PES University, Bangalore
(Established under Karnataka Act 16 of 2013)

UE14CS313

END SEMESTER ASSESSMENT (ESA) B. TECH. 5TH SEMESTER – December 2017

UE14CS313 - Advanced Database Management Systems

Time: 3 Hours	Answer All Questions	Max Marks: 100

Make and state suitable assumptions when necessary

1.	a	What is Multidimensional model? What are some typical questions that can be answered with the multidimensional model? Why we should not use OLTP for querying? List and explain the OLAP operations.	6
	b	Give the architecture for a data warehouse and explain each component.	6
	c	Complete the following SQL queries:	8

Get the sum for every combination of month, store,
```
SELECT month, store, sum(sales)
FROM SALES_FACT, TIME_DIM, STORE_DIM
WHERE SALES_FACT.time_id = TIME_DIM.time_id
AND  SALES_FACT.store_id = STORE_DIM.store_id
GROUP BY _____
```

Get the details for every store and month them a total for month, then a total for store and finally a grand total.
```
SELECT store, month, sum(sales)
FROM SALES_FACT, TIME_DIM, STORE_DIM
WHERE SALES_FACT.time_id ~ TIME_DIM.time_id
AND  SALES_FACT.store_id = STORE_DIM.store_id
GROUP BY _____
```

For every month, list the sum of sales and the rank of the store in term of total sales in the month.
```
SELECT month, store, sum(sales),
_____
FROM SALES_FACT, STORE_DIM, TIME_DIM
WHERE  SALES_FACT.time_id = TIME_DIM.time_id
   AND  SALES_FACT.store_id = STORE_DIM.store_id
GROUP BY _____
,
SELECT store, date, (Here we want the moving average of the last 7 days sales using the
Window Clause)
FROM SALES_FACT, TIME_DIM, STORES_DIM, PRODUCT_DIM
WHERE   SALES_FACT.time_id = TIME_DIM.time_id
   AND  SALES_FACT.store_id = STORE_DIM.store_id
   AND SALES_FACT.product_id = PRODUCT_DIM.product_id
```

2.	a	Give the three architectures for parallel databases. Illustrate Speed-Up and Scale-up with charts. Which architecture scales-up best and which speeds-up best?	8
	b	Explain Fragmentation and Replication.	6

	c	Explain: i) Distributed Data Independence and Distributed Transaction Atomicity. ii) Types of parallel query evaluation. iii) Middle-ware systems	6

3.	a	Why NoSQL? List the four categories of NoSQL databases and give two examples for each category. State CAP theorem. Explain each of the three terms in CAP theorem. What is eventual consistency?	10
	b	What is impedance mismatch? Explain how impedance mismatch is overcome with Aggregate orientation. Give an example of Aggregate using a MongoDB document for article and comments published in a blog. A blog article has an author and readers comment on blog article as well as on other comments.	6
	c	What is schema-less? Explain how each of the four category of the NoSQL database is schema-less.	4

4.	a	CQL is like SQL and CQL is not like SQL. Explain with examples.	6
	b	"Neo4J uses a **Labeled Property Graph** Model." Explain. Write SQL statements for the following CYPHER queries: Make suitable assumptions and state them. MATCH (e) – [w: WorksOn] → (p: PROJECT {Pno: 2}) RETURN p.Pname, e.Ename, w.Hours MATCH (d : DEPARTMENT {Dno: '5'}) – [: LocatedIn] → (loc) RETURN d.Dname, loc.Lname	6
	c	Give typical use cases for the four categories of NoSQL databases.	8

5.	a	What is the motivation for considering main memory databases? What percent of time is spent on useful work by a typical RDBMS? Name the four sources of overhead that consume the remaining time.	6
	b	Name and explain the characteristics of Big Data. Explain the components of Hadoop v2 with a diagram.	8
	c	What is spatial data? explain types of spatial data, their representation and what are some types of queries on spatial data.	6

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