SQL and PL/SQL

Q1. Write CREATE TABLE commands for the following table descriptions: **[15]**

CLIENT_MASTER

CLIENTNO	vc2(6)	PK & Must start with 'C'
NAME	vc2(20)	NOT NULL
ADDRESS1	vc2(30)	
ADDRESS1	vc2(30)	
CITY	vc2(15)	
PINCODE	n(8)	
STATE	vc2(15)	
BALDUE	n (10,2)	

PRODUCT_MASTER

PRODUCTNO	vc2(6)	PK & Must start with 'P'
DESCRIPTION	vc2(15)	NOT NULL
PROFITPERC	n(4,2)	NOT NULL
UNITMEASURE	vc2(10)	NOT NULL
QTYONHAND	n (8)	NOT NULL
REORDERLVL	n(8)	NOT NULL
SELLPRICE	n (8,2)	NOT NULL & can't be 0
COSTPRICE	n (8,2)	NOT NULL & can't be 0

SALESMAN_MASTER

SALESMANNO	vc2(6)	PK & Must start with 'S'
SALESMANNAME	vc2(20)	NOT NULL
ADDRESS1	vc2(30)	NOT NULL
ADDRESS2	vc2(30)	
CITY	vc2(20)	
PINCODE	n(8)	
State	vc2(20)	
SALAMT	n(8,2)	NOT NULL & Can't be 0
TGTTOGET	n(6,2)	NOT NUL
YTDSALES	n(6,2)	NOT NULL
REMARKS	vc2(60)	

SALES_ORDER

ORDERNO	vc2(6)	PK & Must start with 'O'
CLIENTNO	vc2(6)	FK to CLIENT_MASTER
ORDERDATE	date	
DELYADDR	vc2(25)	
SALESMANNO	vc2(6)	FK to SALESMAN_MASTER
DELYTYPE	char(1)	Check 'P' or 'F'
BILLEDYN	char(1)	Check 'Y' or 'N'
DELYDATE	date	
ORDERSTATUS	vc2(10)	Check 'In Process' or 'Fulfilled' or 'Backorder' or 'Cancelled'

SALES_ORDER_DETAILS

ORDERNO	vc2(6)	FK to SALES_ORDER
PRODUCTNO	vc2(6)	FK to PRODUCT_MASTER
QTYORDERED	n(8)	
QTYDISP	n(8)	
PRODUCTRATE	n(10,2)	

Create Composite PRIMARY KEY of ORDERNO and PRODUCTNO

Sample Insert Commands

```
INSERT INTO Client_Master (ClientNo, Name, City, PinCode, State, BalDue) VALUES ('C00001', 'Ivan Bayross', 'Mumbai', 400054, 'Maharashtra', 15000);
INSERT INTO Product_Master VALUES ('P00001', 'T-Shirts', 5, 'Piece', 200, 50, 350, 250);
INSERT INTO Salesman_Master VALUES ('S00001', 'Aman', 'A/14', 'Worli', 'Mumbai', 400002, 'Maharashtra', 3000, 100, 50, 'Good');
INSERT INTO Sales_Order (OrderNo, OrderDate, ClientNo, DelyType, BilledYn, SalesmanNo, DelyDate, OrderStatus)
                                    VALUES('O19001', '12-june-02', 'C00001', 'F', ' N', 'S00001', '20-july-02', 'In Process');
INSERT INTO Sales_Order_Details (OrderNo, ProductNo, QtyOrdered, QtyDisp, ProductRate) VALUES('O19001', 'P00001', 4, 4, 525);
```

Answer following queries with the help of above schema : **[10]**

1. Display the names of all the clients.
2. Display all the clients who are located in Mumbai.
3. Display all the products whose selling price is > 2000 and < 5000.
4. Display Name, City and State of Clients not in the state of Maharashtra.
5. Display all the information of client_no C0001 and C0002.
6. Change the selling price of '1.44 drive' to Rs. 1150.50.
7. Delete the record of client_no C0005.
8. Display the clients who stay in a city whose second letter is 'a'.
9. Count the number of products having price greater than or equal to 1500.
10. Display qtyordered, qtydisp and balancedqty (not in table).

