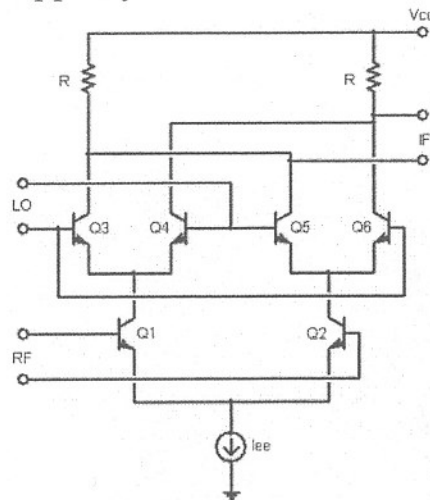




Exam – 21.11.2005

Each question is worth ten points, making the total maximum 50 points. Good luck!

1. Define the following concepts related to low-noise amplifiers (LNA):
 - a. Gain
 - b. 1-dB compression point
 - c. 3rd order intercept point
 - d. Noise figure
 - e. Intermodulation
2. Draw the block diagram of an indirect upconversion transmitter. Explain what is done to the signal in each stage of the transmitter.
3. What is the circuit in the figure below? What is it used for? Explain its structure briefly. Support your answer with drawings.



4. What are the advantages and disadvantages of the VCO-1L topology compared to the VCO-2L topology from the implementation point of view? Explain the two modes of operation – voltage-limited and current-limited – for the VCO-1L topology. What are the specifics of those regions and at which point is the optimal phase noise performance achieved with reasonable power consumption?
5. Explain why the LNA is used as the first stage in a receiver front-end. What are the main design targets for the LNA?