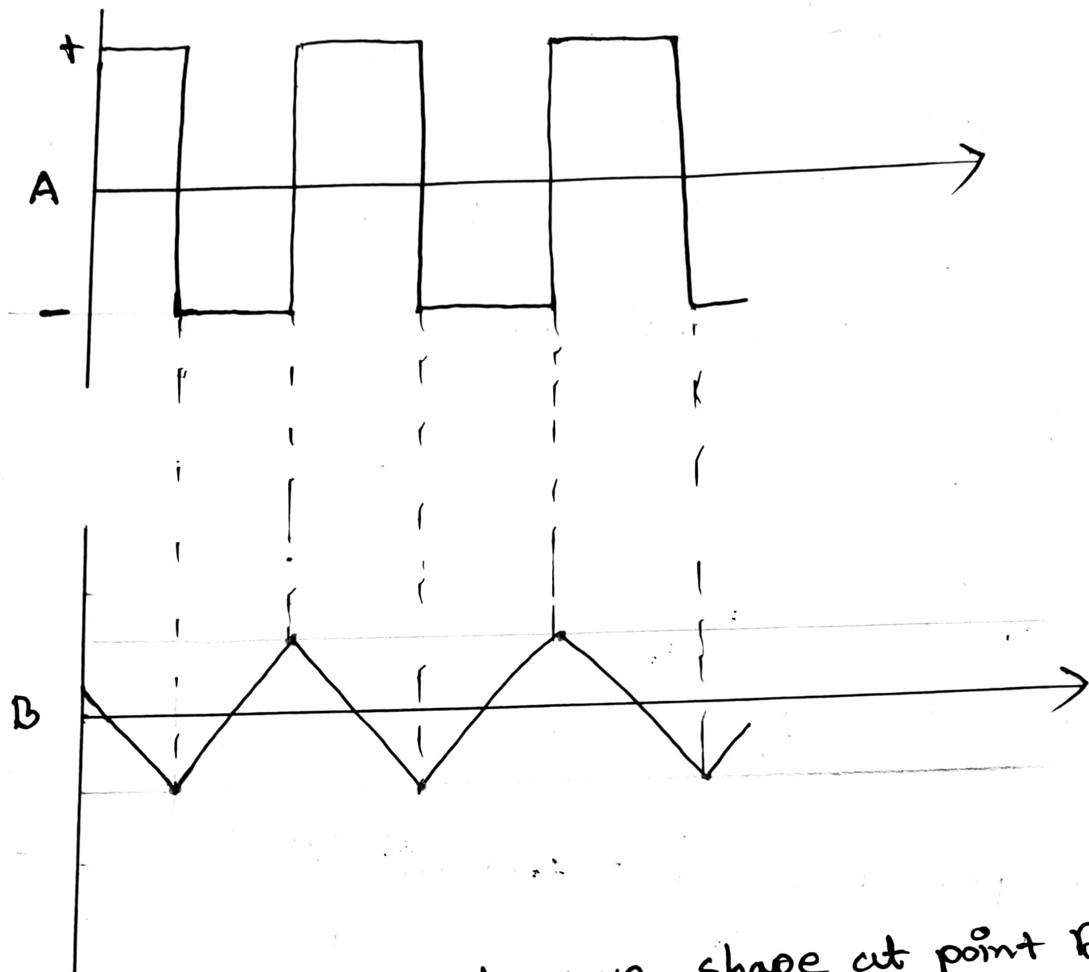


Fig: Output wave shape at point B

Date: ..../........../..........

② There are two sections of the triangular wave oscillator.

They are:

① Schmitt

② Op-amp intigrator.

Schmitt produces a square shaped wave at point A. Also, Op-amp intigrator produces a triangular wave at point B. Depending on the capacitor there is also a capacitor as output.

Now, schmitt trigger circuit has two thresholds.

① Upper

② lower

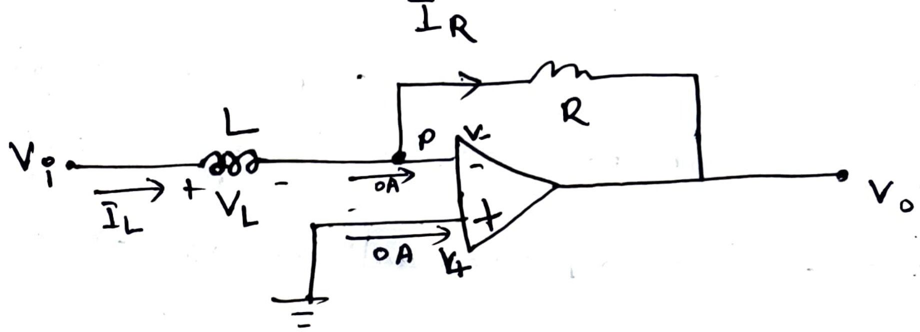
When current flows through the lower part, it creates high square shape as output and when current flows through the ~~lower part~~ higher part, it creates a full square shape.

In om-amp integrator, when we get lower signal from output A, it goes to the upper signal at B. Similarly when it gets higher signal from output A, it goes to the lower signal at B. These up and downs creates the triangular shape.

