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Roll No. ....

First Semester

M.Tech.(CSE)

Supplementary Examination

February-2019

CO- 501. Advanced Database Management System

Time: 3 Hours

Max. Marks : 100

Note : Answer **any five** questions, All questions carry equal marks.  
Assume suitable missing data, if any.

Q1 a) What is an equivalence rule? Describe various equivalence rules used for query optimization. [10]

b) Explain the B+ tree file organization. What are the steps involved in searching a node in B+ tree? Explain with the help of suitable example. [10]

Q2 a) Define Assertion. How it is different from Trigger? How referential integrity is managed using triggers? [10]

b) Name various algorithms for concurrency control in real time databases. Explain any one of them. [10]

Q3 a) What form of parallelism (inter query, interoperation or intraperation) is likely to be the most important for each of the following task? [10]

i) Increasing the throughput of a system with many small queries.

ii) Increasing the throughput of a system with a few large queries, when the number of disks and processors is large.

b) Draw an ER diagram for HOSPITAL using entities such as patient, doctor, room, receptionist, medicine, employee etc. Clearly state the attributes, relationships, and any assumptions made. [10]

Q4 a) What is the difference between persistent and transient objects? How is persistence handled in typical object-oriented data-base systems? [10]

b) Explain Parallel External Sort Merge. How it works? [10]

Q5. a) Let  $r$  and  $s$  be relations with no indices and assume that the relations are not sorted. Assume infinite memory; what is the lowest-cost way (in terms of I/O operations) to compute  $r \bowtie s$ ? What is the amount of memory required for this algorithm? [10]

b) What do you mean by fragment of a relation? Explain various types of fragmentation with the help of suitable examples. What are the criteria for accessing the correctness of fragmentation? [10]

Q6.a) Compare RDBMS, OODBMS and ORDBMS. [6]

b) Explain in brief Parallel database architecture. [4]

c) Show how to derive the following equivalence by a sequence of transformations using the equivalence rules. [4]

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i)  $\sigma_{\theta_1 \wedge \theta_2 \wedge \theta_3}(E) = \sigma_{\theta_1}(\sigma_{\theta_2}(\sigma_{\theta_3}(E)))$

ii)  $\sigma_{\theta_1 \wedge \theta_2}(E_1 \bowtie_{\theta_3} E_2) = \sigma_{\theta_1}(E_1 \bowtie_{\theta_3} (\sigma_{\theta_2}(E_2)))$ . where  $\theta_2$  involves only attributes from  $E_2$ . [10]

Q7. Write short notes on any four of the following:

[5\*4]

- i. OLAP
- ii. NOSQL
- iii. Database Recovery
- iv. Knowledge Base System
- v. Multimedia Database