Write Commands to do following **[10]**

1. Make Client_no as primary key in client_master.
2. Add a new column phone_no in the client_master table.
3. Add the not null constraint in the product_master table with the column description, profit percent, sell price and cost price.
4. Change size of name column to 60 in client_master table.
5. Remove pincode column from table.

Define in 1 or 2 lines and give one example also **[10]**

1. Recursive Relationship.
2. Composite key.
3. The 'like' operator with pattern matching.
4. Drop Table command.
5. Full Outer Join.

Write queries for following descriptions: (Joins) **[10]**

1. Find out the products, which have been sold to 'Ivan Bayross'.
2. Finding out the products and their quantities that will have to be delivered in the current month.
3. Listing the ProductNo and description of constantly sold (i.e. rapidly moving) products.
4. Finding the names of clients who have purchased 'Trousers'.
5. Listing the products and orders from customers who have ordered less than 5 units of 'Pull Overs'.

Write queries for following descriptions: (Subqueries) **[12]**

1. Finding the non-moving products i.e. products not being sold.
2. Finding the name and complete address for the customer who has placed Order number 'O19001'.
3. Finding the clients who have placed orders before the month of May'02.

Write Commands to do following **[12]**

1. Display system date as Saturday, February 11, 2012
2. Display Balance Due from Client master as $99,999.99
3. Display message as 'Salesman Aman sold goods of 50 while given target was 100.
4. Display your Age in Years

1)Creating database:

```
CREATE DATABASE ASSIGNMENT_WEEK1;
USE ASSIGNMENT_WEEK1;
```

2)Creating tables

Client

```
CREATE TABLE ClientMaster(
ClientNo VARCHAR(6) PRIMARY KEY
CHECK (ClientNo LIKE 'C%'),
Name VARCHAR(20) NOT NULL,
Address1 VARCHAR(20),
Address2 VARCHAR(20),
City VARCHAR(15),
Pincode NUMERIC(8),
State VARCHAR(15),
BalDue NUMERIC(10,2)
);
```

Product :

```
CREATE TABLE ProductMaster (
   ProductNo VARCHAR(6) PRIMARY KEY
   CHECK (ProductNo LIKE 'P%'),
   Description VARCHAR(15) NOT NULL,
   ProfitPercent NUMERIC(4,2) NOT NULL,
   UnitMeasure VARCHAR(10) NOT NULL,
   QtyOnHand INT NOT NULL,
   ReorderLvl INT NOT NULL,
   SellPrice NUMERIC(8,2) NOT NULL CHECK (SellPrice != 0),
   CostPrice NUMERIC(8,2) NOT NULL CHECK (CostPrice != 0)
);
```

Sales Man

```
CREATE TABLE SalesManMaster(
      SalesManNo VARCHAR(6) PRIMARY KEY
      CHECK (SalesManNo LIKE 'S%'),
      SalesManName VARCHAR(20) NOT NULL,
      Address1 VARCHAR(30) NOT NULL,
      Address2 VARCHAR(30),
      CITY VARCHAR(20),
      Pincode NUMERIC(8),
      State VARCHAR(20),
      SalAmt NUMERIC(8,2) NOT NULL
      CHECK (SalAmt!=0),
      TargetToGet NUMERIC(6,2) NOT NULL,
      YearTdSales NUMERIC(6,2) NOT NULL,
      Remarks VARCHAR(60)
);
```

SalesOrder

```
CREATE TABLE SalesOrder(
OrderNo VARCHAR(6) PRIMARY KEY
CHECK (OrderNo LIKE 'O%'),
ClientNo VARCHAR(6),
OrderDate DATE,
DelAddr VARCHAR(25),
SalesManNo VARCHAR(6),
DelType CHAR(1)
CHECK (DelType IN ('P','F')),
BilledYN CHAR(1)
CHECK (BilledYN IN ('Y','N')),
DelDate DATE,
OrderStatus VARCHAR(10)
CHECK (OrderStatus IN ('In Process','Fulfilled','Backorder','Cancelled')),

CONSTRAINT FK_SO_Client
FOREIGN KEY (ClientNo)
REFERENCES ClientMaster(ClientNo),

CONSTRAINT FK_SO_SalesMan
FOREIGN KEY (SalesManNo)
REFERENCES SalesManMaster(SalesManNo),
);
```

