

**RDBMS CONCEPT AND COMPUTER NETWORKING
(CSE2207)**

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) View is a
 - (a) temporary table
 - (b) virtual table
 - (c) permanent table
 - (d) SQL statement.
- (ii) 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
- (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) Dependency preservation ensures that:
 - (a) All functional dependencies are preserved in decomposed relations
 - (b) All decomposed relations are in BCNF
 - (c) There is no loss of tuples during decomposition
 - (d) The decomposition results in a single relation
- (v) Which of the following schedules is NOT recoverable?
 - (a) A schedule where all transactions commit only after ensuring their dependencies are also committed
 - (b) A schedule where transactions are executed serially
 - (c) A schedule where a transaction commits before another transaction that reads its uncommitted data
 - (d) A schedule that does not allow cascading aborts

- (vi) Which topology requires a multipoint connection?
 (a) Ring (b) Bus
 (c) Star (d) Mesh
- (vii) What is the term for the data communication system within a building or campus?
 (a) MAN (b) LAN
 (c) PAN (d) WAN
- (viii) Which one of the following is not used to generate dynamic web pages?
 (a) PHP (b) ASP.NET
 (c) JSP (d) CSS
- (ix) Which of these is not used by the intranet?
 (a) TCP (b) BSNL
 (c) IP (d) HTTP
- (x) Which part of the URL identifies the way a file is transmitted?
 (a) Domain (b) Filepath
 (c) Name of the website (d) Scheme

Fill in the blanks with the correct word

- (xi) A relation has attributes (A, B, C, D, E) and functional dependencies $\{A \rightarrow B, C \rightarrow D, (A, C) \rightarrow E\}$. The number of candidate keys present here is ____.
- (xii) Consider a relation with attributes (A, B, C, D) and functional dependencies $\{A \rightarrow B, C \rightarrow D\}$. The possible candidate key is _____.
- (xiii) Specialization is a _____ design process.
- (xiv) _____ transmission is involved in communication between a computer and a keyboard
- (xv) _____ is a protocol that allows sending / uploading an email message from a local computer to an email server.

Group - B

2. (a) Describe the derived attributes and aggregation relationships with an example. [[CO2](Remember/LOCQ)]
 (b) Consider a relational database as given below:
 Train (train-no, train_name, start_station)
 Coach(coach-no, train-no, type, price)
 where the underlined attributes are the primary keys.
 Write down the expressions in SQL and in relational algebra for the following queries:
 (i) List all the train names starting from station Kolkata.
 (ii) List the train number and price of all "3 A/C" (type) coaches with price below 3025/-
8 + (2 + 2) = 12
3. (a) Discuss the advantage of Database System over File processing system. Explain physical and logical independence with respect to RDBMS. [[CO1](Remember/LOCQ)]

- (b) Site an example of Weak Entity Set and its identifying relationship with a strong entity set by using ER-notation. [[CO2](Remember/LOCQ)]
- (c) Design a generalization, specialization hierarchy for a motor vehicle sales company. The company sells motorcycles, passenger cars, vans, buses. Justify your placement of attributes at each level of hierarchy. [[CO2](Analyse/HOCQ)]
- (3 + 3) + 3 + 3 = 12**

Group - C

4. (a) Consider the following schedule S of transactions T1, T2, T3, T4:

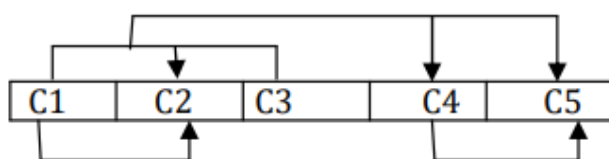
T ₁	T ₂	T ₃	T ₄
	Reads (X)		
		Writes (X)	
		Commit	
Writes (X)			
Commit			
	Writes (Y)		
	Reads (Z)		
	Commit		
			Reads (X)
			Writes (Y)
			Commit

Prove that S is both conflict-serializable and recoverable. [[CO4](Analyse/HOCQ)]

- (b) Differentiate between a transaction rollback and a transaction abort. Provide examples where each may occur. [[CO4](Understand/LOCQ)]
- (c) What is the difference between a committed transaction and an uncommitted transaction? What happens if a system crashes before a transaction is committed? [[CO2](Remember/LOCQ)]
- 6 + 3 + (1 + 2) = 12**

5. (a) Let us assume a table User_Personal (UserID, U_email, Fname, Lname, City, State, Zip) with following FDs:
 UserID → U_email, Fname, Lname, City, State, Zip
 Zip → City, State
 Is this table in 2NF? Explain.
 Is this table in 3NF? If yes, explain why it is in 3NF. If not, then normalize it to Third Normal Form. [[CO3](Apply/IOCQ)]

- (b) Given the dependency diagram shown in the following figure:



Create a database whose tables are at least in 3NF, showing dependency diagrams for each table. [[CO3](Apply/IOCQ)]

(2 + 4) + 6 = 12

Group - D

6. (a) Is it 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) Write down the advantages of mesh and star topology. [[CO5](Remember/LOCQ)]
 (b) What are the functions provided by the physical link layer and network layer in the OSI model? [[CO5](Remember/LOCQ)]
 (c) Given an IP address 130.34.54.12. Find the class of the given IP address in a classful addressing scheme. Also find the netmask of that class and determine the netid and host id. [[CO5](Apply/IOCQ)]
(2 + 2) + (2 + 2) + (1 + 1 + 1 + 1) = 12

Group - E

8. (a) Argue on the need for two different emailing services like SMTP and POP3. [[CO6](Analyse/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) While we surf the WWW, what roles do DNS server and Proxy server play? [[CO6](Remember/LOCQ)]
 (b) Explain, with diagrams, step by step, how a Search engine works. Why is Google so special among all the Search engines? [[CO6](Apply/IOCQ)]
(2 + 2) + (6 + 2) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	42.7	41.6	15.7