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# 國立臺北科技大學九十六學年度博士班入學考試

系所組別： 2140 電機工程系博士班丁(通訊)組

## 第一節 通訊原理 試題

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### 注意事項：

1. 本試題共四題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

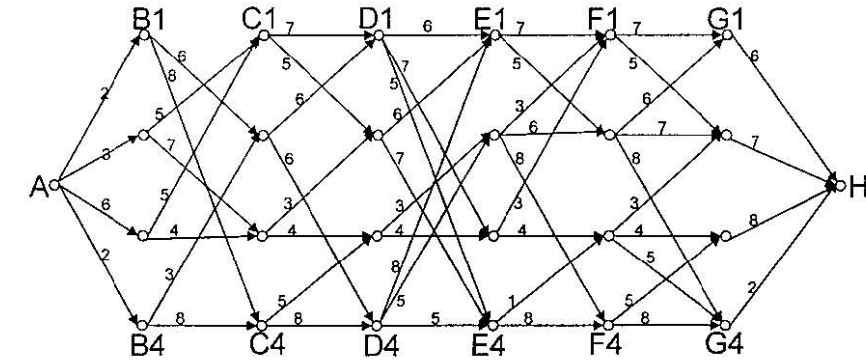


Fig.1

1. If the Linear Predictive Equation is defined as below: (25%)  
 $\hat{x}[n] = a_1 \cdot x[n-1] + a_2 \cdot x[n-2]$ ,  $n=1,2,3,\dots,200$ ,  
 Please find the optimal equation of "a1" and "a2"?
2. A system function is given as below: (25%)  

$$H(z) = \frac{0.5 - 0.75z^{-1} + 0.2z^{-2}}{3 - 2.5z^{-1} + 2z^{-2}}$$
 , please find:
  - (a) Please write down the differential equation. (8%) (i.e.  $y[n] = \dots x[n] + \dots y[n-1] \dots$ )
  - (b) Draw the signal flow (Direct Form II). (8%)
  - (c) Please design a subroutine for the H(z) with C Code. (9%)
3. Please draw the flow-chart of REGISTER and INVITE commands for SIP protocol. (25%)
4. (20%) Please use the Viterbi-algorithm to find the optimal path of Fig.1. The Fig.1 is drawn in the next page. The cost value(過路費) is also given in the Fig.1. (25%)