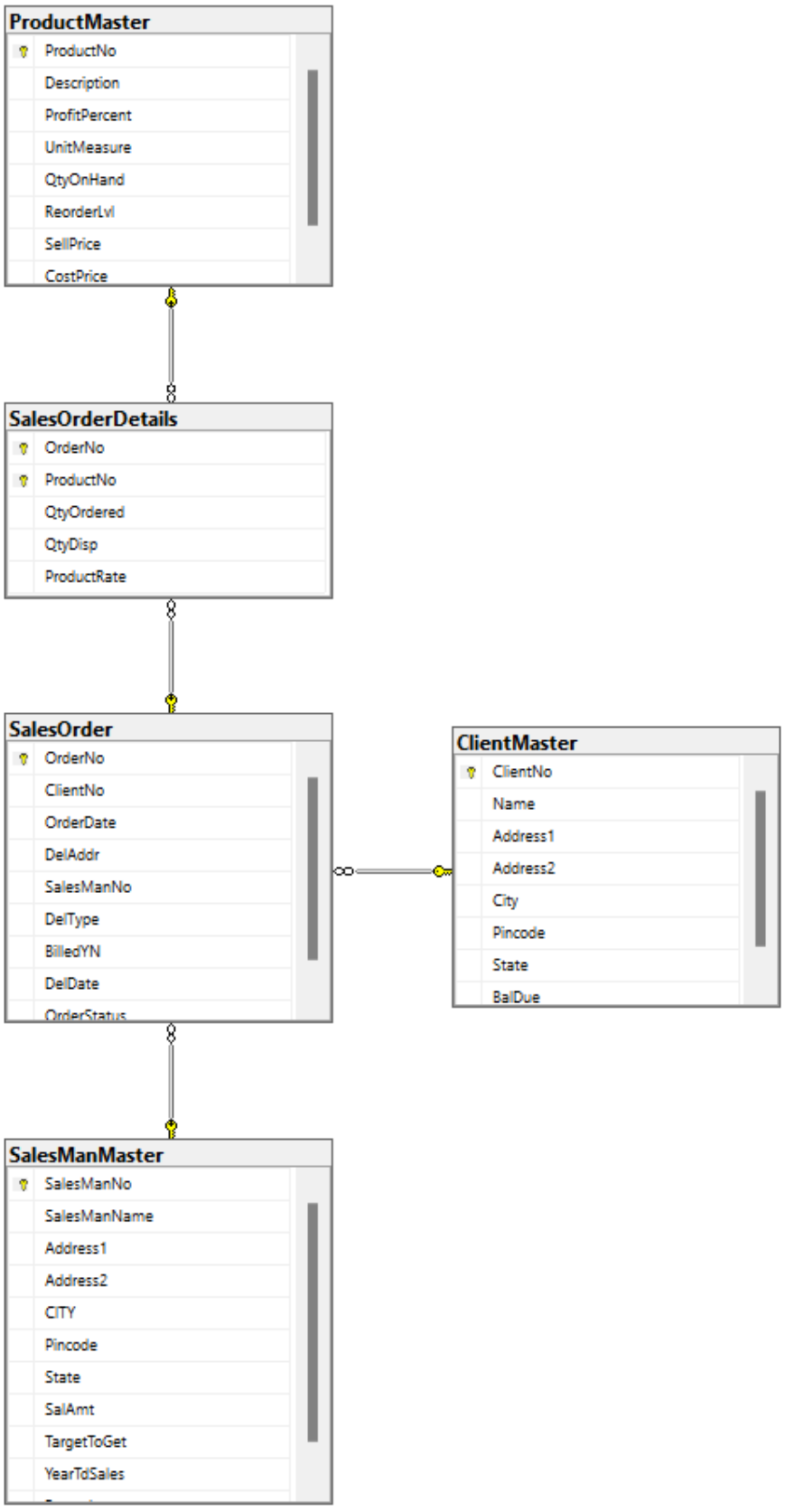
SalesOrderDetails

```
CREATE TABLE SalesOrderDetails(
OrderNo VARCHAR(6),
ProductNo VARCHAR(6),
QtyOrdered NUMERIC(8),
QtyDisp NUMERIC(8),
ProductRate NUMERIC(10,2),

CONSTRAINT PK_SalesOrderDetails
PRIMARY KEY (OrderNo,ProductNo),

CONSTRAINT FK_SOD_Order
FOREIGN  KEY(OrderNo)
REFERENCES SalesOrder(OrderNo),

CONSTRAINT FK_SOD_Product
FOREIGN  KEY(ProductNo)
REFERENCES ProductMaster(ProductNo),
);
```


