國立臺北科技大學

九十四學年度電腦與通訊研究所碩士在職專班入學考試

乙組：通訊理論 試題

填准考證號碼

注意事項：

1. 本試題共【5】題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在試卷答案欄內，否則不予計分。

一、(20%) Consider a bandpass signal $x(t)$ of bandwidth W Hz centered around f_0 Hz and $W << f_0$. If we want to process $x(t)$ use digital signal processing method, what should we do? If the digital signal processing board has low sampling rate, what should we do?

二、(15%) If a 64-QAM communication system transmits at a rate of 1 M bps (bits per second), find the duration of each 64-QAM signal.

三、(20%) Three different message signals, $m_1(t), m_2(t), m_3(t)$, are to be multiplexed and transmitted. $m_1(t), m_2(t)$, and $m_3(t)$ have bandwidth of 4 kHz, 4 kHz, and 8 kHz, respectively. Determine the minimum bandwidth required for each of the following multiplexing/modulation method.

(a) TDM/PAM with roll-off factor $\beta = 0$.

(b) TDM/PAM with roll-off factor $\beta = 0.5$.

(c) FDM/SSB

(d) FDM/DSB-SC

四、(30%) Discuss the relative advantage and disadvantage of 16-PSK, coherent 16-FSK, and 16-QAM in terms of bit error rate and bandwidth.

五、(15%) Let a signal $x(t)$ with power spectral density $S_x(f)$ be the input of a low pass filter with frequency response $H(f)$. $S_x(f)$ and $H(f)$ are plotted in Figures 1 and 2, respectively. Plot the power spectral density of the output signal.

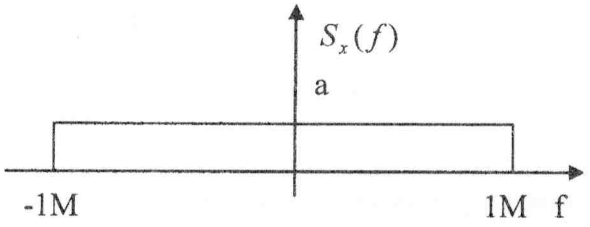

Figure 1

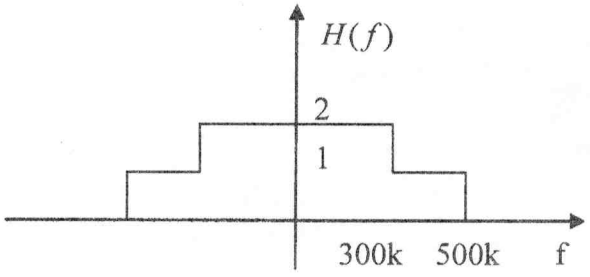

Figure 2