

Extra Credit 2
Op-Amp Circuit

You can receive extra credit for the second ¼ of the semester by building a simple oscillator circuit found in the *Engineer's Mini-Notebook* on Op-Amp Circuits by Forrest M. Mims. This circuit generates a sine wave. You can get extra credit on the second quiz, ONE of the experiments for this part of the course (4 or 5), OR the second project. The points available are as follows:

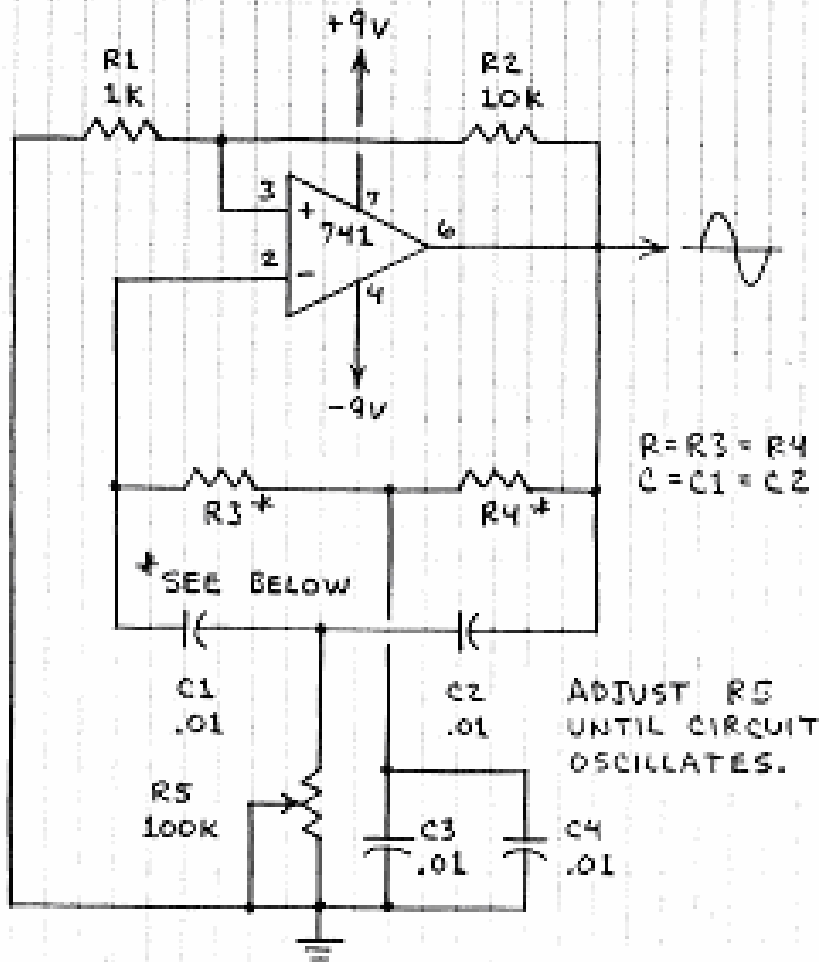
<u>Circuit</u>	<u>Points on Experiment</u>	<u>Points on Project 2</u>	<u>Points on Quiz 2</u>
sine wave	6	3	4

YOU MUST do the project as an individual. Your points will be applied towards your grade on an individual basis. This circuit is not difficult, so it is unlikely that it will take more than one open shop to build it.

Ground Rules:

- 1) We will provide you with a protoboard.
- 2) The circuit and some basic instructions are included on the following page.
- 3) Build your circuit using components from your kit. If you do not have a particular component, ask the staff.
- 4) Demonstrate that it generates the appropriate output.
- 5) Have a staff member sign the attached sheet.
- 6) Return the protoboard. (If you are not finished, we will store the board for you and return it when you wish to continue.)
- 7) YOU MUST tell the staff member what you would like to apply the extra credit towards at the time s/he signs the sheet.

SINE WAVE OSCILLATOR



R3, R4, R5, C1, C2, C3, AND C4 FORM A TWIN-TEE FILTER. WHEN CONNECTED IN THE FEEDBACK LOOP OF AN OP-AMP, THE RESULTING CIRCUIT GENERATES A SINE WAVE. THE FREQUENCY IS $1/(2\pi RC)$.

TYPICAL RESULTS FROM TEST CIRCUIT:

R3 = R4	FREQUENCY
4.7 K	2926 Hz
10 K	1356 Hz
15 K	927 Hz

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Names of Participant(s): _____

Section _____ Group _____

Circuit built _____

Apply Towards: _____

Points _____ (Points per circuit: quiz = 4, project = 3, experiment = 6)

Protoboard returned _____

Staff Signature _____