

1. RDBMS & SQL Assignment

- (i) What do you understand by Union & Cartesian Product operations in relational algebra? **(CBSE 2011)**
- (ii) Give a suitable example of a table with sample data and illustrate Primary and Candidate keys in it. **(CBSE 2012)**
- (iii) What is the difference between degree and cardinality of a table? What is the degree and cardinality of the following table: **(CBSE 2013)**

ENo	Name	Salary
101	John Fedrick	45000
103	Raya Mazumdar	50600

- (iv) Explain the concept of Union between two tables, with the help of an appropriate example. **(CBSE 2014)**
- (v) Give a suitable example of a table with sample data and illustrate Primary and Alternate keys in it.
- (vi) Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key. **(CBSE-Delhi 2015)**

Id	Product	Qty	Price	Transaction Date
101	Plastic Folder 12"	100	3400	2014-12-14
104	Pen Stand Standard	200	4500	2015-01-31
105	Stapler Medium	250	1200	2015-02-28
109	Punching Machine Big	200	1400	2015-03-12
103	Stapler Mini	100	1500	2015-02-02

- (vii) Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key. **(CBSE-Outside Delhi 2015)**

Code	Item	Qty	Price	Transaction Date
1001	Plastic Folder 14"	100	3400	2014-12-14
1004	Pen Stand Standard	200	4500	2015-01-31
1005	Stapler Mini	250	1200	2015-02-28
1009	Punching Machine Small	200	1400	2015-03-12
1003	Stapler Big	100	1500	2015-02-02

- (vii) Consider the following tables CABHUB and CUSTOMER and answer (a) and (b) parts of this question:

(CBSE 2012)

CABHUB

Vcode	VehicleName	Make	Color	Capacity	Charges
100	Innova	Toyota	WHITE	7	15
102	SX4	Suzuki	BLUE	4	14
104	C Class	Mercedes	RED	4	35
105	A-Star	Suzuki	WHITE	3	14
108	Indigo	Tata	SILVER	3	12

CUSTOMER

CCode	CName	VCode
1	Hemant Sahu	101
2	Raj Lal	108
3	Feroza Shah	105
4	Ketan Dhal	104

(a) Write SQL commands for the following statements:

- 1) To display the names of all white colored vehicles
- 2) To display name of vehicle, make and capacity of vehicles in ascending order of their sitting capacity
- 3) To display the highest charges at which a vehicle can be hired from CABHUB.
- 4) To display the customer name and the corresponding name of the vehicle hired by them.

(b) Give the output of the following SQL queries:

- 1) SELECT COUNT(DISTINCT Make) FROM CABHUB;
- 2) SELECT MAX(Charges), MIN(Charges) FROM CABHUB;
- 3) SELECT COUNT(*), Make FROM CABHUB;
- 4) SELECT VehicleName FROM CABHUB WHERE Capacity = 4;

(viii) Write SQL queries for (a) to (f) and write the outputs for the SQL queries mentioned shown in (g1) to (g4) parts on the basis of tables ITEMS and TRADERS: (CBSE 2013)

ITEMS

CODE	INAME	QTY	PRICE	COMPANY	TCODE
1001	DIGITAL PAD 12i	120	11000	XENITA	T01
1006	LED SCREEN 40	70	38000	SANTORA	T02
1004	CAR GPS SYSTEM	50	21500	GEOKNOW	T01
1003	DIGITAL CAMERA 12X	160	8000	DIGICLICK	T02
1005	PEN DRIVE 32GB	600	1200	STOREHOME	T03

TRADERS

TCode	TName	CITY
T01	ELECTRONIC SALES	MUMBAI
T03	BUSY STORE CORP	DELHI
T02	DISP HOUSE INC	CHENNAI

- a) To display the details of all the items in the ascending order of item names (i.e. INAME).
- b) To display item name and price of all those items, whose price is in range of 10000 and 22000 (both values inclusive).
- c) To display the number of items, which are traded by each trader. The expected output of this query should be:

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T01    2
T02    2
T03    1
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- d) To display the price, item name and quantity (i.e. qty) of those items which have quantity more than 150.
- e) To display the names of those traders, who are either from DELHI or from MUMBAI.
- f) To display the names of the companies and the names of the items in descending order of company names.

