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 any4 (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) What is internet?
(a) A network of interconnected local area networks
(b) A collection of unrelated computers
(c) Interconnection of wide area networks
(d) A single network.

(ii) Which layer is responsible for process-to-process delivery in a general network model?
(a) session layer
(b) data link layer
(c) transport layer
(d) network layer

(iii) Which network topology requires a central controller or hub?
(a) Ring
(b) Bus
(c) Star
(d) Mesh

(iv) What is the term for the data communication system within a building or campus?
(a) MAN
(b) LAN
(c) PAN
(d) WAN

(v) Which layer provides the services to user?
(a) Physical layer
(b) Presentation layer
(c) Session layer
(d) Application layer.

(vi) Which of the following allows you to connect and login to a remote computer?
(a) SMTP
(b) HTTP
(c) FTP
(d) Telnet.

(vii) Which of the following is not a property of transactions?
(a) Atomicity
(b) Concurrency
(c) Isolation
(d) Durability.

(viii) When an E-R diagram is mapped to tables, the representation is redundant for
(a) weak entity sets
(b) weak relationship sets
(c) strong entity sets
(d) strong relationship sets

(ix) The correct order of SQL expression is
(a) select, group by, where, having
(b) select, having, group by, where
(c) select, having, where, group by
(d) select, where, group by, having.

(x) The clause alter table in SQL can be used to
(a) add an attribute
(b) delete a constraint
(c) alter the default values of an attribute
(d) all of the above

Fill in the blanks with the correct word

(xi) _____ is a protocol which allows users to download E Mail messages from mail server to a local computer.

(xii) Every computer on the internet has a unique _____.

(xiii) DROP is a _____ statement in SQL.

(xiv) Left outer join is indicated by _____ symbol.

(xv) In an E-R diagram double lines indicate _____.

Group - B

2. (a) What is the difference between schema and instance? Explain with examples. *[(CO1)(Understand/LOCQ)]*

(b) "DBMS is a better way to handle data compared to traditional file-oriented ledgers." - Justify the acceptability of this statement. *[(CO1)(Evaluate/HOCQ)]*

(c) What is the relationship between super key, candidate key and primary key? Explain with suitable examples. *[(CO2)(Understand/LOCQ)]*

3 + 5 + 4 = 12

3. Write SQL query for following consider table
EMP(empno , deptno, ename ,salary, Designation, joiningdate, DOB,city)
(i) Display employees name and number in an increasing order of salary
(ii) Display employee name and employee number dept wise
(iii) Display total salary of all employee
(iv) Display number of employees dept wise
(v) Display employee name having experience more than 3 years
(vi) Display employee name staring with "S" and working in deptno 1002

[(CO2)(Apply/IOCQ)]

(6 × 2) = 12

Group - C

4. (a) Suppose you are given a relation R = (A,B,C,D,E) with the following functional dependencies:
{CE → D,D → B,C → A}.
(i) Find all candidate keys.
(ii) Identify the best normal form that R satisfies (1NF, 2NF, 3NF, or BCNF).
(iii) If the relation is not in BCNF, decompose it until it becomes BCNF. At each step, identify anew relation, decompose and re-compute the keys and the normal forms they satisfy. *[(CO5)(Apply/IOCQ)]*

(b) Describe what is meant by full functional dependency and describe how this type of dependency relates to 2NF. Provide an example to illustrate your answer. *[(CO5)(Understand/LOCQ)]*

(2 + 1 + 3) + 6 = 12

5. (a) What is serializable schedule? Explain with example. *[(CO4)(Understand/LOCQ)]*

(b) Consider the following two transactions:

```
T1:   read(A);
      read(B);
      if A = 0 then B := B + 1;
      write(B).
T2:   read(B);
      read(A);
      if B = 0 then A := A + 1;
      write(A).
```

Let the consistency requirement be A = 0 ∨ B = 0, with A = B = 0 the initial values.
(i) Show that every serial execution involving these two transactions preserves the consistency of the database.
(ii) Show a concurrent execution of T1 and T2 that produces a nonserializable schedule.
(iii) Is there a concurrent execution of T1 and T2 that produces a serializable schedule? *[(CO2)(Apply/IOCQ)]*

3 + (3 + 3 + 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) Explain the mechanism of Stop-and-Wait ARQ with diagram. *[(CO5)(Remember/LOCQ)]*
   (b) "Information that passes through different layers of TCP/IP model are referred by different names in each layer"- Explain. *[(CO5)(Analyze/IOCQ)]*
   (c) Describe the services offered by Network Layer. *[(CO5)(Remember/LOCQ)]*

5 + 4 + 3 = 12

Group - E

8. (a) SMTP is used for emailing services. Then why is POP3 also necessary for emailing service? *[(CO6)(Apply/IOCQ)]*
   (b) The website address of IBM is www.ibm.com. Explain briefly each and every component of the web addresses. *[(CO6)(Apply/IOCQ)]*
   (c) Describe the different architectures for distributed database systems. *[(CO6)(Remember/LOCQ)]*

4 + 4 + 4 = 12

9. (a) Explain the search engine architecture with a diagram. *[(CO6)(Remember/LOCQ)]*
   (b) Write a short note:
   (i) FTP
   (ii) URL
   (iii) MIME. *[(CO6)(Remember/LOCQ)]*

6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	47.91	40.63	11.46

Course Outcome (CO):

After the completion of the course students will be able to

1. Identify the characteristics of a database and describe the architecture and languages of relational Database Management System.
2. Understand & analyze design principles for logical design of databases, including the E-R model and apply the concepts of normalization to design an optimal database.
3. Apply relational database theory, and be able to write relational algebra expressions for queries and apply the concepts to manage a database using SQL.
4. Understand the concept of database transaction, it's properties and the concept called serializability.
5. Understand the topology, transmission mode of computer networks and explains key networking protocols in the context of a conceptual model, such as the OSI and TCP/IP framework.
6. Understand the basic workings of Inter networking, WWW, search engine and e-mail in the context of data communication.

**LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question.*