

TEL 352
SAYISAL HABERLEŞME
(Araştırma 1 Çözümleri)

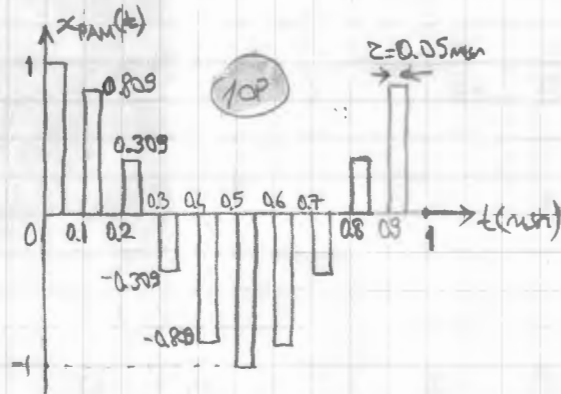
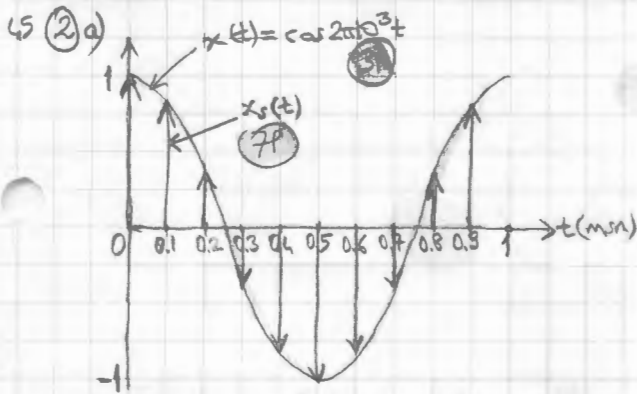
20.1) $W = 22 \text{ kHz}$
 $Q = 128 = 2^n \Rightarrow n = 7 \text{ bit}$

$f_{\text{örnek}} = 2W = 2 \times 22 \times 10^3 = 44,000 \text{ Hz}$ (1 sn. de 44000 örnek alınıyor)

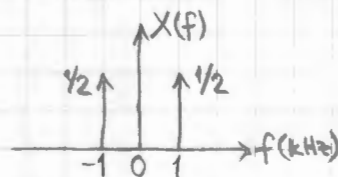
Her örnek kuantalardan sonra 7 bit ile kodlandığına göre, 20 dakikalık kayıt için

$44000 \times 7 \times 20 \times 60 = 396.6 \times 10^6 \text{ bit} = 46.2 \times 10^6 \text{ byte}$ ile kodlanır.

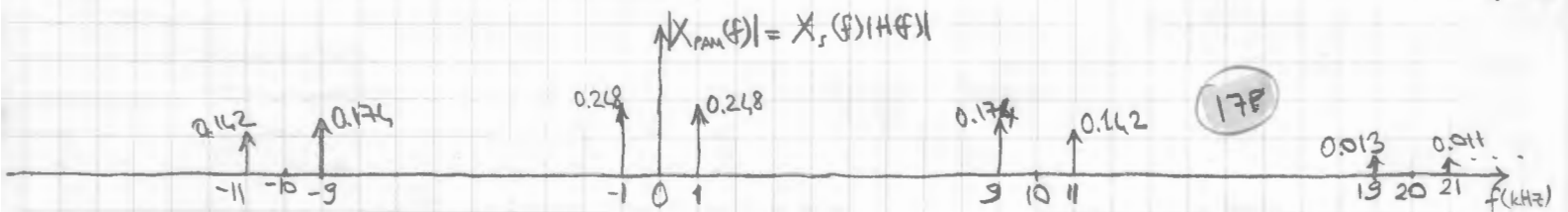
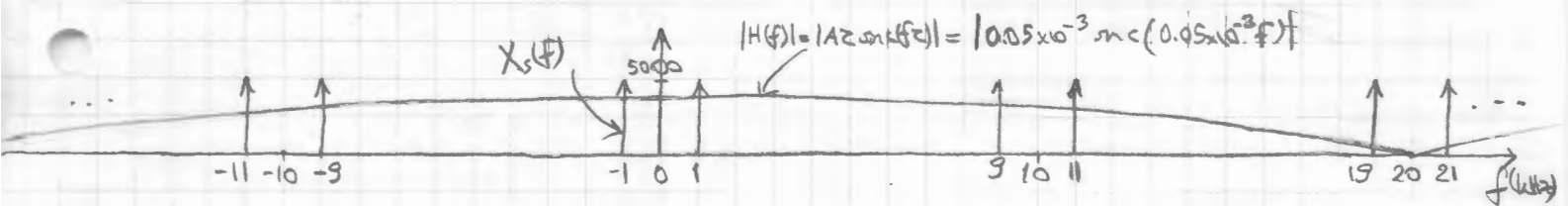
20P



b) $x(t) = \cos 2\pi 10^3 t \Rightarrow X(f) = \frac{\delta(f - 10^3) + \delta(f + 10^3)}{2}$



$x_s(t) = x(t) \sum_k \delta(t - kT_s) \Rightarrow X_s(f) = f_s \sum_k X(f - kf_s)$, $A=1$, $T_s = 0.1 \times 10^{-3} \text{ s} \Rightarrow f_s = 10000 \text{ Hz}$



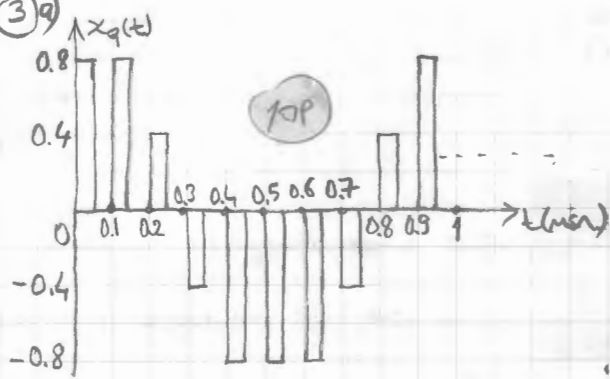
c)

$K = \frac{1}{T_s}$, $1 \text{ kHz} < B < 9 \text{ kHz}$



8P

35 (3) a)



b)

1 1 1 1 1 0 0 1 1 0 0 0 1 0 0 1 0 0 1 0 1 0 0 0 0 1 1 1 1

10P

$$p_0 = \frac{14}{30} = \frac{7}{15} = 0.4\bar{6}, \quad p_1 = 1 - p_0 = \frac{8}{15} = 0.5\bar{3}$$

5P

c)

