

Integrated Circuit 2A Examination / Integrated Circuit2 Midterm Examination

2019/12/2(Mon) 08:45~10:15@102

※ メモなし講義資料(手書きの書き込みも可)・自筆ノート・書籍のみ持込可。

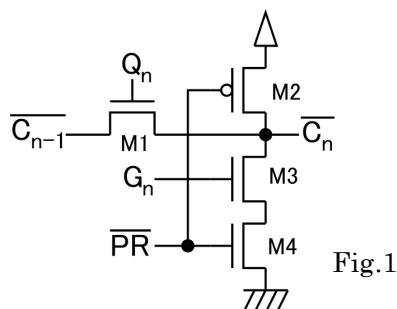
※ 解答は導出過程を含めてすべて答案用紙(日本語でも英語でもよい)に記入すること。

1. Figure 1 shows the circuit diagram of Manchester Carry Chain's unit. Note that Q_n and G_n are the propagation and the generation term derived from A_n and B_n . (50)

(1) Describe Boolean expression of Q_n and G_n .

(2) Show each MOS transistor's state (ON or OFF) of M1 - M4 for all sixteen combinations of inputs A_n , B_n , C_{n-1} and pre-charge signal \overline{PR} . Use the circle ("○") for ON, and the cross ("×") for OFF.

(3) Show all the combinations of A_n , B_n , C_{n-1} that makes $C_n=1$ after $\overline{PR}=1$.



2. Discuss the pros and the cons of the ripple carry adder compared with the carry look-ahead adder (CLA). The following keywords MUST be included: carry propagation delay(キャリー伝搬遅延), circuit complexity(回路の複雑さ), circuit regularity(回路の規則性)(20)

3. Discuss the pros and the cons of RISC processors compared with CISC processors. The following keywords MUST be included: instruction length(命令長), controller complexity(制御回路の複雑さ), pipeline(パイプライン), cache(キャッシュ)(20)

4. 【予告問題】Discuss the topic on “MOSFET's Scaling, or Moore's Law” in terms of social, technical, and economical impacts. Your opinion AND your personal experience MUST be included. Write it down on A4-size paper (hand-written material only, in Japanese or English). (10)