※ 注意：請於試卷上「非選擇題作答區」內依序作答，並應註明作答之大題及其題號。

1. (12 points) Please explain the following terms:
   (a) (3 points) Blog
   (b) (3 points) Web 2.0
   (c) (3 points) The Long Tail effect
   (d) (3 points) Wikipedia
2. (22 points) Please answer the following questions.
   (a) (4 points) Over a 100 Mbps (mega bits per second) channel, if Manchester encoding is applied, what is the baud rate? And what will the baud rate become if 16 QAM (Quadrature Amplitude Modulation) is applied?
   (b) (4 points) What are the objectives and typical methods for error recovery?
   (c) (4 points) What are the three types of sliding-window protocols? For an extremely noisy geostationary satellite channel, which one will you choose?
   (d) (4 points) Is the CSMA/CD (Carrier Sense Multiple Access With Collision Detection) protocol suitable for supporting stringent real-time services? Why?
   (e) (6 points) Describe the objectives and steps of (i) the Dijkstra's algorithm and (ii) the Prim's algorithm
3. (11 points) Please answer the following questions.
   (a) (5 points) Consider a large institute, where the rate of outgoing calls is m calls per second and the call arrival process is assumed to be Poisson. Assume also that the call holding time can be characterized by an exponentially distributed random variable with mean t seconds. Please propose a method to calculate the minimum number of outgoing lines (channels) required so that the call blocking probability (the probability that an outgoing call finds that all the outgoing lines are occupied) should be no greater than p%.
   (b) (6 points) Assume that k independent users are competing for a time slot, where each user is given the same probability p to transmit a packet over this time slot. Transmission over this time slot is considered successful if exactly one user transmits a packet. Please calculate this success probability (throughput) of this system as a function of p and k. Please also calculate the optimal value of p so as to maximize this success probability. In addition, what will this maximum success probability becomes when k approaches infinity?
4. (5 points) Authentication/Verification of users' identities for sensitive applications over the Internet, e.g. Web ATM (Automated Teller Machine), can you propose any mechanism which is more secure than the traditional credential (ID plus password) approach?
5. (20 points) Of the following schedules,
   (1) $w_1(x), c_1, r_2(x), c_2, w_1(x), c_3$
   (2) $r_2(x), w_2(y), w_1(x), w_2(u), r_1(y), w_3(u), c_3, c_2, c_1$
   (3) $w_2(x), r_1(x), r_2(y), w_1(y), c_2, c_1, r_3(y), c_3$
   (4) $r_1(x), r_2(y), w_1(z), c_1, w_2(y), w_3(x), r_3(z), c_2, c_3$
   (5) $r_1(x), r_2(y), w_2(x), w_1(z), w_3(y), w_3(z), c_1, c_2, c_3$

   (a) which of them are recoverable?
   (b) which of them are avoid cascading rollback?
   (c) which of them are strict?
   (d) which of them are serializable? Show one of the equivalent serial schedules if it is.

見背面

國立臺灣大學96學年度碩士班招生考試試題

6. (30 points) Answer the following questions with respect to the following relation schema.

Hotel

hotel-name	phone	city	country

Room

room-number	hotel-name	type	price

Booking

hotel-name	guest-name	date-from	date-to	room-number

Guest

guest-name	phone	city	country

(a) Write an SQL to list the hotels located in Taipei city.

(b) Write an SQL to list the average room price for each hotel.

(c) Write an SQL to list all guests currently staying in the Howard Hotel.

(d) Write an SQL to retrieve the rooms that are currently unoccupied in the Howard Hotel located in Taipei city.

(e) Write an SQL to retrieve the most commonly booked room type for each hotel in Japan.

(f) Write an SQL to retrieve the guests who visited Taipei twice but staying in different hotels in year 2006.