

**Mid 1 Solution**

**Question 1: (15 Marks)**

**TRUE or FALSE:**

1. The conceptual scheme of a database cannot be changed once it is defined. ( **T / F** )
2. An advantage of the database approach is the creation of maximum data redundancy. ( **T / F** )
3. A database administrator designs, constructs, and manages the databases. ( **T / F** )
4. Database scheme is specified during database design. ( **T / F** )
5. Database scheme changes very frequently. ( **T / F** )
6. The database state is also called an instance of database. ( **T / F** )
7. Schema diagram does not show the data types of each data item. ( **T / F** )
8. Composite or multivalued attributes are allowed in relational model. ( **T / F** )
9. A superkey can have redundant attributes. ( **T / F** )
10. A foreign key can have a null value. ( **T / F** )

**Question 2: (20 Marks)**

**MULTIPLE-CHOICE-QUESTIONS: Encircle only one correct answer**

- 1) Many airline reservation and telephone directory systems that support large number of concurrent transactions with little delay are categorized as \_\_\_\_\_.  
a) **OLTP** b) RTS c) AI d) OFTP
- 2) \_\_\_\_\_ is the ability to change the schema at one level of a database system without having to change the schema at next higher level.  
a) data exchange b) data dependence c) **data independence** d) data binding
- 3) \_\_\_\_\_ data independence changes the conceptual scheme without changing the external scheme.  
a) physical b) internal c) low-level d) **logical**
- 4) \_\_\_\_\_ language is used to define both the internal and conceptual scheme when there is no separation between these schemes.  
a) VDL b) SDL c) **DDL** d) DML
- 5) A high-level DML used in stand-alone interactive manner is called \_\_\_\_\_ language.

- a) **query** b) machine c) assembly d) natural
- 6) The description of schema constructs and constraints is called \_\_\_\_\_ data.  
a) dynamic b) beta c) **meta** d) key
- 7) The description of a database is called database \_\_\_\_\_.  
a) **schema** b) structure c) construct d) implementation
- 8) A state that satisfies the structure and constraints of a scheme is called \_\_\_\_\_ state.  
a) invalid b) true c) real d) **valid**
- 9) The database state is called \_\_\_\_\_ of the schema.  
a) intension b) **extension** c) expansion d) definition
- 10) The ability to modify the data structure and not have to change the programs using that data is called:  
a) data dictionary      **b) data independence** c) data integrity    d) referential integrity

### **Question 3 : (12 Marks)**

A chain of pharmacies has offered to give you a free lifetime supply of medicine if you design its database. Given the rising cost of health care, you agree. Here's the information that you gather:

- Patients are identified by an SSN, and their names, addresses, and ages must be recorded.
  - Doctors are identified by an SSN. For each doctor, the name, specialty, and years of experience must be recorded.
  - Each pharmaceutical company is identified by name and has a phone number.
  - For each drug, the trade name and formula must be recorded. Each drug is made by a given pharmaceutical company, and the trade name identifies a drug uniquely from among the products of that company. If a pharmaceutical company is deleted, you need not keep track of its products any longer.
  - Each pharmacy has a name, address, and phone number.
  - Every patient comes to his Doctor. Every doctor has at least one patient.
  - Each pharmacy sells several drugs and has a price for each. A drug could be sold at several pharmacies, and the price could vary from one pharmacy to another.
  - Doctors prescribe drugs for patients. A doctor could prescribe one or more drugs for several patients, and a patient could obtain prescriptions from several doctors. Each prescription has a date and a quantity associated with it. You can assume that, if a doctor prescribes the same drug for the same patient more than once, only the last such prescription needs to be stored.
- Pharmaceutical companies have long-term contracts with pharmacies. A pharmaceutical company can contract with several pharmacies, and a pharmacy can contract with several

