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- b Explain the following Relational Algebra operations with suitable example. [10]
- 1) Generalized Project
  - 2) Select
  - 3) Union
  - 4) Rename
  - 5) Natural Join
- 4 a Write SQL queries for the given database [10]
- Book(book\_id, title, author, cost)
- Store(store\_no, city, state, inventory\_val)
- Stock(store\_no, book\_id, quantity)
- (i) Modify the cost of DBMS books by 10%
  - (ii) Find the total number of books in Mumbai stores
  - (iii) Find title of all books whose title contains the word 'System'
  - (iv) Find title of the most expensive book
  - (v) Add a new record in Book (Assume values as per requirement)
- b Why there is need of normalization? Explain 1NF, 2NF, 3NF and BCNF with example. [10]
- 5 a Describe ACID properties with examples [10]
- b Give example of serial schedule and equivalent to serial schedule with respect to conflict serializability. Discuss conflict serializability with example [10]
- 6 Write short note on the following (Any four) [20]
- a Conversion of Specialization to relational schema with suitable example [05]
  - b Types of attributes [05]
  - c 2PL concurrency control protocol [05]
  - d Triggers [05]
  - e Lossless decomposition [05]