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221TCS001022301

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

First Semester M.Tech Degree Examination December 2022 (2022 Scheme)

COMPUTER SCIENCE AND ENGINEERING

221TCS001 ADVANCED DATABASE MANAGEMENT

Max. Marks: 60 Duration: 2.5 Hours

PART A

Answer all questions. Each question carries 5 marks Marks

1 The queries given below are for finding out the count of books under categories excluding the "Novel" category. Estimate which one of the two queries A or B will give better performance and explain why. (5)

Query A:

```
SELECT Category, COUNT(*)
FROM BOOK
WHERE Category != 'Novel';
GROUP BY Category;
```

Query B:

```
SELECT Category, COUNT(*)
FROM BOOK
GROUP BY Category
HAVING Category != 'Novel';
```

2 Explain with examples, any two SQL injection techniques. (5)

3 List out the different architectural models for parallel database systems. Explain any two with the help of neat diagrams. (5)

4 a) Consider the EMPLOYEE Relation shown below: (5)

E.No	Gender	DName	EName	Grade
522	M	Sales	Mathew	A
524	F	CustomerCare	Claire	B

525	F	Sales	Juliet	B
527	M	Production	Albert	C
530	M	Production	Edison	A
533	F	Sales	Elizabeth	A
535	F	Production	Marie	A
537	M	CustomerCare	Einstein	B

Explain bitmap indexing and how it can be used to answer the following query:

"Find the ENames, who are working in 'Production' department and having A grade."

(Show how the query is answered using bitmap operations and the obtained result)

5 Point out using an example, the factors which must be satisfied to create a well formed XML document. (5)

PART B

Answer any 5 questions. Each question carries 7 marks

6 Illustrate with the help of a diagram, the different steps used internally by a DBMS for processing a high-level query. (7)

7 Differentiate between DAC and MAC. Describe a scenario in which mandatory access control prevents a breach of security that cannot be prevented through discretionary access control. (7)

8 Consider a parallel system with shared nothing architecture. Assume that there are three processors P0, P1 and P2 with associated disks D0, D1 and D2. Assume that the records with the following keys are partitioned among the disks such that record with key, k goes to disk Di if k mod 3 = i: (7)

26, 16, 27, 15, 30, 18, 14, 25, 10, 9, 8, 24,5

Assume parallel external sort merge is used to sort the records. Depict what will be the contents of the disk before sorting. Assume that the same partition vector [11, 20] is used in the merge phase. Show snapshots of data distribution after the various steps of parallel external sort merge.

9 Discuss the semi-join strategy for executing an equijoin of two relations BOOK and PUBLISHER located at different sites S1, S2 respectively. How is it advantageous over simple join processing? (7)

10 Explain 2 Phase Commit protocol in a distributed environment. Describe the actions taken when a coordinator restarts after a failure. (7)

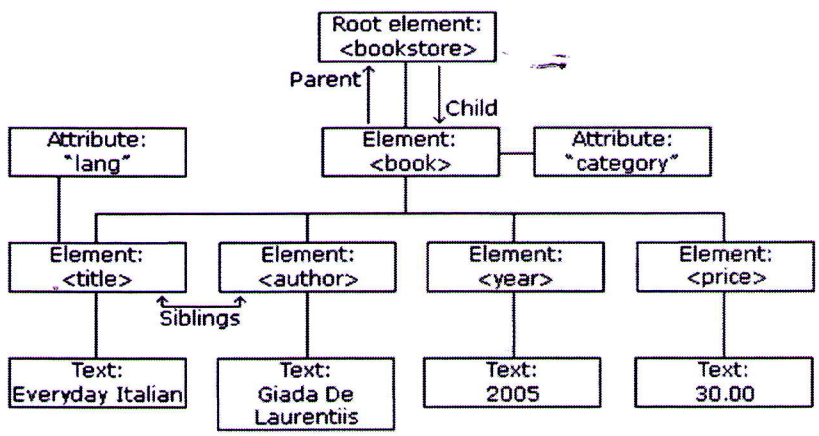
11 Consider the XML document- Recipes.xml given below and answer the questions that follow. (7)

```
<?xml version="1.0" encoding="UTF-8"?>
<recipes>
 <recipe>
   <title> French Toast</title>
   <ingredient>
      <name qty="2nos">eggs </name>
      <name qty="4slice">bread</name>
      <name qty="1tbsp">milk</name>
      <name qty="2tbsp">sugar</name>
      <name qty="1tbsp">butter</name>
   </ingredient>
   <preparation>
       <step> Beat the eggs till frothy and add sugar and milk to this </step>
       <step> Dip the bread slices in the milk-egg mixture </step>
      <step> Melt butter in a frying pan and add the bread slices</step>
      <step> Toast both sides of each bread slice, till golden brown </step>
   </preparation>
   <comment> Serve Hot</comment>
</recipe>
</recipes>
```

Write XPATH expressions for the below queries:

i. All ingredients whose quantity is required as 2 nos.
ii. All ingredients required for French Toast recipe
iii. The title of all recipes in the document
iv. The last step in preparing French Toast

12 Construct the equivalent XML document of the XML Tree structure shown below. (7)



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