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**VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**  
**B.E. (IT: CBCS) IV-Semester Main & Backlog Examinations, May-2019**

**Database Management Systems**

Time: 3 hours

Max. Marks: 60

*Note: Answer ALL questions in Part-A and any FIVE from Part-B*

| Q.No.   | Stem of the question  | M | L | CO | PO |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
|---|---|---|---|----|----|---|---|---|---|----|---|---|----|---|---|----|---|---|----|---|---|---|---|---|-----|---|---|-----|---|
| <b>Part-A (10 × 2 = 20 Marks)</b>   |   |   |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 1.  | Explain data isolation problems of a file management system?                                      | 2 | 2 | 1  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 2.  | Compare and Contrast Network and Hierarchical model.  | 2 | 2 | 1  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 3.  | Identify the entities, types of attributes and appropriate keys from the given ER-Model:          | 2 | 3 | 1  | 2  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| <pre> graph TD     Scientist[Scientist] --- Invents{Invents}     Invention[Invention] --- Invents     Scientist --- Sid((Sid))     Scientist --- Rarea((Rarea))     Scientist --- Sname((Sname))     Scientist --- Country((Country))     Invention --- IID((IID))     Invention --- Name((Name))     Invention --- Year((Year))     Invents --- Fname((Fname))     Invents --- Lname((Lname)) </pre>   |   |   |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 4.  | What is full outer join? perform the full outer join for the given relation below :               | 2 | 3 | 2  | 2  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>A</td><td>B</td><td>C</td></tr> <tr><td>1</td><td>Xq</td><td>Z</td></tr> <tr><td>1</td><td>Xy</td><td>Z</td></tr> <tr><td>2</td><td>Rs</td><td>P</td></tr> <tr><td>2</td><td>Ry</td><td>P</td></tr> </table> <table border="1" style="display: inline-table;"> <tr><td>P</td><td>Q</td><td>C</td></tr> <tr><td>1</td><td>ram</td><td>Z</td></tr> <tr><td>2</td><td>raj</td><td>P</td></tr> </table> |   |   |   |    |    | A | B | C | 1 | Xq | Z | 1 | Xy | Z | 2 | Rs | P | 2 | Ry | P | P | Q | C | 1 | ram | Z | 2 | raj | P |
| A   | B   | C |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 1   | Xq  | Z |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 1   | Xy  | Z |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 2   | Rs  | P |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 2   | Ry  | P |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| P   | Q   | C |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 1   | ram   | Z |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 2   | raj   | P |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 5.  | Define pattern matching in SQL? Discuss with an example.  | 2 | 2 | 3  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 6.  | Briefly explain what is an active database?   | 2 | 1 | 3  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 7.  | Differentiate between lossless join and lossy join decompositions.                                | 2 | 2 | 4  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 8.  | Outline the insertion and deletion anomalies of database system with a suitable example for each? | 2 | 1 | 4  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 9.  | What is an isolation? How it can be achieved?   | 2 | 2 | 5  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 10.   | Explain wait-die scheme for deadlock prevention mechanism?  | 2 | 4 | 5  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| <b>Part-B (5 × 8 = 40 Marks)</b>  |   |   |   |    |    |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| 11. a)  | With a neat illustration explain database system architecture.                                    | 6 | 1 | 1  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |
| b)  | Differentiate between composite and multivalued attributes.                                       | 2 | 2 | 1  | 1  |   |   |   |   |    |   |   |    |   |   |    |   |   |    |   |   |   |   |   |     |   |   |     |   |

