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PES UNIVERSITY

PES University, Bangalore

(Established under Karnataka Act 16 of 2013)

UE14CS313

END SEMESTER ASSESSMENT (ESA) – B. TECH. (CSE) 5th Semester
Dec. 2016

UE14CS313 – Advances in Database Management Systems (ADBMS)

Time: 3 Hrs | Answer All Questions | Max Marks: 100

1.	a)	Define the following. Provide std notations. > Database State > Arity of a relation List the differences between the following terms with the help of suitable examples. i. Relational Schema and Relation State ii. Domain and Attribute iii. Candidate key and Primary key	5
	b)	i. List the relational model constraints. ii. Compare entity and referential integrity types of constraints with examples.	5
	c)	i. Define foreign key. What is it used for? Give an example. ii. Distinguish between a transaction and an update.	5
	d)	i. List the different types of definition (DDL) and manipulation (DML) operations performed on relational databases. ii. Illustrate each DML operation with an example SQL script.	5
2.	a)	i. What are the three main architectures of Parallel Databases? Explain with diagrams. ii. What is speed-up and scale-up?	5
	b)	i. Explain Distributed Database Independence and ii. Distributed Transaction Atomicity in 2-3 sentences. iii. Draw the Lattice diagram of GROUP BY queries using pid, locid and timeid as three dimensions.	5
	c)	i. Distinguish between horizontal and vertical fragmentation. Provide an example. ii. Describe Replication. iii. What are the two main types of replication? iv. Write two motivating factors for replication.	5
	d)	i. What are the three lock management strategies available in a distributed DB. ii. With the help of a diagram show the differences between homogeneous and heterogeneous distributed databases.	5
3.	a)	i. Draw the typical architecture of a data warehouse. ii. List the distinguishing features of a data warehouse. iii. Compare OLTP and OLAP.	5
	b)	i. What is a star schema? What are it's main components? ii. Differentiate between star and snowflake schema.	5

	c)	i. Unlike OLTP why are tables not highly normalized in OLAP design? ii. Explain roll up, drill down, slicing and dicing. iii. Give typical examples of aggregation queries in a business. Min 4.	5
	d)	i. What are materialized views? ii. Describe their advantages and challenges. iii. What are the types of deferred maintenance of materialized views?	5
4.	a)	i. What are the four major categories of NoSQL databases? Describe the main feature of each category in 1-2 lines. ii. Give examples for each category. iii. Compare NOSQL database systems with Relational database systems.	5
	b)	i. Define CAP theorem. ii. What does the acronym CAP stand for? Explain each one. iii. What is eventual consistency?	5
	c)	i. What are the 5 Vs of Big Data? Explain briefly. ii. What is MapReduce? iii. What is Sharding? What is its alternate name?	5
	d)	i. What is Hadoop? List the advantages of Hadoop. ii. What is PIG and HIVE? iii. Draw the Hadoop v2 block diagram.	5
5.	a)	i. What are active databases? ii. What are three parts in a trigger description? iii. What are the two classes of spatial data? iv. Name typical applications where Spatial database is suitable.	5
	b)	i. What are the different types of data that are stored in Multimedia databases? ii. What are the two important things present in a Deductive database specification?	5
	c)	i. Identify all the primary keys and foreign keys in the tables given below. ii. Write SQL syntax for creating Employee table with required constraints. iii. Identify candidate keys of Employee table. iv. Write an SQL query to generate a report of all employees by Department whose salary is more than 5 lakhs per annum. * Employee = (eid, ename, aadhar-no, DoB, Gender, Address, Salary) * Department = (dname, dnum, Dept_mgr) * Project = (pid, pname, location, budget) * Proj_team = (pid, eid)	5
	d)	Draw a star schema diagram depicting the below relations with corresponding data types and sample attribute values for each. Mark all required labels including primary keys, foreign keys, fact and dimension tables. • purchase-order, product, supplier, dept, date.	5