VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
M.E. I Year (ECE) I-Semester (Make Up) Examinations, March-2016
(Embedded Systems & VLSI Design)

Analog IC Design

Time: 3 hours   Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE questions from Part-B

Part-A (10 X 2=20 Marks)

1. Explain the basic current mirror operation.
2. Write differences between white noise and leakage noise.
3. Which amplifier is better when single input amplifier and differential amplifier are considered? Why?
4. Define common and differential mode gains of differential amplifier.
5. Draw the equivalent small signal model of MOFSET.
6. Discuss whether the MOSFET is current controlled or Voltage controlled device.
7. Write the limitations of LC-Oscillators from the point of realizing them in IC form.
8. Which amplifier is used as high gain stage in op-amp circuit? Explain.
9. Differentiate between OpAmp and OTA.
10. Explain the principle of VCO.

Part-B (5 × 10 = 50 Marks)

11. a) What are the various applications of current mirrors in realizing Integrated Circuits? [5]
    b) Derive the expression for output impedance of source degenerated current mirror circuit. [5]

12. a) Explain the operation of common gate amplifier and discuss its advantages and disadvantages. [5]
    b) With the help of a circuit diagram, explain how a Telescopic cascade amplifier works. [5]

13. a) Explain the operation of a negative resistance oscillator with an example. [4]
    b) Explain any two LC-oscillators with neat diagrams and derive the Frequency of operation. [6]

14. a) Derive expression for the following parameters of a two stage OpAmp. [5]
       i) ω_{ta} ii) Slew rate   iii) Voltage gain
    b) How do you use a differential amplifier as a variable gain amplifier? [5]

15. a) Discuss the different types of loads used in designing CMOS based amplifier and give merits and demerits. [6]
    b) How do you realize   i) Resistor   and   ii) Capacitor in MOS technology. [4]

16. a) Explain diode connected CD amplifier or source follower and discuss its input and output characteristics. [5]
    b) Draw the 3, 5, 7-stage inverter based ring oscillator and discuss about their frequency [5]
       of Operation. Draw waveforms and also give the solution to remove the spikes that appear in Inverter based ring oscillator output.

17. Write short notes on any **two** of the following:
    a) Peaking current source [5]
    b) Common mode feedback in fully differential Opamps. [5]
    c) Two port oscillators. [5]

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