- g1) SELECT MAX(PRICE), MIN(PRICE) FROM ITEMS;
- g2) SELECT PRICE*QTY AMOUNT FROM ITEMS WHERE CODE=1004;
- g3) SELECT DISTINCT TCODE FROM ITEMS;
- g4) SELECT INAME, TNAME FROM ITEMS I, TRADERS T WHERE I.TCODE=T.TCODE AND QTY<100;

- (i) **Union (Binary operator):** It operates on two relations and is indicated by U. For example, $R=R_1 \cup R_2$ represents union operation between two relations R_1 and r_2 . The degree of R is equal to the degree of R_1 (or R_2).

Following have to be considered for operation $R_1 \cup R_2$.

- Degree of R_1 = degree of R_2
- The corresponding attributes of R_1 and R_2 must have common domains.

Example:

Relation: R1		Relation: R2		Relation: $R_1 \cup R_2$	
Student_ID	Name	Student_ID	Name	Student_ID	Name
S001	Adil	S101	Mukta	S001	Adil
S002	Shabana	S102	Naveen	S002	Shabana
				S101	Mukta
				S102	Naveen

Cartesian product (Binary Operator): It operates on two relations and is denoted by X. Let Cartesian product of two tables R_1 and R_2 is $R (R=R_1 \times R_2)$. The degree of R is equal to the sum of the degrees of R_1 and R_2 and cardinality of R is the product of the cardinalities of R_1 and R_2 . Example:

Relation: R1		Relation: R2		Relation: $R_1 \times R_2$			
Student_ID	Name	Teacher_ID	TName	Student_ID	Name	Teacher_ID	TName
S001	Adil	T101	Mukta	S001	Adil	T101	Mukta
S002	Shabana	T102	Naveen	S002	Shabana	T101	Mukta
				S001	Adil	T102	Naveen
				S002	Shabana	T102	Naveen

- (ii) A table may have one or more such attributes or groups of attributes that identify each row uniquely. All such attribute(s) or group(s) are known as Candidate keys. Out of the candidate keys, one is selected as primary key. A table may have multiple Candidate keys but it cannot have more than one Primary key. Example:

Relation: Stock

Ino	Item	Qty	Price
I01	Pen	560	2
I02	Pencil	600	1
I03	CD	200	2

In this relation Ino and Item are Candidate keys. Any one of these can be designated as the Primary key.

- (iii) Degree of a table is the number of columns (attributes) in it, whereas Cardinality is the number of rows (tuples) in it. Degree of the given table is 3 and its Cardinality is 2.

- (iv) **Part (i) above**

- (v) A table may have one or more such attributes or groups of attributes that identify each row uniquely. All such attribute(s) or group(s) are known as Candidate keys. Out of all the candidate keys, one is selected as primary key and the remaining candidate keys (which are not selected as Primary key) are known alternate keys. Example:

Relation: Stock

Ino	Item	Qty	Price
I01	Pen	560	2
I02	Pencil	600	1
I03	CD	200	2

In this relation Ino and Item are Candidate keys. If Ino is selected as the primary key, then Item will be the alternate key, and vice-versa.

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(vi) Candidate keys : Id, Product
Primary keys : Id

(vii) Candidate keys : Code, Item
Primary keys : Code

(a)

- 1) SELECT VehicleName FROM CARHUB WHERE Color = 'WHITE';
- 2) SELECT VehicleName, Make, Capacity FROM CARHUB ORDER BY CAPACITY;
- 3) SELECT MAX(Charges) FROM CARHUB;
- 4) SELECT CName, VehicleName, FROM CUSTOMER, CARHUB
WHERE CUSTOMER.Vcode = CARHUB.Vcode;

(b)

1)

COUNT(DISTINCT Make)
4

2)

MAX(Charges)	MIN(Charges)
35	12

3)

COUNT (*)
5

4)

VehicleName
SX4
C Class

(viii)

- a) SELECT * FROM ITEMS ORDER BY INAME;
- b) SELECT INAME, PRICE FROM ITEMS WHERE PRICE BETWEEN 10000 AND 22000;
- c) SELECT TCODE, COUNT(*) FROM ITEMS GROUP BY TCODE;
- d) SELECT PRICE, INAME, QTY FROM ITEMS WHERE QTY > 150;
- e) SELECT INAME FROM TRADERS WHERE CITY IN ('DELHI', 'MUMBAI');
- f) SELECT COMPANY, INAME FROM ITEMS ORDER BY COMPANY DESC;

g1)

MAX(PRICE)	MIN(PRICE)
38000	1200

g2)

AMOUNT
1075000

g3)

DISTINCT TCODE
T01
T02
T03

g4)

INAME	TNAME
LED SCREEN 40	DISP HOUSE INC
CAR GPS SYSTEM	ELECTRONIC SALES