ProductMaster
ProductNo
Description
ProfitPercent
UnitMeasure
QtyOnHand
ReorderLvl
SellPrice
CostPrice
SalesOrderDetails
OrderNo
ProductNo
QtyOrdered
QtyDisp
ProductRate
SalesOrder
OrderNo
ClientNo
OrderDate
DelAddr
SalesManNo
DelType
BilledYN
DelDate
OrderStatus
ClientMaster
ClientNo
Name
Address1
Address2
City
Pincode
State
BalDue
SalesManMaster
SalesManNo
SalesManName
Address1
Address2
CITY
Pincode
State
SalAmt
TargetToGet
YearTdSales

3)Inserting into tables

```
INSERT INTO ClientMaster VALUES
('C0001','abhi','13-195','kamala nagar colony','medipally',500098,'telangana',1200.00),

('C0002','santhu','plot 45','railway colony','secunderabad',500003,'telangana',3500.50),

('C0003','spoorthik','near lake view','main road','tellapur',502032,'telangana',800.00),

('C0004','varun','teachers colony','station road','warangal',506002,'telangana',150.75),

('C0005','bhanu','flat 302','mg road','mumbai',400001,'maharashtra',2200.00),

('C0006','durgi','lane 7','shivaji nagar','mumbai',400002,'maharashtra',5000.00),

('C0007','arav','block b','it park','secunderabad',500015,'telangana',950.00),

('C0008','sai','phase 2','financial district','tellapur',502032,'telangana',1750.00);
```

```
INSERT INTO ProductMaster VALUES
('P0001','Trousers',10.00,'Piece',200,50,2500.00,2000.00),
('P0002','Pull Overs',12.00,'Piece',150,40,1800.00,1400.00),
('P0003','T-Shirts',8.00,'Piece',300,60,1200.00,900.00),
('P0004','Jeans',15.00,'Piece',100,30,3000.00,2500.00),
('P0005','4.44 Drive',5.00,'Piece',50,10,1300.00,1000.00);
```

```
INSERT INTO SalesManMaster VALUES
('S0001','Aman','A-14','Worli','Mumbai',400002,'Maharashtra',3000.00,100.00,50.00,'Good'),

('S0002','Ravi','Road No
5','Kukatpally','Hyderabad',500072,'Telangana',4000.00,120.00,80.00,'Excellent'),

('S0003','Kiran','Sector 9','Market
Road','Warangal',506002,'Telangana',3500.00,90.00,60.00,'Average');
```

```
INSERT INTO SalesOrder VALUES
('O19001','C0001','2022-06-12','Hyderabad','S0001','F','N','2022-07-20','In Process'),

('O19002','C0005','2022-06-18','Mumbai','S0002','P','Y','2022-06-25','Fulfilled'),

('O19003','C0002','2022-05-10','Secunderabad','S0003','F','N','2022-05-20','Fulfilled'),

('O19004','C0006','2022-04-02','Mumbai','S0001','P','N','2022-04-10','Backorder');
```

```
INSERT INTO SalesOrderDetails VALUES
('O19001','P0001',4,4,2500.00),
('O19001','P0002',2,2,1800.00),

('O19002','P0003',6,6,1200.00),

('O19003','P0002',3,3,1800.00),

('O19004','P0002',2,1,1800.00),
('O19004','P0004',1,1,3000.00);
```

