(3 Hours)   [Total Marks : 80

NOTE:
I.   Question No. 1 is Compulsory
II.   Attempt any FOUR question from 2 to 7

Q.1 (a) A large bank has several branches at different places. Each branch maintains the   (20)
account details of customer. The customer may open joint as well as single accounts.
The bank also provides the loan to the customer for different purposes. Bank keeps
record of each transaction by the customer to his account. All of the branches have
employees and some employees are manager.
Construct an ER diagram for the above banking system. Document all assumptions
that you make for designing.

(b) Write a schema definition and normalize all tables to 3NF for the above ER diagram.

Q.2 (a) What is deadlock? Describe deadlock detection and prevention technique.   (8)
(b) Discuss the three steps in crash recovery in ARIES   (7)

Q.3 (a) Define minimal cover and closure for functional dependencies.   (8)
Consider the relation R(P,Q,R,X,Y,Z) and set of functional dependencies are
$P \to Q$, $RX \to Y$, $RX \to Z$ **muadda.com**
$P \to R$, $Q \to Y$
Obtain other functional dependencies and compute closure of PX^+.

(b) Write a detailed note on query optimization.   (7)

Q.4 (a) Explain hash based indexing. Discuss the use of hash function in identifying a bucket   (8)
to search.
(b) Explain the responsibilities of DBA.   (7)

Q.5 (a) Explain the architecture of database system and also explain how it is different from   (8)
conventional file system.
(b) Explain the terms Lossless join decomposition and Dependency preserving   (7)
decomposition.

Q.6 (a) What is locking protocol? Describe the 2 phase locking protocol and strict two phase   (8)
locking protocol.
(b) What is Bell-LaPadula model? Explain the intuition behind its two rules.   (7)

Q.7   Write a short note on following (any Three)   (15)
(a) ACID Property
(b) Grant and Revoke Command
(c) Shadow Paging
(d) Aggregation and Ternary relationship.

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***** ALL THE BEST *****