

國立臺北科技大學 108 學年度碩士班招生考試

系所組別：2141 電機工程系碩士班丁組

第一節 通訊原理 試題 (選考)

第一頁 共一頁

注意事項：

1. 本試題共五題，每題 20 分，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一、The signal $\frac{1}{4} \text{sinc}^2\left(\frac{t}{4}\right)$ is input to a LTI system with impulse response $\text{sinc}\left(\frac{t}{4}\right) + \text{sinc}\left(\frac{t}{2}\right)$.

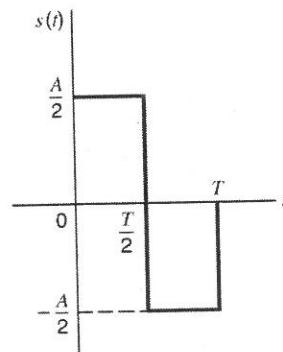
(一) Plot the amplitude response of this system. (10 分)

(二) Plot the spectrum of the output signal. (10 分)

二、Consider the signal $s(t)$ shown in the figure.

(一) Determine the impulse response of a filter matched to this signal. (10 分)

(二) Plot the matched filter output as a function of time. (10 分)



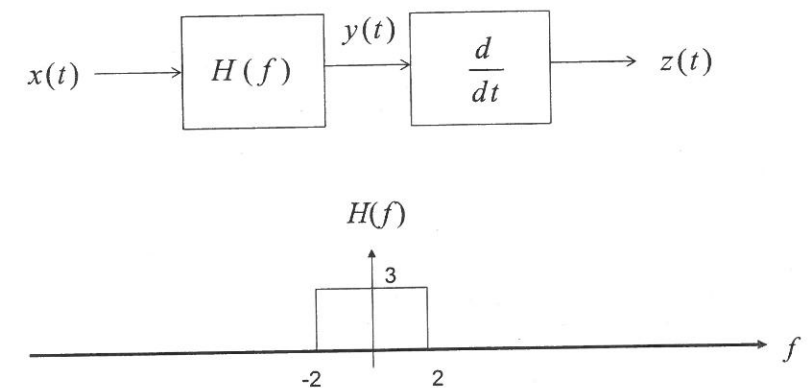
三、The message signal $\cos(2\pi f_1 t) + 2 \cos(4\pi f_1 t)$ is upper sideband modulated with carrier $\cos(2\pi f_c t)$, where $f_c \gg f_1$.

(一) Find the modulated signal $s(t)$. (10 分)

(二) Sketch the spectrum of $s(t)$. (10 分)

四、Let $x(t) = \sin(2\pi t) + w(t)$, where the power spectral density of white noise $w(t)$ is

0.01 Watt/Hz. Find the signal-to-noise ratio in $z(t)$. (20 分)



五、To communicate one bit of information reliably, the information “zero” is transmitted as

000 and “one” is 111. The receiver uses the majority decoding to decode the information.

If the binary symbol error probability is 0.2, what is the information error probability? (20

分)