| <p>12. a) Consider the relations: Employee (Person name, street, and city), Works (Person name, company name, and salary), Company (Company name city), Manages (person name, manager name). Give an expression in relational algebra for the following queries</p> <p>i) Give all managers in this database a 10 percent salary raise.</p> <p>ii) Give all managers in this database a 10 percent salary raise, unless the salary would be greater than \$100,000. In such cases, give only a 3 percent raise.</p> <p>iii) Delete all tuples in the <i>works</i> relation for employees of Small Bank Corporation.</p>  | 6        | 3  | 2       | 2 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
|--|----------|----|---------|---|----------|--|---------|---------|----------|----------|--|---------|--|----------|---|---|---|---|
| <p>b) Explain what is an attribute inheritance? Give an example.</p>   | 2        | 2  | 2       | 1 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>13. a) What is dynamic SQL? Give an example.</p>  | 4        | 1  | 3       | 1 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>b) What is a stored procedure? Write a program to find factorial of a given number?</p>   | 4        | 3  | 3       | 2 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>14. a) Write the procedure for closure of attribute set and find the candidate keys for the given FD's: <math>R(A,B,C,D,E)</math>, <math>F=\{ AB \rightarrow C, AB \rightarrow D, D \rightarrow A, BC \rightarrow D, BC \rightarrow E \}</math>.</p>  | 5        | 3  | 4       | 2 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>b) Differentiate between 3NF and BCNF.</p>  | 3        | 2  | 4       | 1 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>15. a) What is a precedence graph? How is it used to test the serializability, discuss it for the given schedule with following transactions:</p>   | 4        | 3  | 5       | 1 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="border-right: 1px solid black; padding: 5px;">T0</th> <th style="padding: 5px;">T1</th> </tr> </thead> <tbody> <tr> <td style="border-right: 1px solid black; padding: 5px;">read(A)</td> <td style="padding: 5px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">write(A)</td> <td style="padding: 5px;"></td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">read(B)</td> <td style="padding: 5px;">read(A)</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">write(B)</td> <td style="padding: 5px;">write(A)</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px;">read(B)</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;"></td> <td style="padding: 5px;">write(B)</td> </tr> </tbody> </table> | T0       | T1 | read(A) |   | write(A) |  | read(B) | read(A) | write(B) | write(A) |  | read(B) |  | write(B) | 4 | 2 | 5 | 1 |
| T0   | T1       |    |         |   |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| read(A)  |          |    |         |   |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| write(A)   |          |    |         |   |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| read(B)  | read(A)  |    |         |   |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| write(B)   | write(A) |    |         |   |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
|  | read(B)  |    |         |   |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
|  | write(B) |    |         |   |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>b) Explain two phase locking protocol, strict 2PL with the help of an example for each.</p>   | 4        | 2  | 1       | 1 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>16. a) Describe different types of database users and interfaces.</p>   | 4        | 3  | 2       | 2 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>b) Consider the following relational schema:<br/>                 Person(<u>PID</u>, Pname, Address)<br/>                 Car(<u>Reg_no</u>, Year, Model)<br/>                 Accident(<u>Date</u>, <u>Driver</u>, car_Reg_no)<br/>                 Owns(<u>PID</u>, License)<br/>                 Implement any two Extended ER- features and draw the ER Diagrams for the same.</p>  | 17.      | 4  | 1       | 3 | 1        |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>Answer any <i>two</i> of the following:</p>   | 4        | 2  | 4       | 1 |          |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>a) What is a cursor? Write a program to find the details of the employee where empid is given as parameter using explicit cursor.</p>   | 17.      | 4  | 2       | 4 | 1        |  |         |         |          |          |  |         |  |          |   |   |   |   |
| <p>b) Explain Armstrong axioms with an example.</p>  |          |    |         |   |          |  |         |         |          |          |  |         |  |          |   |   |   |   |



|   |  |   |   |   |   |
|---|--|---|---|---|---|
| c) Explain the conditions for two schedules to be view equivalent and check whether the given transactions are view equivalent. |  | 4 | 2 | 5 | 2 |
| <p>T0</p> <hr/> <p>read(A)<br/>A:=A-50;<br/>write(A)</p><br><p>read(B)<br/>B:=B+50;<br/>write(B)</p>                            | <p>T1</p> <hr/> <p>read(B)<br/>B:=B-10;<br/>write(A)</p><br><p>read(B)<br/>A:=A-50;<br/>write(B)</p> |   |   |   |   |

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

| S. No. | Criteria for questions   | Percentage |
|--------|--|------------|
| 1      | Fundamental knowledge (Level-1 & 2)  | 68         |
| 2      | Knowledge on application and analysis (Level-3 & 4)                              | 32         |
| 3      | *Critical thinking and ability to design (Level-5 & 6)<br>(*wherever applicable) | Nil        |

