

MIXED MODE IC DESIGN
Examination 24.5.2018

1. Explain

- (a) the operating principle of latched comparators.
- (b) metastability in latched comparators.
- (c) kickback in latched comparators.

2. Explain the following terms related to data converters:

- (a) INL
- (b) DNL
- (c) Monotonicity of DA converter

3. (a) Describe briefly the advantage(s) and disadvantages of Flash ADCs.
(b) Describe how a 2-bit binary-weighted DAC and a 2-bit thermometer-coded DAC should be connected to form a 4-bit segmented DAC with two thermometer-coded MSBs and two binary-weighted LSBs (or draw a schematic).
4. (a) Draw a block diagram for a first-order 1-bit analog-input delta-sigma modulator (note! This means the blocks inside the actual modulator, and not the overall whole converter blocks like S/H and interpolation/decimation)
(b) Draw a block diagram for a charge-pump PLL.
(c) Describe the operation of the PLL building blocks.