

大葉大學 九十三年 學年度 碩士在職專班 招生考試試題紙

系所別	組別	考試科目 (中文名稱)	考試日期	節次	備註
電信工程學系碩士在職專班	乙	通訊原理	3月28日	第一節	共二頁

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律不准攜帶）08230~10200

第一頁

1. (15%) A lowpass RC filter is shown in Fig. 1
- (A). Determine the impulse response of the filter.
- (B). Determine the response of the filter to the input signal

$$x(t) = \begin{cases} 1, & |t| \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

- (C). What's the frequency spectrum of the results in part (B).

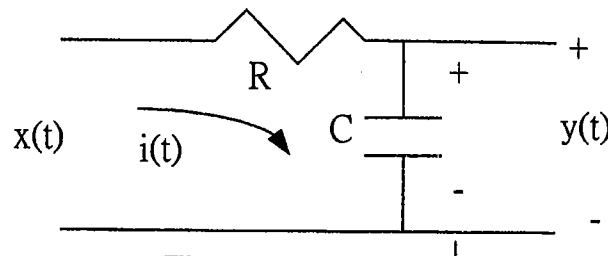


Fig. 1

2. (20%) (A). Show that whether the signal  $s(t) = \exp(-|t|/3)\cos(10\pi t)$  were an energy-type signal or not?
- (B). How is the energy value in part (A), if your answer is "yes"?
- (C). "A signal can be either an energy-type signal, or an power-type signal", does the words described above right? Why?
- (D). "A signal can be neither an energy-type signal, nor an power-type signal", does the words described above right? Why?
3. (15%) (A). Explain the theorem of Nyquist sampling rate?
- Now, a signal is given by  $s(t) = \frac{\sin(5\pi t)}{\pi t} + \frac{\sin(10\pi t)}{\pi t}$ , which to be sampled with a periodic pulse train consisting of narrow pulses.
- (B). Determine the Nyquist sampling rate of the sampled signal.
- (C). Sketch the Fourier transform of the sampled waveform.

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第二頁

4. (15%) Assuming that the picture shown in Fig. 2 is a performance curve of one communication system. What is the information that you can describe according to your knowledge of communication systems?

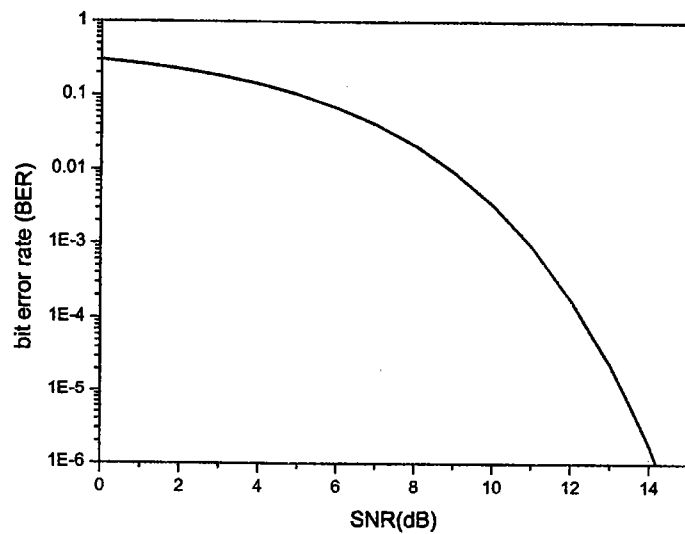


Fig. 2

5. (15%) An envelope detector is shown in Figure. 3, and the input to the detector is

$$V_i = r(t) \cos(2\pi f_c t), \text{ where } r(t) \text{ is always greater than zero.}$$

- What is the output of the envelope detector?
- What is the average power of the input in terms of the average power of  $r(t)$ ?
- Find the average power of the detector output?

6. (10%) (A). Do you know what are the reasons that induce the ISI (inter-symbol interference)?  
(B). How to solve the ISI that you described in part (A)?

7. (10%) I would like to listen to the stories about “the history of wireless communication systems, e.g., GSM, CDMA-2000, ... etc.”, would you please talk something about it to me?