

Lab 1 Marking Scheme, Oct. 2000

Part 1 Tuned Amplifier Design, Simulation, 40 marks.

- Components R1,R2, C_{in}, CE, L, CL, RL calculations and values 15 points
- Compute and measure (simulate) the voltage gain at 10.7 MHz. (Expected for this part, and all other parts which have both computations and measurements (simulations) that you will compare theory to simulations) 5 marks
- Estimate and measure the phase shift at 10.7 MHz. 5 marks
- Estimate and measure frequency response clearly showing the -3 dB points. The theoretical calculation for the 3 dB points need only be an estimate. 5 marks
- Estimate the input impedance of the amplifier at 10.7 MHz. Measure the input impedance of the amplifier. 10 marks

Part 2 Frequency Multiplier 15 marks

- Observations, sketches of input, output demonstrating multiplying by 2,3,4, explanations, discussion. This involves time-domain simulations. 15 Marks

Part 3 Matching Effects on Noise Figure, gain 30 marks

Prior to matching:

- Simulation result of Frequency Response (marks above in part 1)
- simulations results of Noise Figure, 5 marks
- Determination of input impedance (marks above in part 1)
- Impedance matching calculations (one inductor, one capacitor), verification by simulation that matching is correct 15 Marks
- Gain after matching, comparison, 5 marks
- Noise Figure after matching, comparison, 5 marks
- Discretionary marks, 15 Marks

Total 100 marks

Assignment 1 Marking Scheme, Oct. 2000

Double Tuned Amplifier, Transformers

- Calculate output transformer turns, to replace load resistor with 50 Ohm resistor, 5 marks
- Using impedance calculated in part 1 calculate components for transformer-based impedance matching, turns ratio, extra C, L value in transformer secondary, 20 marks
- Calculate voltage gain of complete double tuned amplifier, 10 marks
- Find 3 dB bandwidth of double-tuned circuit, 5 marks
- Discretionary marks, 10 marks

Total 50 Marks