

Paper Id:

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B.TECH.
(SEM 5th) THEORY EXAMINATION 2018-19
DATABASE MANAGEMENT SYSTEM

Time: 3 Hours

Total Marks: 70

Note: 1. Attempt all Sections.

SECTION A

1. Attempt *all* questions in brief.

2 x 7 = 14

- a. Explain the difference between a weak and a strong entity set with example.
- b. Discuss three level of abstractions or schemas architecture of DBMS.
- c. Define constraint and its types in DBMS.
- d. Explain the difference between physical and logical data independence with example.
- e. What are the different types of anomalies associated with database?
- f. Write the difference between super key and candidate key.
- g. Why do we normalize database?

SECTION B

2. Attempt any *three* of the following:

7 x 3 = 21

- a. Define Transaction and explain its properties with suitable example.
- b. What is schedule? What are its types? Explain view serializable and cascadeless schedule with suitable example of each.
- c. What is log file? Write the steps for log based recovery of a system with suitable example.
- d. What is deadlock? What are necessary conditions for it? How it can be detected and recovered?
- e. Draw overall structure of DBMS and explain its components in brief.

SECTION C

3. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Compare Generalization, Specialization and aggregation with suitable examples.
- (b) Write difference between Cross Join, Natural Join, left outer join and right outer join with suitable example.

4. Attempt any *one* part of the following:

7 x 1 = 7

- (a) Define partial functional dependency. Consider the following two sets of functional dependencies $F = \{A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H\}$ and $G = \{A \rightarrow CD, E \rightarrow AH\}$. Check whether or not they are equivalent.

- (b) Define Minimal Cover. Suppose a relation R (A,B,C) has FD set $F = \{A \rightarrow B, B \rightarrow C, A \rightarrow C, AB \rightarrow B, AB \rightarrow C, AC \rightarrow B\}$ convert this FD set into minimal cover.

5. Attempt any one part of the following: 7 x 1 = 7

- (a) Explain two phase locking protocol with suitable example.
 (b) Write the salient features of graph based locking protocol with suitable example

6. Attempt any one part of the following: 7 x 1 = 7

- (a) Which of the following schedules are conflicts serializable? For each serializable schedule find the equivalent schedule.

S1: r1(x); r3(x); w3(x); w1(x); r2(x)

S2: r3(x); r2(x); w3(x); r1(x); w1(x)

S3: r1(x); r2(x); r3(y); w1(x); r2(z); r2(y); w2(y)

- (b) Write the difference between 3NF and BCNF. Find normal form of relation R(A,B,C,D,E) having FD set $F = \{A \rightarrow B, BC \rightarrow E, ED \rightarrow A\}$

7. Attempt any one part of the following: 7 x 1 = 7

- (a) Suppose there are two relations

$R(A, B, C), S(D, E, F)$

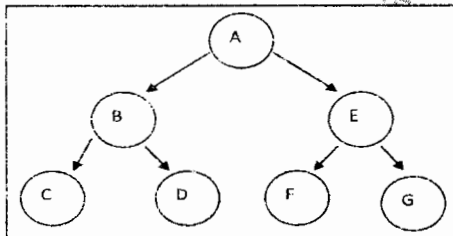
Write TRC and SQL for the following RAs

i) $\Pi_{A, B} (r)$

ii) $\sigma_{B=45} (r)$

iii) $\Pi_{A, F} (\sigma_{C=D} (r \times s))$

- (b) What do you mean by multi granularity? How the concurrency is maintained in this case. Write the concurrent transactions for the following graph.



T1 wants to access Item C in read mode

T2 wants to access item D in Exclusive mode

T3 wants to read all the children of item B

T4 wants to access all items in read mode