



30 **Communication**

- 4 Work recorded in notebook (rather than pasted in)
- 8 Complete information: task descriptions, diagrams, data, reproducible one year later
- 4 Written in Ink
- 4 Student Signed every page
- 4 Student Dated every page
- 6 TA Signature for every lab session (-3 each session missed)

12 IV. OP-AMP IN COMPARATOR MODE

C. *Procedure*

- 1 2) Test voltage-divider (explanation, schematic, verified v_2 varies around 0V)
- 1 3) Explanation of task (built comparator)
- 1 Schematic of comparator circuit
- 1 4) Explanation of testing (varied v_2 around 0V, measured v_0)
- 3 Table II filled in with measured v_0 rail-voltage values
- 1 5) Explanation of testing (varied $v_2 < 0$ and $v_2 > 0$, varied R_{Load} , measured v_0)
- 4 Table III filled in with measured v_0 (with load) values

8 V. OP-AMP AS SCHMIDT TRIGGER

C. *Procedure*

- 1 1) Explanation of task (designed and built Schmidt trigger)
- 1 Schematic of Schmidt trigger circuit
- 2 Derivation of R_1 and R_2 values
- 1 3) Test of circuit (v_2 varied, noted whether LED turning on and off)
- 3 4) Measured value of v_1 for v_0 high and low (note whether close to expected v_1)

20 VI. RC CIRCUIT

C. *Procedure*

- 1 1) Explanation of task (designed and built RC circuit)
- 1 Schematic of RC circuit
- 2 Derivation of R value for time constant $\tau = 50$ ms
- 4 3) Measure RC circuit output with 10 Hz square-wave input (Matlab[®] v_2 plot)
- 2 4) Measured value of initial voltage on C
- 10 5) Measured and predicted v_2 (Matlab[®] v_2 plot)

14 VII. SCHMIDT TRIGGER WITH RC CIRCUIT INPUT

C. *Procedure*

- 1 1) Explanation of task (designed and built Schmidt trigger with RC input)
- 1 Schematic of Schmidt trigger with RC circuit
- 3 Calculation of delay time between square wave input and v_2 switching
- 5 3) Measured v_2 and v_0 (Matlab[®] plot)
- 4 4) Explanation of waveform for v_0 .

12 VIII. OSCILLATOR CIRCUIT

C. *Procedure*

- 1 1) Explanation of task (designed and built Oscillator circuit, measured CFF)
- 1 Schematic of oscillator circuit
- 6 Symbolic expression for how long half-cycle of v_0 square wave will last
- 3 Calculation of minimum and maximum value of duration of half cycles
- 1 3) Measured critical fusion frequency (CFF) of LED

4 CONCLUSION

- 4 Comment on shortcomings/possible improvements of oscillator circuit