4)Performing queries

1)display all clients:
SELECT Name from ClientMaster;

	Name
1	abhi
2	santhu
3	spoorthik
4	varun
5	bhanu
6	durgi
7	arav

2)All clients in mumbai city:

SELECT * from ClientMaster WHERE City='Mumbai';

Results Messages

	ClientNo	Name	Address1	Address2	City	Pincode	State	BalDue
1	C0005	bhanu	flat 302	mg road	mumbai	400001	maharashtra	2200.00
2	C0006	durgi	lane 7	shivaji nagar	mumbai	400002	maharashtra	5000.00

3)All clients in mumbai city:

SELECT * FROM ProductMaster where SellPrice BETWEEN 2000 AND 5000;

	ProductNo	Description	ProfitPercent	UnitMeasure	QtyOnHand	ReorderLvl	SellPrice	CostPrice
1	P0001	Trousers	10.00	Piece	200	50	2500.00	2000.00
2	P0004	Jeans	15.00	Piece	100	30	3000.00	2500.00

4)display name,city,state of clients not in state of maharashtra

SELECT Name,City,State FROM ClientMaster WHERE
State!='maharashtra';

SELECT Name,City,State FROM ClientMaster WHERE State NOT IN (
SELECT State FROM ClientMaster WHERE State='maharashtra'
);

	Name	City	State
1	abhi	medipally	telangana
2	santhu	secunderabad	telangana
3	spoorthik	tellapur	telangana
4	varun	warangal	telangana
5	arav	secunderabad	telangana
6	sai	tellapur	telangana

5)Display all the information of client no C0001 and C0002

```
SELECT * FROM  ClientMaster WHERE ClientNo IN ('C0001','C0002');
```

	ClientNo	Name	Address1	Address2	City	Pincode	State	BalDue
1	C0001	abhi	13-195	kamala nagar colony	medipally	500098	telangana	1200.00
2	C0002	santhu	plot 45	railway colony	secunderabad	500003	telangana	3500.50

6)Change the selling price of '1.44 drive' to Rs. 1150.50.

```
UPDATE ProductMaster
SET SellPrice = 1150.50
WHERE Description = '1.44 drive';
```

```
(1 row affected)
```

7)Delete the record of client_no C0005..

```
DELETE FROM ClientMaster
WHERE ClientNo='C0005';
```

```
--The DELETE statement conflicted with the REFERENCE constraint "FK_SO_Client". The conflict occurred in database "ASSIGNMENT_WEEK1", table "dbo.SalesOrder", column 'ClientNo'.
--The statement has been terminated.
--2 ways
-- on delete cascade
-- sequential multiple series of statments

ALTER TABLE SalesOrder DROP CONSTRAINT FK_SO_Client;
ALTER TABLE SalesOrder ADD CONSTRAINT FK_SO_Client FOREIGN KEY(ClientNo) REFERENCES ClientMaster(ClientNo) ON DELETE CASCADE;
ALTER TABLE SalesOrderDetails DROP CONSTRAINT FK_SOD_Order;
ALTER TABLE SalesOrderDetails ADD CONSTRAINT FK_SOD_Order FOREIGN KEY(OrderNo) REFERENCES SalesOrder(OrderNo) ON DELETE CASCADE;

DELETE FROM ClientMaster
WHERE ClientNo = 'C0005';
```

8)Display the clients who stay in a city whose second letter is 'a'.

```
SELECT * FROM ClientMaster WHERE City LIKE '_a%';
```

	ClientNo	Name	Address1	Address2	City	Pincode	State	BalDue
1	C0004	varun	teachers colony	station road	warangal	506002	telangana	150.75

9)Count the number of products having price greater than or equal to 1500.

```
SELECT COUNT(*) as cnt FROM ProductMaster WHERE SellPrice>=1500;
```

	cnt
1	3

10)Display qtyordered, qtydisp and balanceqty (not in table).

```
SELECT QtyOrdered,QtyDisp,(QtyOrdered-QtyDisp) AS
BalanceQty
FROM SalesOrderDetails;
```

