

RDBMS CONCEPT AND COMPUTER NETWORKING
(CSEN 3207)

Time Allotted : 2½ hrs

Full Marks : 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) The decoupling of external level and the conceptual level is called
 - (a) logical data independence
 - (b) local data independence
 - (c) physical data independence
 - (d) non-local data independence.
- (ii) The level of data abstraction which describes how the data is actually stored is
 - (a) physical level
 - (b) storage level
 - (c) conceptual level
 - (d) view level
- (iii) The ability to modify the internal schema without causing any change to the external schema is
 - (a) physical data independence
 - (b) logical data dependence
 - (c) physical data dependence
 - (d) logical data independence
- (iv) In a relation R(A, B, C, D), if $A \rightarrow B$, $B \rightarrow C$, and $C \rightarrow D$, then which of the following is TRUE?
 - (a) C is not dependent on A
 - (b) B is a candidate key
 - (c) A is a superkey
 - (d) D is functionally dependent on B only
- (v) Which of the following is a necessary condition for dependency preservation in decomposition?
 - (a) Each decomposed relation should contain a candidate key of the original relation
 - (b) The original functional dependencies must be inferable from decomposed relations
 - (c) The decomposed relations must be in BCNF
 - (d) Lossless decomposition is not required for dependency preservation.
- (vi) A table that is in 2NF but not in 3NF must have:
 - (a) A composite key
 - (b) A partial dependency
 - (c) A transitive dependency
 - (d) A candidate key with multiple attributes

- (vii) Which topology requires a multipoint connection?
 (a) Ring (b) Bus
 (c) Star (d) Mesh
- (viii) Which one of the following is not a function of network layer?
 (a) Congestion Control (b) Error Control
 (c) Routing (d) Inter Networking.
- (ix) Which part of the URL identifies the way a file is transmitted?
 (a) Domain (b) File path
 (c) Name of the website (d) Scheme.
- (x) Host name can also be called as _____
 (a) Server (b) IP address
 (c) DNS (d) Element.

Fill in the blanks with the correct word

- (xi) An attribute of one table matching the primary key of another table is called _____.
- (xii) One limitation of E-R model is that it cannot _____.
- (xiii) _____ normal form eliminates partial dependency.
- (xiv) _____ ensures that transactions do not interfere with each other.
- (xv) The ACID property that ensures that a transaction brings the database from one valid state to another is _____.

Group - B

2. (a) Design an E-R diagram of hospital management system with the following entities. Try to include the constraints in the E-R.
 User (login, password),
 Admin (login, password),
 Test (diag_no, diag_date, remark, advice_date, final _diag, ecg),
 Patients (reg _ no, reg _ date, name, add, city, contact _ no),
 Medicine (diag_no, med_no, med_name, precaution, no_of_doses),
 Blood_test (reg_no, test_date, haemoglobin, tlc,esr),
 Patient _ fee (receipt _ no, reg _ no, amt _ due, amt _ paid, date_payment). [[CO2](Analyse/HOCQ)]
- (b) Explain the DDL, DML and DQL in the context of SQL? [[CO3](Remember/LOCQ)]

6 + 6 = 12

3. (a) Consider the following relational database
 employee (person name, street, city)
 works (person name, company name, salary)
 company (company name, city)
 Give an expression in the relational algebra to express each of the following queries:
 (i) Find the names of all employees who live in city "Kolkata".

- (ii) Find the names of all employees whose salary is greater than Rs 100,00.
 (iii) Find the names of all employees who live in “Kolkata” and whose salary is greater than Rs100,00. [[CO3](Apply/IOCQ)]

- (b) Consider the following insurance database
 person (driver id, name, address)
 car (license, model, year)
 accident (report number, date, location)
 owns (driver id, license)
 participated (report number, license, driver id, damage amount)

The primary keys are underlined.

Construct the following SQL queries for this relational database.

- (i) Find the total number of people who owned cars that were involved in accidents in 2009.
 (ii) Find the number of accidents in which the cars belonging to “Rahul Kumar” were involved.
 (iii) Update the damage amount for the car with the license number “AABB2000” in the accident with report number “AR2197” to Rs 3000. [[CO3](Apply/IOCQ)]

(2 × 3) + (2 × 3) = 12

Group - C

4. (a) Describe what is meant by transitive dependency and describe how this type of dependency relates to 3NF. Provide an example to illustrate your answer.

[[CO3](Analyse/HOCQ)]

- (b) Describe an approach to converting a first normal form (1NF) table to second normal form(2NF) table(s). [[CO3](Understand/LOCQ)]

6 + 6 = 12

5. (a) “Every Super Key is a Candidate Key but it is not true the other way” – justify.

[[CO3](Analyse/HOCQ)]

- (b) What is the difference between Primary Key and Unique Key? Explain your answer with proper example. [[CO4](Remember/LOCQ)]

- (c) Order(OrderID, CustomerID, CustomerName, ProductID, ProductName, Quantity, Price)

Given the functional dependencies:

OrderID → CustomerID, CustomerName

ProductID → ProductName, Price

Determine the highest normal form of the relation. If it is not in BCNF, decompose it into BCNF. [[CO3](Apply/IOCQ)]

3 + 2 + (4 + 3) = 12

Group - D

6. (a) Is it is possible to detect the error bit, if any, using Hamming code, if the received bit sequence is 10010100101? Justify. [[CO5](Evaluate/HOCQ)]

- (b) How does Go-Back-N ARQ differ from Selective Repeat ARQ? [[CO5](Remember/LOCQ)]

6 + 6 = 12

7. (a) Construct the Hamming code for the bit sequence 1001101. *[(CO5)(Create/HOCQ)]*
 (b) How does a single-bit error differ from a burst error? *[(CO5)(Analyze/IOCQ)]*
 (c) Describe the Piggybacking? *[(CO5)(Remember/LOCQ)]*
6 + 3 + 3 = 12

Group - E

8. (a) SMTP is used for email services. Then why is POP3 also necessary for email service? *[(CO6)(Apply/IOCQ)]*
 (b) Write a brief note on FTP. *[(CO6)(Remember/LOCQ)]*
 (c) Describe the advantage and disadvantage of distributed database system. *[(CO6)(Remember/LOCQ)]*
4 + 4 + 4 = 12
9. (a) Explain the role of DNS server and Proxy server in the context of World Wide Web. *[(CO6)(Remember/LOCQ)]*
 (b) Explain, with diagram, the working principle of a search engine. *[(CO6)(Apply/IOCQ)]*
(3 + 3) + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	38.54	33.33	28.13