

END TERM EXAMINATION

SECOND SEMESTER [MCA] MAY-JUNE 2018

Paper Code: MCA-108

Subject: Database Management Systems

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions. All questions carry equal marks.

- Q1 (a) What do you mean by a data model? How does a relational model differ from relational object database model? Write any three additional features of object relational data model over relational model?
(b) What is extended entity relational model? Explain with suitable examples.
- Q2 (a) Explain primary key, composite attribute and multi-valued attributes with suitable examples. Define various integrity constraints which are valid in relational data model.
(b) Explain natural join, outer join and semi join operations with suitable example. Also write at least one of their applications.
- Q3 Consider the following relational scheme:
BOOKS(Book_id, B_name, Author, Purchase_date, Cost)
MEMBERS(Member_id, M_name, Address, Phone, Birth_date)
ISSUE_RETURN(Book_id, Member_id, Issue_date, Return_date)
Specify the following queries in SQL-
(a) Find the name of all books that have not been issued.
(b) Display the member_id and the number of books issued to that member. (Assume that if a book in ISSUE_RETURN relation does not have a Return_date then it is issued).
(c) Find the book that has been issued maximum number of times.
(d) Display names and authors of books that have been issued at any time to a member whose member_id is ab.
(e) List the books ids of those books that have been issued to any member whose date of birth is less than 01-01-1985 but have not been issued to any member having the birth date equal to or greater than 01-01-1985.
- Q4 (a) What do you mean by attribute closure of a set of attributes? Write an algorithm to compute closure of a set of attribute and write its applications.
(b) Find the canonical cover for the following set of functional dependencies-
 $F = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$
- Q5 (a) Explain with suitable examples insertion anomaly, deletion anomaly and update anomaly. Further, write a condition for lossless join decomposition of a relation schema.
(b) What do you mean by 3NF and BCNF? Prove that BCNF is more stringent than 3NF.
- Q6 (a) What do you mean by various transaction states? Write ACID properties of a transaction.
(b) Explain two phase locking protocol and show that it has possibility of deadlock and cascading rollback.
- Q7 How does a distributed database differ from a centralized database? Explain various transparencies which are supported by distributed database. Also explain various fragmentation techniques used to implement it.
- Q8 Explain log based recovery methods in detail.

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