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M.E. / M.TECH. DEGREE EXAMINATIONS, MAY/JUNE 2017
SECOND SEMESTER
APPLIED ELECTRONICS
AL16201 – ANALYSIS AND DESIGN OF ANALOG INTEGRATED CIRCUITS
(Regulation 2016)

Q. Code: 179537

Time: Three Hours

Maximum : 100 Marks

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. What are the advantages of cascode stage over cascade stage?
2. Derive output impedance of source follower.
3. What is the effect of high frequency supply noise in differential amplifier?
4. Compare frequency response characteristics of CS, CD and CG amplifier.
5. What is the advantage of negative feedback?
6. Mention a method to improve the slew rate.
7. What is frequency compensation?
8. Calculate the full-power bandwidth of the Op Amp with $V_i = 1$ Volt.
9. Write the transfer function of multi pole system.
10. Draw circuit for constant Gm Biasing.

PART B - (5 X16 = 80 Marks)

11. (a) (i) Derive the small signal low frequency model for a MOS (8)
transistor operating in the ohmic region with Q point.
(ii) What does this reduce to when $V_{DSQ} = 0V$? (8)
- (OR)**
- (b) (i) Draw the circuit of CG amplifier with active load and determine (8)
expression for input resistance, output resistance and voltage
gain.
(ii) Explain the various second order effects of MOS transistors. (8)
12. (a) (i) For an nMOS differential amplifier with pMOS load, assuming (8)
all devices operate in saturation and circuit in symmetric,
calculate input referred noise voltage.

- (ii) Derive the expression for the frequency response of a current mirror loading a differential pair. (8)
- (OR)**
- (b) (i) Draw the schematic of FET differential amplifier with active load. (4)
- (ii) Explain the effect of mismatch of g_m and R_d on the gain of differential amplifier. (12)
13. (a) Analyse the operational amplifier circuit in terms of slew rate model and high frequency response. (16)
- (OR)**
- (b) (i) Draw and explain the gain of two stage op-amp and derive the expression. (10)
- (ii) Calculate input common mode voltage range and closed loop output impedance for cascade Op Amp. (6)
14. (a) (i) Explain the various compensation methods of two stage Op Amps. (12)
- (ii) Explain the need for frequency compensation in Op Amps. (4)
- (OR)**
- (b) (i) Construct root locus for the two pole system. (10)
- (ii) Discuss compensation technique using common gate stage. (6)
15. (a) (i) Explain the operation of PTAT current generator with circuit diagram. (10)
- (ii) Write a short note on supply independent biasing. (6)
- (OR)**
- (b) (i) With schematic and expressions compare cascode, Wilson and Widlar current sources. (8)
- (ii) Explain any one type of output stage of op amp. (8)