**Coimbatore Institute of Technology, Coimbatore-14**

**Department of Computer Science and Engineering**

**Course : B.E CSE AY: December 2019 –May 2020**

**Sem : IV Total Marks: 50**

**Date :10th, February, 2020 Duration: 2 Hours**

**15CI07 –DATABASE MANAGEMENT SYSTEMS**

**Mid Semester Test – I**

Course Instructor: A.Punidha

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| **COURSE OUTCOMES** | |
| CO1 | Knowledge in basic concepts and the architecture of database management systems, data models, relational database theory and the features of SQL queries. |
| CO2 | Master the sound design principles of logical design by using ER modeling and normalization concepts. |

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| **ANSWER ALL QUESTIONS(20 Marks)** | | | | |
| **PART A** | | **BT** | **CO** | **MARKS** |
|  | **Which of the following queries cannot be expressed using the basic relational algebra operations (U, -, x, π, σ, p)? (GATE CS 2000)**  (a) Department address of every employee (b) Employees whose name is the same as their department name (c) The sum of all employees’ salaries **(d) All employees of a given department** | AN | CO1 | 1 |
|  | Given the basic ER and relational models, which of the following is INCORRECT?(GATE CS 2012)  **(a)** An attribute of an entity can have more than one value **(b)** An attribute of an entity can be composite **(c)** In a row of a relational table, an attribute can have more than one value **(d) In a row of a relational table, an attribute can have exactly one value or a NULL value** | AN | CO1 | 1 |
|  | Consider the following schema: [(ISRO-DEC2017](https://gateoverflow.in/182063/isro-dec2017-13)) Sailors(sid,sname,rating,age)Sailors(sid,sname,rating,age) Boats(bid,bname,colour)Boats(bid,bname,colour) Reserves(sid,bid,day)Reserves(sid,bid,day)  Two boats can have the same name but the colour differentiates them.  The two relations  1.PNGIf // is division operation, the above set of relations represents the query   1. **Names of sailors who have reserved all boats called Ganga.** 2. Names of sailors who have not reserved any Ganga boat. 3. Names of sailors who have reserved at least one Ganga boat. 4. Names of sailors who have reserved at most one Ganga boat. | AN | CO1 | 2 |
|  | Consider the following relational schema:  Suppliers(sid:integer, sname:string, city:string, street:string)  Parts(pid:integer, pname:string, color:string)  Catalog(sid:integer, pid:integer, cost:real)  Consider the following relational query on the above database:  [GATE-CS-2009](https://www.geeksforgeeks.org/gate-quiz-gq/gate-cs-2009-gq/)  SELECT S.sname  FROM Suppliers S  WHERE S.sid NOT IN (SELECT C.sid  FROM Catalog C  WHERE C.pid NOT IN (SELECT P.pid  FROM Parts P  WHERE P.color<> 'blue'))  Assume that relations corresponding to the above schema are not empty. Which one of the following is the correct interpretation of the above query? (A) Find the names of all suppliers who have supplied a non-blue part. (B) Find the names of all suppliers who have not supplied a non-blue part. (C) Find the names of all suppliers who have supplied only blue parts. (D) Find the names of all suppliers who have not supplied only blue parts. | AN | CO1 | 2 |
|  | Consider the table employee(empId, name, department, salary) and the two queries Q1 ,Q2 below. Assuming that department 5 has more than one employee, and we want to find the employees who get higher salary than anyone in the department 5, which one of the statements is TRUE for any arbitrary employee table? GATE-CS-2007  Q1 : Select e.empId  From employee e  Where not exists  (Select \* From employee s where s.department = “5” and  s.salary >=e.salary)  Q2 : Select e.empId  From employee e  Where e.salary > Any  (Select distinct salary From employee s Where s.department = “5”)  **(A) Q1 is the correct query** **(B)** Q2 is the correct query **(C)** Both Q1 and Q2 produce the same answer. **(D)** Neither Q1 nor Q2 is the correct query | AN | CO1 | 2 |
|  | Select operation in SQL is equivalent to (**GATE-CS-2015)** **(A)** the selection operation in relational algebra **(B)** the selection operation in relational algebra, except that select in SQL retains duplicates **(C)** the projection operation in relational algebra **(D) the projection operation in relational algebra, except that select in SQL retains duplicates** | AN | CO1 | 1 |
|  | Which of the following is/are correct? **(GATE CS 1999)  (A)** An SQL query automatically eliminates the duplicates **(B)** An SQL query will not work if there are no indexes on the relations **(C)** SQL permits attribute names to be repeated in the same relation **(D) None of the above** | AN | CO1 | 1 |
|  | Which of the following is/are true with reference to ‘view’ in DBMS ? (a) A ‘view’ is a special stored procedure executed when certain event occurs. (b) A ‘view’ is a virtual table, which occurs after executing a pre-compiled query. code: **(A)** Only (a) is true **(B) Only (b) is true** **(C)** Both (a) and (b) are true **(D)** Neither (a) nor (b) are true | U | CO1 | 1 |
|  | An Assertion is a predicate expressing a condition we wish database to always satisfy. The correct syntax for Assertion is : **(UGC NET CS 2015) (A)CREATE ASSERTION ‘ASSERTION Name’ CHECK ‘Predicate’** **(B)**CREATE ASSERTION ‘ASSERTION Name’ **(C)**CREATE ASSERTION, CHECK Predicate **(D)** SELECT ASSERTION | U | CO1 | 1 |
|  | List the types of Database users. [Database](https://www.thestudygenius.com/what-is-database/) Administrator (DBA)Database Designers:System Analyst:Application ProgrammersNaïve Users / Parametric UsersSophisticated Users | KN | CO1 | 2 |
|  | List the types of Big Data. StructuredUnstructuredSemi-structured | KN | CO1 | 2 |
|  | Differentiate two tier and three tier architecture. | KN | CO1 | 2 |
|  | Explain composite and multivalued attributes.   * A multivalued attribute may have one or more values for a particular entity. For example, Location as the attribute of an entity called ENTERPRISE is multivalued, because each enterprise can have one or more locations. * Composite attributes are not atomic because they are assembled using some other atomic attributes. A typical example of a composite attribute is a person’s address, which is composed of atomic attributes, such as City, Zip, and Street. | KN | CO2 | 2 |