(3) Yes, the integrator circuit can be implemented by with an inductor.

~~Inductor:~~

Here,



$$I_p = \frac{0 - V_o}{R}$$

$$= \frac{-V_o}{R} \; ; \quad \left.\begin{array}{l} V^- = 0 \\ V^+ = 0 \end{array}\right\} \text{Virtual ground concept}$$

KCL,

$$I_L = 0 + I_R = I_R$$

$$V_L = V_i - 0 = V_i$$

$$\Rightarrow V_L = L \frac{dI_L}{dt}$$

$$= L \frac{dI_R}{dt}$$

$$\therefore V_i = V_L = -\frac{L}{R} \times \frac{dV_o}{dt}$$

$$\Rightarrow \frac{-R}{L} V_i = \frac{dV_o}{dt}$$

$$\Rightarrow \int \frac{dV_o}{dt} \times dt = -\int \frac{R}{L} V_i \, dt$$

$$\Rightarrow V_o = -\int \frac{R}{L} V_i \, dt.$$

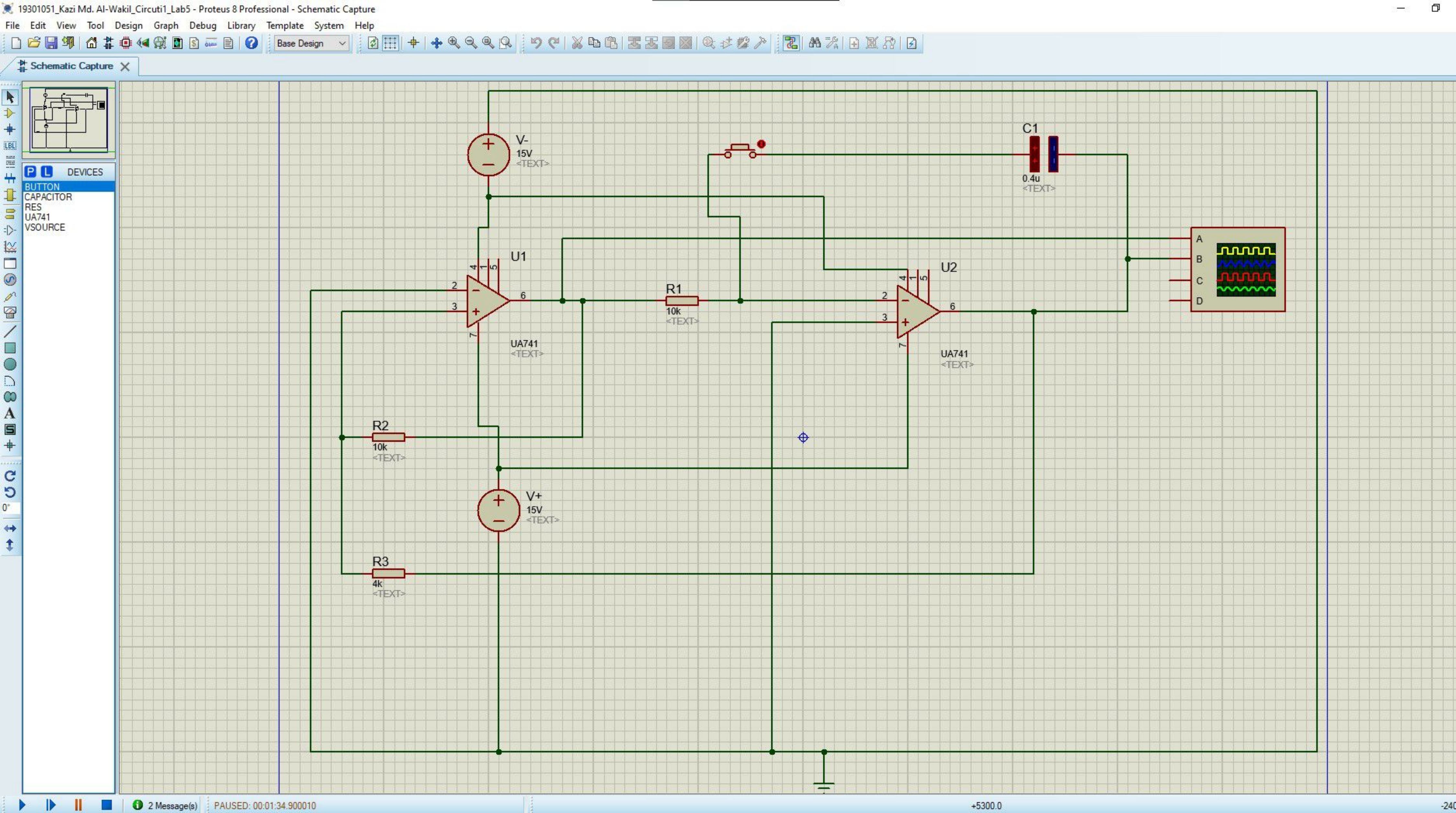
(Ans)

R = Negative feedback Resistance

V_i = Input voltage

V_o = Output "

L = inductence.


