DBMS ASSIGNMENT

1. Database Design with Constraints

Database: Bank Management System (BankDB) Tables included: 1. Customer 2. Account 3. Transaction

Customer Table

```
CREATE TABLE Customer (
CustomerID INT PRIMARY KEY,
Name VARCHAR(50) NOT NULL,
Phone VARCHAR(15),
City VARCHAR(30)
);
```

Account Table

```
CREATE TABLE Account (
AccountNo INT PRIMARY KEY,
CustomerID INT,
AccountType VARCHAR(20) NOT NULL,
Balance DECIMAL(10,2) DEFAULT 0,
FOREIGN KEY (CustomerID) REFERENCES Customer(CustomerID)
);
```

Transaction Table

```
CREATE TABLE Transaction (
TransID INT PRIMARY KEY,
AccountNo INT,
Amount DECIMAL(10,2) NOT NULL,
TransType VARCHAR(10) CHECK (TransType IN ('DEPOSIT','WITHDRAW')),
FOREIGN KEY (AccountNo) REFERENCES Account(AccountNo)
);
```

2. ALTER, UPDATE, DELETE Statements

```sql
ALTER TABLE Customer ADD Email VARCHAR(50);

UPDATE Account SET Balance = Balance + 500 WHERE AccountNo = 101;

DELETE FROM Customer WHERE CustomerID = 1;
```

3. SQL Joins (INNER, LEFT, RIGHT)

```sql
SELECT Customer.Name, Account.AccountNo, Account.Balance
FROM Customer
INNER JOIN Account ON Customer.CustomerID = Account.CustomerID;

SELECT Customer.Name, Account.AccountNo
FROM Customer
LEFT JOIN Account ON Customer.CustomerID = Account.CustomerID;

SELECT Customer.Name, Account.AccountNo
FROM Customer
RIGHT JOIN Account ON Customer.CustomerID = Account.CustomerID;
```

4. SQL Functions (MAX, MIN, AVG, COUNT)

```sql
SELECT MAX(Balance) FROM Account;

SELECT MIN(Balance) FROM Account;

SELECT AVG(Balance) FROM Account;

SELECT COUNT(*) FROM Customer;
```

5. Integrity Constraints Examples

```sql
INSERT INTO Customer VALUES (1,'Amit');
INSERT INTO Customer VALUES (1,'Rohit'); -- Error: Duplicate PK

INSERT INTO Account VALUES (200,99,'SAVING',1000); -- Error: Foreign Key Fail

INSERT INTO Transaction VALUES (1,101,2500,'TRANSFER'); -- Error: CHECK Fail
```

6. Creating & Using Views

```
CREATE VIEW CustomerAccountView AS
SELECT Customer.Name, Account.AccountNo, Account.Balance
FROM Customer
JOIN Account ON Customer.CustomerID = Account.CustomerID;

SELECT * FROM CustomerAccountView;
```

7. SQL Trigger Example

```
CREATE TRIGGER UpdateBalance
AFTER INSERT ON Transaction
FOR EACH ROW
BEGIN
IF NEW.TransType = 'DEPOSIT' THEN
UPDATE Account SET Balance = Balance + NEW.Amount
WHERE AccountNo = NEW.AccountNo;
ELSE
UPDATE Account SET Balance = Balance - NEW.Amount
WHERE AccountNo = NEW.AccountNo;
END IF;
END;
```

8. Referential Integrity Demonstration

```
INSERT INTO Customer VALUES (1,'Rahul','9876543210','Delhi');
INSERT INTO Account VALUES (101,1,'SAVING',1000);

UPDATE Customer SET City='Mumbai' WHERE CustomerID=1;

DELETE FROM Customer WHERE CustomerID=1; -- Error Due to Foreign Key

DELETE FROM Account WHERE CustomerID=1;
DELETE FROM Customer WHERE CustomerID=1;
```