

23W-EC ENGR-11L-LEC-1 Design Experiment 11L Answer Sheet

SANJIT SARDA

TOTAL POINTS

20 / 20

QUESTION 1

1 Schematic 10 / 10

✓ - **0 pts** Correct

- **1 pts** Mostly Correct
- **2 pts** Mostly Correct
- **2.5 pts** Mostly Correct
- **5 pts** Partially Correct
- **7.5 pts** Incorrect
- **10 pts** Missing
- **4 pts** Incorrect R2 value
- **8 pts** No voltage division
- **9 pts** Incorrect

- **9 pts** Incorrect

- **6 pts** Measurement correct but wrong setup

- **3 pts** High Time Constant Value

QUESTION 2

2 Time Constant 10 / 10

✓ - **0 pts** Correct

- **2.5 pts** Measurement correct. Waveform is incorrect.

- **5 pts** Answer missing but waveform image looks correct.

- **6 pts** Answer present but does not match with waveform image/ answer indiscernable from image

- **7.5 pts** Answer Missing
- **9 pts** Image Missing
- **10 pts** Image Missing

$$R_C = 20 \mu C$$

$$R_1 + R_2 = R_T$$

$$V = I R_1 - I R_2 \quad I R_1 = 0.65$$

$$= 0$$

$$I R_2 = 0.65$$

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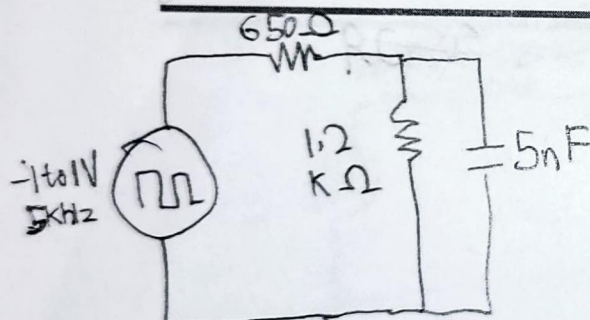
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11L - Design Experiment

Experiment: Consider the figure below. Design a 1st order circuit with an input pair of terminals and an output pair of terminals such that the voltage across the output pair of terminals is as shown by the curve "Response" when a square wave of frequency 5 kHz with amplitude levels -1 and +1 (curve "Input") is applied to the input pair of terminals. Note the following:

- You are only allowed to use the components in your component kit in your circuit.
- Make sure that the time-constant of your circuit is no more than 20 μs , to ensure settling.

(a) Draw the schematic of your circuit neatly labelled with the component values, in the space below. (10 points)



(b) Hook up your designed circuit and apply the "input" waveform and capture the "Response" waveform using the AD2. Measure the time duration between when the "Response" starts transitioning from 0.65 to when it reaches 0. Write it down in the space below.

(10 points)

$$= -99.9 - 101.4 = 101.4 - 99.9 = 1.5 \mu s$$

(c) Take a screenshot of the waveforms image (including the measurement in part (b)) and upload the image to Gradescope by 1:59pm Thursday, March 16, 2023. Make sure that no more than 5 cycles of the square wave are visible, clearly showing the response along with the input, and the measurement.

(5 points)

