MASTER IN MULTIMEDIA DEVELOPMENT
AND
M.TECH. IT (COURSEWARE ENGG) EXAMINATION-2018
(Second Semester)
MANAGEMENT OF SOFTWARE SYSTEM DEVELOPMENT

TIME: 3 Hours | Full Marks: 100

Answer any ***five*** questions
[All the question part must be answered together]

1. a) Explain with an example why BCNF is stronger than 3NF? 4x5
   b) Define triggers in SQL? Create a trigger MIN_SALARY_TRG for the relation schema PROFESOR (pNum, pName, salary) to check that while inserting new row in the PROFESOR table, salary has to be greater than Rs. 60,000/-.
   c) What are the different types of Database Models in relational database?
   d) What is the role of WBS in software engineering?

2. Consider a database with the following schema: 5x4
   Suppliers (sID, sName, address)
   Parts (pID, pName, colour)
   Catalog (sID, pID, price)
   For each of the following questions, formulate the specified queries using relational algebra.
   a. Find the names of all red Parts.
   b. Find all prices for Parts that are red or green. (A part may have different prices from different manufacturers.)
   c. Find the sIDs of all Suppliers who supply a part that is red or green.
   d. Find the names of all Suppliers who supply a part that is red or green.
   e. Find the pIDs of those Parts whose price is more than Rs. 1,000/-.

3. a) What is the difference between inner join and outer join in relational database? 5+5+10
   b) State and explain the operations on bags with example.
   c) Are the sets $F = \{B \rightarrow CD, AD \rightarrow E, B \rightarrow A\}$ and $G = \{B \rightarrow CDE, B \rightarrow ABC, AD \rightarrow E\}$ equivalent. If yes, explain why.

4. Consider a database with the following schema:
Worker (WorkerID, FirstName, LastName, Salary, JoinDate, Department)
Bonus (WorkerRefID, BonusAmt, BonusDate)
Title (WorkerRefID, WorkerTitle, AffectedFrom)
Construct the following SQL queries for this relational database. 8
a) Display all worker Details from the Worker table order by FirstName ascending and Department descending.
b) Display the list of employees with the same Salary.
c) Display the second highest salary from the Worker table
d) Display the Departments that have less than five people in it.
e) Display the name of Workers having the highest salary in each department.

5. Suppose you are given a relation *R* with four attributes, *A, B, C and D*. For each of the following sets of *FDs*, do the following. 5
a) Identify the candidate key(s) for *R*.
b) Identify the best normal form that *R* satisfies (*1NF, 2NF, 3NF, or BCNF*).
c) If *R* is not in BCNF, decompose it into a set of BCNF relations that preserve the dependencies.
   1. $C \rightarrow D, C \rightarrow A, B \rightarrow C$
   2. $B \rightarrow C, D \rightarrow A$
   3. $ABC \rightarrow D, D \rightarrow A$
   4. $A \rightarrow B, BC \rightarrow D, A \rightarrow C$
   5. $AB \rightarrow C, AB \rightarrow D, C \rightarrow A, D \rightarrow B$

6. a) Schema $R = (A, B, C, D, E)$ is decomposed into $R1 = (A, B, C)$ and $R2 = (A, D, E)$. Show that this decomposition is lossless-join decomposition if the following set of functional dependencies holds. 1
$F = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$.
b) Compute the closure of the following set functional dependencies $F = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$ for relation schema $R = (A, B, C, D, E)$.
List the candidate keys for *R*.

7. a) Explain statistical methods for software metric estimation and evaluation Explain project management and different tasks involved. 1
b) What are software quality metrics? Explain how they affect software quality?

8. a) To develop a 76-KLOC embedded product which is nominal, the database size is rated very high and the use of software tools is low. Using Intermediate COCOMO, compute the estimated effort in person (man) months? 10+10
*[**Hints:** Product of effort multipliers is 1.35]*

b) Construct the PERT network and identify the critical path and its duration.

Activity:	**0-1**	**1-2**	**1-3**	**2-4**	**2-5**	**3-4**	**3-6**	**4-7**	**5-7**	**6-7**
Duration:	**2**	**8**	**10**	**6**	**3**	**3**	**7**	**5**	**2**	**8**

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