19301051_Kazi Md. Al-Wakil_Circuti1_Lab5 - Proteus 8 Professional - Schematic Capture
File Edit View Tool Design Graph Debug Library Template System Help
Base Design
Schematic Capture
DEVICES
BUTTON
CAPACITOR
RES
UA741
VSOURCE
V-
15V
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C1
0.4u
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U1
UA741
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R1
10k
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U2
UA741
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A
B
C
D
R2
10k
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V+
15V
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R3
4k
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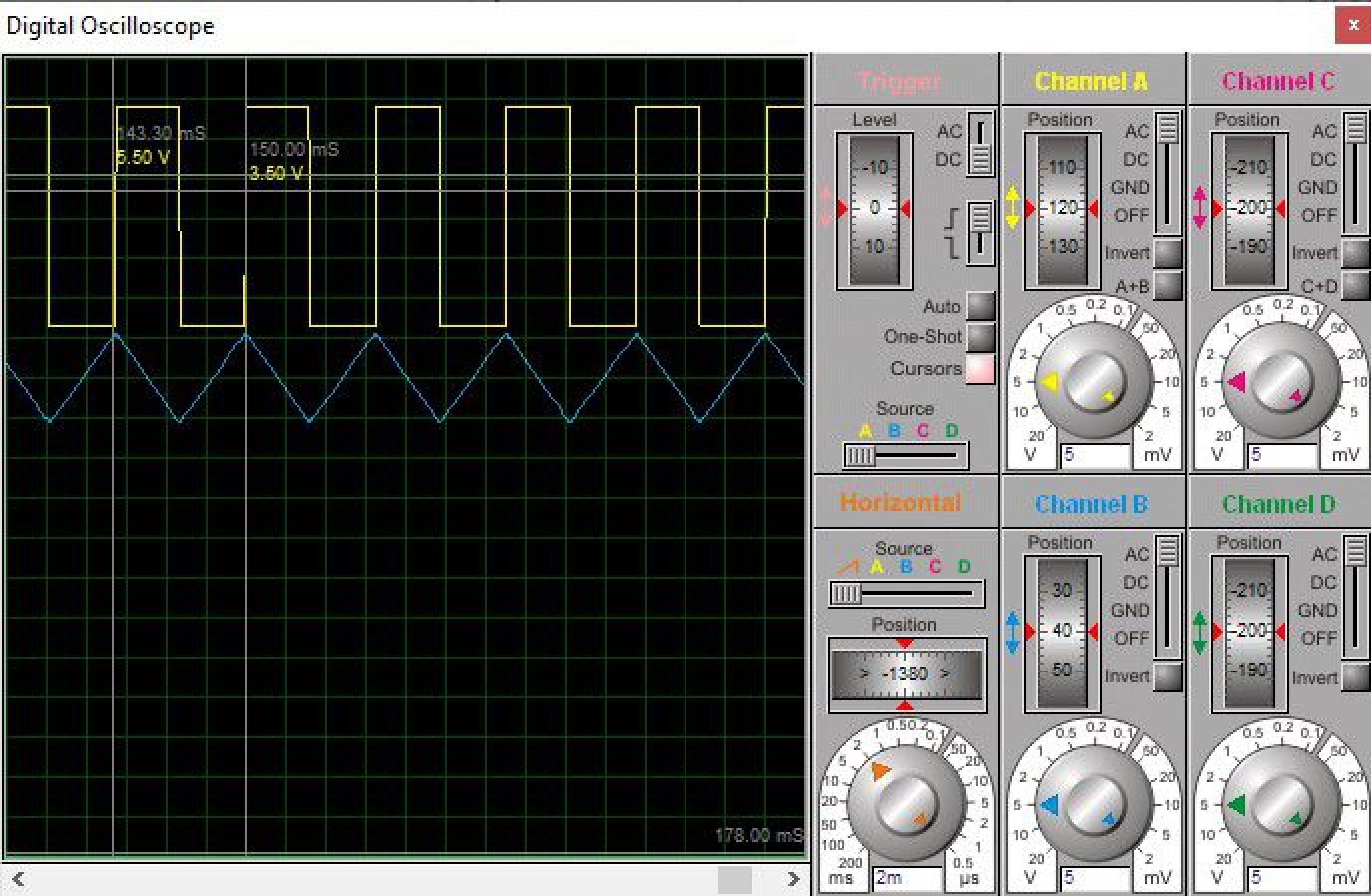

Digital Oscilloscope
143.30 mS
5.50 V
150.00 mS
3.50 V
178.00 mS
Trigger
Level
AC
DC
Auto
One-Shot
Cursors
Source
A B C D
Horizontal
Source
A B C D
Position
-1380
ms
µs
2m
Channel A
Position
AC
DC
GND
OFF
Invert
A+B
V
mV
5
Channel B
Position
AC
DC
GND
OFF
Invert
V
mV
5
Channel C
Position
AC
DC
GND
OFF
Invert
C+D
V
mV
5
Channel D
Position
AC
DC
GND
OFF
Invert
V
mV
5