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| **PART B (10 X 3 Marks = 30 Marks)** | | | **BT** | **CO** | **MARKS** |
| **11.** | i) | In an inventory management system implemented at a trading corporation, there are several tables designed to hold all the information. Amongst these, the following two tables hold information on which items are supplied by which suppliers, and which warehouse keeps which items along with the stock-level of these items. Gate IT 2005  Supply = (supplierid, itemcode) Inventory = (itemcode, warehouse, stocklevel)  For a specific information required by the management, following SQL query has been written  Write a query For the warehouse at Nagpur, find all suppliers who supply two or more items  **Answer:**  Select distinct STMP.supplierid  From Supply as STMP  Where not unique (Select ITMP.supplierid  From Inventory, Supply as ITMP  Where STMP.supplierid = ITMP.supplierid  And ITMP.itemcode = Inventory.itemcode  And Inventory.warehouse = 'Nagpur'); | AP | CO1 | 5 |
| ii) | With neat sketch explain the database architecture. | U | CO1 | 5 |
| **(OR)** | | | | | |
| **12.** | i) | Consider the relational schema given below, where eId of the relation dependent is a foreign key referring to empId of the relation employee. Assume that every employee has at least one associated dependent in the dependent relation. (GATE-CS-2014) employee (empId, empName, empAge)  dependent(depId, eId, depName, depAge)  Write the relational algebra query which evaluates to the set of empIds of employees whose age is greater than that of all of his/her dependents.  1.PNG | AP | CO1 | 5 |
| ii) | Discuss SQL DDL,DML and TCL Commands with example.   | **Language** | **Command List** | | --- | --- | | DDL | * CREATE * DROP * ALTER * RENAME * TRUNCATE | | DML | * SELECT * INSERT * UPDATE * DELETE | | DCL | * GRANT * REVOKE | | TCL | * START TRANSACTION * COMMIT * ROLLBACK | | U | CO1 | 5 |
| **13.** | i) | Differentiate binary and ternary relationship with example. | U | CO1 | 2 |
| ii) | Assume we have the following application that models soccer teams, the games they play, and the players in each team. In the design, we want to capture the following:  • We have a set of teams, each team has an ID (unique identifier), name, main stadium, and to which city this team belongs.  • Each team has many players, and each player belongs to one team. Each player has a number (unique identifier), name, DoB, start year, and shirt number that he uses  . • Teams play matches, in each match there is a host team and a guest team. The match takes place in the stadium of the host team.  • For each match we need to keep track of the following: o The date on which the game is played o The final result of the match o The players participated in the match. For each player, how many goals he scored, whether or not he took yellow card, and whether or not he took red card. o During the match, one player may substitute another player. We want to capture this substitution and the time at which it took place.  • Each match has exactly three referees. For each referee we have an ID (unique identifier), name, DoB, years of experience. One referee is the main referee and the other two are assistant referee.  **Design an ER diagram to capture the above requirements. State any assumptions you have that affects your design. Make sure cardinalities and primary keys are clear.**  **1.PNG** | AP | CO2 | 8 |
| **(OR)** | | | | | |
| **14.** | i) | A university registrar’s office maintains data about the following entities: (a) courses, including number, title, credits, syllabus, and prerequisites; (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom; (c) students, including student-id, name, and program; and (d) instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.  **Construct an E-R diagram forthe registrar’s office. Document all assumptions that you make about the mapping constraints.**  **2.PNG** | AP | CO2 | 8 |
| ii) | 1. Explain the need for aggregation in ER Diagram. | U | CO2 | 2 |
| **15.** | i) | What are the naming conventions in ER Schema Design? | KN | CO2 | 5 |
| ii) | Differentiate Binary and ternary relationship with example. | KN | CO2 | 5 |
| **(OR)** | | | | | |
| **16.** | i) | Explain the join operation with suitable example. | AP | CO2 | 3 |
| ii) | Explain the operations on relational algebra with example. | AP | CO2 | 7 |

**Note: BT – Bloom’s Taxonomy**

U – UnderstandingAN – Analysis AP – Application