

1. (30 points) Answer the following questions with respect to the following relation schema, where the primary attributes are underlined for each relation.

Theater

<u>theater-name</u>	city	phone
---------------------	------	-------

Play

<u>movie-name</u>	<u>theater-name</u>	date-from	date-to	rating	ticket-sold
-------------------	---------------------	-----------	---------	--------	-------------

Producer

<u>producer-name</u>	city	phone
----------------------	------	-------

Make

<u>producer-name</u>	<u>movie-name</u>	year
----------------------	-------------------	------

- (a) Write an SQL to list the theaters located in Taipei city.
(b) Write an SQL to find the producer making most movies in the year 2007.
(c) Write an SQL to list all theaters playing the movie of "The Devil Wears Prada".
(d) Write an SQL to find the movie with most tickets sold in the year 2007.
(e) Write an SQL to find the number of movies played by the theater with most tickets sold in the year 2007.
2. (20 points) Consider the following incomplete schedule S,
- $$w_1(x), w_3(y), r_2(y), w_1(y).$$
- Modify S to create a complete schedule that satisfies the following conditions. If a modification is not possible, explain briefly. If it is possible, use the smallest possible number of actions (read, write, commit, or abort). You are free to add new actions anywhere in the schedule S, including in the middle.
- (a) Resulting schedule is recoverable.
(b) Resulting schedule is cascadeless.
3. (18 points) Please explain the following terms.
- (a) (3 points) IPTV
(b) (3 points) FTTH
(c) (3 points) RFID
(d) (3 points) IEEE 802.16
(e) (3 points) Wireless ad hoc networks
(f) (3 points) 自然人憑證
4. (32 points) Please answer the following questions.
- (a) (4 points) What are the Nyquist theorem and the Shannon's result,

見背面

respectively?

- (b) (4 points) From ALOHA to CSMA and then to CSMA/CD protocols, what mechanism is added, respectively, and in what way, to enhance the system performance?
- (c) (4 points) Please compare the IEEE 802.3 with the IEEE 802.5 MAC layer protocols.
- (d) (4 points) What are the objectives of contention-limited MAC layer protocols? Please name one and explain (1) how it works and (2) how it achieves such objectives.
- (e) (4 points) In a sliding-window data-link-layer protocol, if the timeout interval for each transmitted frame is set to be less than the round-trip propagation delay, does this protocol still work in terms of (1) correctness and (2) performance (frame delay and throughput)?
- (f) (4 points) Please compare error detection code against error correcting code.
- (g) (4 points) Describe the objectives and steps of the Bellman Ford's algorithm.
- (h) (4 points) Describe the objectives and steps of the Kruskal's algorithm.