Q.1 14.1 of J&K

Assuming oversampling with no noise shaping and using (14.14), find the approximate sampling rate required to obtain a maximum SNR of 80 dB on a signal with a 1-kHz bandwidth using a 1-bit quantizer.

Q.2 14.5 of J&K

Given that an 8-bit A/D converter has a SNR of 50 dB but is linear to 12 bits, what is the sampling rate required to achieve 12 bits of accuracy using straight oversampling on a signal bandwidth of 1 MHz?

Q.3 14.6 of J&K

Repeat Problem 14.5, assuming that the 8-bit A/D converter is placed inside a first-order delta-sigma modulator. What is the sampling rate if a second-order modulator is used?

Q.4 question 5 of 2008 exam.

a) Assume that you are going to design an ADC (Analog-to-Digital Converter) for use in a sensor-node utilizing energy harvesting (containing no batteries), leading to a very strict budget with respect to average power consumption. This ADC should measure slowly changing physiological parameters for humans, needing a maximum resolution of 8 bits ("Effective Number of Bits" ; ENOB). What is most likely to be the best choice among a FLASH ADC or an integrating ADC? Please explain.

b) Sampling in the frequency domain, under two different basic conditions, is depicted below. Could the situation in the lower half of the picture represent a problem ($f_s/2$, f_s, and f is written along the horisontal lines.)? Please explain.

Figure 3.6