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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SECOND SEMESTER M.TECH DEGREE EXAMINATION, MAY 2016

Electronics & Communication Engineering

(VLSI & Embedded Systems)

04 EC 6502—Analog Integrated Circuits Design

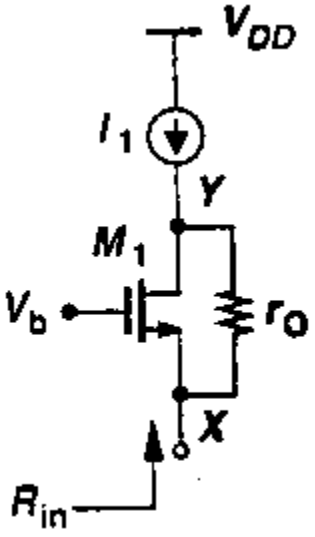
Max. Marks : 60 Duration: 3 Hours

PART A

Answer All Questions

Each question carries 3 marks

1. Draw the circuit of a Common Source amplifier with diode connected load. Also draw its small signal model.
2. Calculate the temperature coefficient of a simple current mirror.
3. What is the significance of multifinger transistors? What are the problems associated with interdigitisation?
4. Write the expression of CMRR of a differential amplifier with a current mirror load. What is the effect of increase in frequency on CMRR?
5. Calculate the input resistance of the circuit shown.



6. Draw the high frequency model of a cascode stage.
7. Define the Power Spectral Density of noise waveform.
8. Define Gaussian Probability density function.

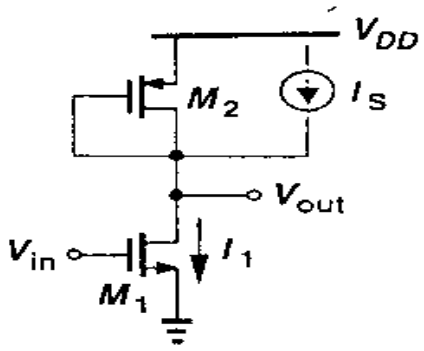
PART B

Each question carries 6 marks

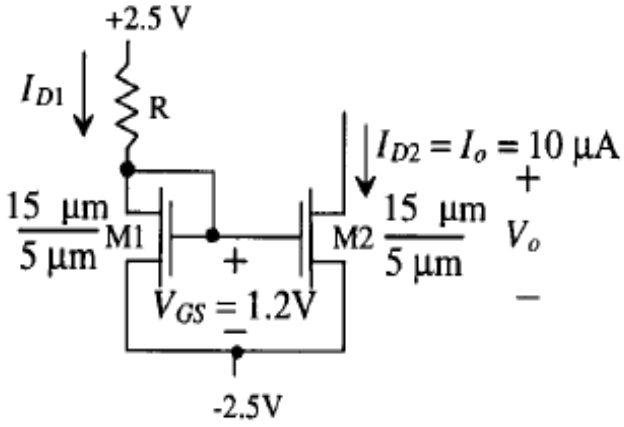
9. Draw the small signal model of a Source follower with a current source load. Calculate its output impedance and voltage gain.

OR

10. In the circuit, M1 is biased in saturation with a drain current equal to I_1. The current source I_s=0.75 I_1 is added to the circuit. How is A_v modified for this case?



11. Estimate the variation in Io for the simple current mirror when V $_{dd}$ changes from 2.3V to 2.7V
    i) Calculate S_{VDD}^{Io} ii) Calculate $\frac{\Delta Io}{Io}$



OR

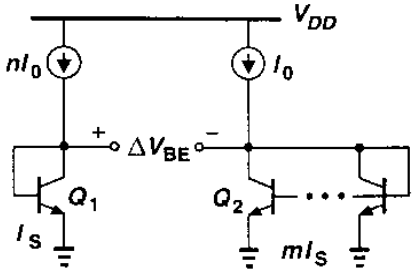
12. Draw the circuit and small signal model of Wilson Current Mirror. Also derive its output impedance .

13. Explain the working of Source coupled Differential amplifier, its DC operation and estimate the maximun and minimum input differential voltage

OR

14. Draw and explain the working of a Wide swing differential amplifier. Write the expression of gain.

15. Calculate ΔV_{BE} of the circuit. What is its temperature coefficient?

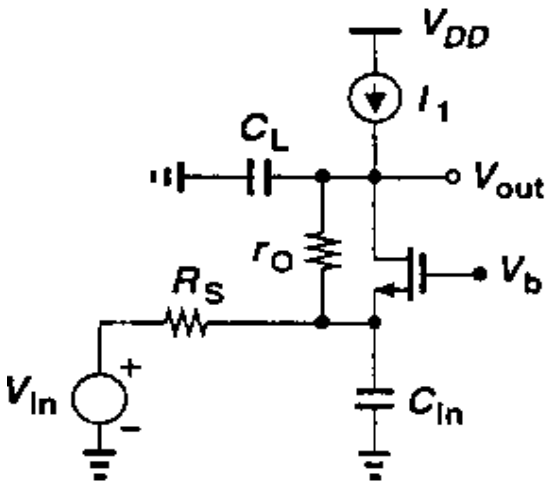


OR

16. Explain PTAT current generation using necessary circuits and equations.
17. Draw the high frequency model of a common source stage. What are the poles associated with it? Write the expression for its transfer function

OR

18. For the Common gate circuit shown, calculate the transfer function and input impedance,Z_{in}. Explain why Z_{in} becomes independent of C_L, as this capacitance increases.



19. Write on correlated and uncorrelated noise sources.

OR

20. Explain the statistical characteristics of noise.