

本試題是否可以使用計算機：可使用，不可使用（請命題老師勾選）

考試日期：0302，節次：1

Please provide concise but self-explanatory answers to the following questions.
English or Chinese is fine.

1. Please list the formula for the average delay in an M/M/1 queue. Describe each variable in the formula. Where can M/M/1 queue be applied to? 20%
2. Consider a source that produces a string of symbols that take four possible values A B C D and that, in the long run, these symbols are produced in the following proportions: A: 45%, B:45%, C:5%, D:5%. Please find out which of the following Huffman Encoding approaches provide better performance in terms of average bit per symbol. (Calculation process needed) 20%
 - a. A: 00, B:01, C:10, D:11
 - b. A:0, B:10, C:110, D:111
3. Please write down a simple formula for RSA Public Key Encryption using C as cipher text, P as plain text. Describe the fundamental meanings of this formula. 20%
4. Describe Shannon Theory. Please use the formula to express the capacity of channels with dominant thermal noise in Shannon Theory. If a phone line transmits the frequencies from 300 Hz to 3400Hz with 35dB noise-to-signal. Determine the capacity. (Calculation process needed) 20%
5. Describe ALOHA protocol. 20%