Hall Ticket Number:

Code No. : 21603

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

M.E. (ECE: CBCS) I-Semester Main Examinations, January-2018

(Embedded Systems & VLSI Design)

Analog IC Design

Time: **3** hours Max. Marks: **60**

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

Part-A (10 × 2 = 20 Marks)

1. Why silicon is the widely used semiconductor material in IC fabrication?
2. How capacitor is realized in IC?
3. What are the passive Components that can be realized through MOSFET?
4. List the specifications of current mirror circuit.
5. What are the limitations of single stage amplifiers?
6. Why do you need Common mode feedback (CMFB) in high gain differential amplifier circuits?
7. Explain the small-signal model for the MOS Transistor.
8. State the principle of Miller compensation of 2-stage OP AMP.
9. Draw the circuit of an LC oscillator and write the expression for its frequency.
10. What do you understand by Voltage Controlled Oscillator (VCO)?

Part-B (5 × 8 = 40 Marks)
(All sub-questions carry equal marks)

11. a) Explain the various structures of resistors and capacitors in integrated circuit technology.
    b) Derive an expression for transconductance (g_m) of a MOSFET.

12. a) Draw and explain the operation of Cascode amplifier using MOSFET.
    b) The transconductance of FETs used in Cascode amplifier is 2000μA/V and the load resistance used is 50 kΩ. Calculate Voltage gain and derive expression used.

13. a) Compare the performance of CS, CD, and CG amplifiers.
    b) Explain the operation of single stage Common Source amplifier with current mirror load.

14. a) What are the performance parameters of OP AMP? Explain them.
    b) Explain the principle of folded cascode amplifier circuit.

15. a) What are the three effects that cause the current mirror to be different from the ideal situation?
    b) Explain the general principle of the band gap reference and draw a conventional band gap reference.

16. a) Mention the various capacitances associated with a MOSFET and explain how it effects the high frequency response of a common source amplifier.
    b) Explain about Wilson current mirror circuit.

17. Answer any ***two*** of the following:
    a) Explain about biasing of differential amplifier.
    b) Briefly explain about coupling issues in OP AMP.
    c) What is a ring oscillator and explain its operation.