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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Second Semester, Master of Computer Applications (MCA)

Make – up Examination; Jan/Feb - 2016

Database Management Systems

Time: 3 hrs *Max. Marks: 100*

Note**: Answer **FIVE** full questions, selecting **ONE** full question from each **unit.

UNIT - I

1. a. Distinguish between file system and Database Management system. 6

   b. Enlist the different functions of DBMS. 6

   c. With a neat diagram, describe a physical centralized Architecture of DBMS. 8

2 a. State the different advantages of DBMS. 6

   b. Discuss the different types of Data Models. 10

   c. Briefly explain about DBMS utilities. 4

UNIT - II

3 a. Design an ER diagram for keeping track of information about a hospital database taking into account at least four entities. 10

   b. Discuss the different types of keys used to maintain data integrity. 10

4 a. What is meant by Recursive relationship? Bring out the importance of role names in recursive relationship with an example. 8

   b. Define Ternary relationship. Give an example. 6

   c. What is a weak entity type? Explain the role of partial keys in design of weak entity type. 6

UNIT - III

5 a. Consider the following relationships and relation containing airline flight information.

Flights (Flno, From, to, distance, departs, arrives)

Aircraft (AirId, airname, cruisingrange)

Certified (empId, AirId)

Employees(EmpId, ename, Salary)

Write the following queries in relational algebra. 10

i) Find the empIds of pilots certified by some Boeing aircraft.

ii) Find the names of pilots certified for some Boeing aircraft.

iii) Find the airIds of all aircrafts that can be used on non-stop flights from Bonn to Madras.

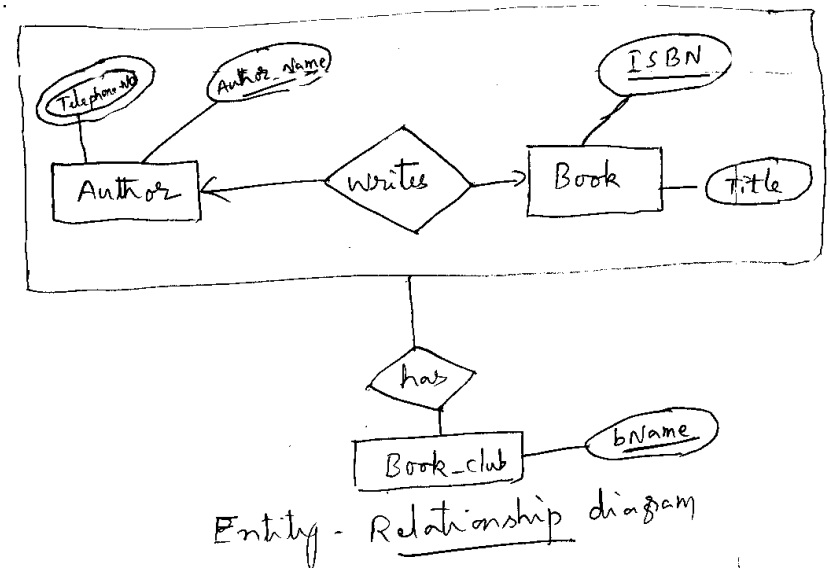
iv) Identify the flights that can be piloted by every pilot whose salary is more $100,000

v) Find the names of pilots who can operate planes with range greater than 3,000 miles but are not certified on any Boeing aircraft.

Contd…2

b. Give the ER to relational mapping algorithm. Discuss each step, with an example. 10

6. a. Consider the following ER diagram. Map the diagram to tables. Specify the table names and their attributes.



Entity - Relationship diagram

10

b. Set R(A,B,C) and S(B,C,D) be the relations.

R	A	B	C
	a	c	c
	a	e	c
	b	d	d

S	B	C	D
	c	c	a
	d	c	a
	e	d	b

10

Compute the following for the relations above:

i) $R \div \Pi_c(S)$ (ii) $\Pi_{R:B,\ S:C}(\sigma_{A=D}(R \times S))$ (iii) $R \cup S$

UNIT - IV

7 a. Consider the following relationships with underlined primary keys:

Product (P_ code, Description, stocking_date, Qtyonhand, minqty, price, Discount V_ code)

Vendor (V_code, Name, address, phone)

Here a vendor can supply more than one product but a product is supplied by only one vendor.

Write the SQL queries for the following: 10

i) List the names of all the vendors who supply more than one product.

ii) List the details of the product whose prices exceed the average product price.

iii) List the name, address and phone of the vendors who are currently not supplying the product.

b. List the different Aggregate function used in SQL 5

c. Write the syntax of the following commands: 5

i) SELECT ii) DELETE

Contd…3

8 a. Consider the following relationships with primary keys underlined:

Sales person (Sales_No., Sales_Name, Designation)

Area (Ar_No., Ar_name, Manager_No)

Product (Pr_No. Ar_name, Cost)

SAP (Sales_No, Ar_No, Pr_No) 10

i) Define the schema in SQL specify the attributes and keys, assuming that Manager_No. is a foreign key. Specify the constraints that the cost of a product cannot be grater than Rs. 10,000

ii) Insert at least record to all the tables:

b. Given the relations staff (StaffNo, Position, Salary) and Property (number, rent, staffNo given below:

Staff

Staff No.	Position	Salary
SL21	Manager	50000.00
SL37	Assistant	15000.00
SG14	Supervisor	25000.00
SG5	Manager	45000.00

Property

Number	Rent	Staff No.
PA14	5000.00	SL21
PG4	6000.00	SG5
PL94	10000.00	SL21

10

Give the result table for the following SQL Queries:

i) Select Staff No.
from staff
Where salary> (Select avg (salary) from staff)

ii) Select Staff No.
from property
Groupby Staff No.
Having Count (*) >1

iii) Insert into Staff
Values ('SG33', 'Assistant')

Contd…4

UNIT - V

9 a. Suppose we are given the relation R with attributes A, B, C, D, E, F and the FD's

A→BC

B→E

CD→EF

Prove that functional dependency AD →F also holds in R. 6

b. Discuss the problem of spurious tuples and how we may prevent it. 8

c. Explain briefly ACID properties. 6

10 a. Explain the following :

i) Recoverable schedule

ii) Cascadeless schedule 8

b. Let R = (A, B, C, D) and F be the set of FD's for R given by $\{A \to B, A \to C, BC \to D\}$.

Prove that A→D 6

c. Discuss the different data anomalies that are likely to occur as a result of data redundancy. 6

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