	QtyOrdered	QtyDisp	BalanceQty
1	4	4	0
2	2	2	0
3	3	3	0
4	2	1	1
5	1	1	0

5)SQL Commands

1---ClientNo is already primary key as we have done it during table creation

2---ALTER TABLE ClientMaster ADD PhoneNo VARCHAR(15);

3---we have already not null constraints for columns like descriptions,prices and profit percent

4---ALTER TABLE ClientMaster ALTER COLUMN Name VARCHAR(60) NOT NULL

5--- ALTER TABLE ClientMaster DROP COLUMN Pincode;

6)Definations

A recursive relationship in SQL Server is a self-referencing relationship in a database table, where a foreign key column in the table refers to the primary key of the same table

A composite key is a primary key made using more than one column.
Ex: (OrderNo, ProductNo) together identify one record in Sales_Order_Details.

The LIKE operator is used to search data that follows a specific pattern.
SELECT * FROM CLIENT_MASTER WHERE NAME LIKE 'A%';
Similar to regex in programming,used in combination with wildcards

Drop table is ddl statement used to permanently remove entire table from db,it removes table structure and all data within.
DROP TABLE CLIENT_MASTER;

A FULL OUTER JOIN returns all records from both tables, matching rows where possible, and showing NULL where there is no match.
SELECT C.ClientNo, C.Name, O.OrderNo FROM CLIENT_MASTER C FULL OUTER JOIN SALES_ORDER O ON C.ClientNo = O.ClientNo;

7)Joins

1--Find out the products, which have been sold to 'abhi'.

```
SELECT p.Description FROM ClientMaster c
JOIN SalesOrder o ON c.ClientNo=o.ClientNo
JOIN SalesOrderDetails d ON o.OrderNo=d.OrderNo
JOIN ProductMaster p ON d.ProductNo=p.ProductNo
WHERE c.Name='abhi';
```

	Description
1	Trousers
2	Pull Overs

2--Finding out the products and their quantities that will have to be delivered in the current month

```
SELECT p.Description,d.QtyDisp FROM SalesOrder o
JOIN SalesOrderDetails d ON o.OrderNo=d.OrderNo
JOIN ProductMaster p ON d.ProductNo=p.ProductNo
WHERE MONTH(o.DelDate)=MONTH(GETDATE())
AND YEAR(o.DelDate)=YEAR(GETDATE());
```

	Description	QtyDisp
1	Trousers	4
2	Pull Overs	2
3	Pull Overs	1
4	Jeans	1

3--Listing the ProductNo and description of constantly sold (i.e. rapidly moving) products.

```
SELECT P.ProductNo,P.Description FROM ProductMaster P
JOIN SalesOrderDetails SOD ON P.ProductNo = SOD.ProductNo
GROUP BY P.ProductNo, P.Description
HAVING COUNT(SOD.ProductNo) > 1;
```

	ProductNo	Description
1	P0002	Pull Overs

4--Finding the names of clients who have purchased 'Trousers'.

```
SELECT DISTINCT c.Name FROM ClientMaster c
JOIN SalesOrder o ON  c.ClientNo=o.ClientNo
JOIN SalesOrderDetails d ON o.OrderNo=d.OrderNo
JOIN ProductMaster p ON d.ProductNo=p.ProductNo
WHERE p.Description='trousers';
```

	Name
1	abhi

5--Listing the products and orders from customers who have ordered less than 5 units of 'Pull Overs'

```
SELECT
    SO.OrderNo,
    P.ProductNo,
    P.Description,
    SOD.QtyOrdered
FROM SalesOrder SO
JOIN SalesOrderDetails SOD
    ON SO.OrderNo = SOD.OrderNo
JOIN ProductMaster P
    ON SOD.ProductNo = P.ProductNo
WHERE P.Description = 'Pull Overs'
  AND SOD.QtyOrdered < 5;
```

	OrderNo	ProductNo	Description	QtyOrdered
1	O19001	P0002	Pull Overs	2
2	O19003	P0002	Pull Overs	3
3	O19004	P0002	Pull Overs	2

8)Subqueries

1--Finding the non-moving products i.e. products not being sold

```
SELECT Description from ProductMaster
WHERE ProductNo NOT IN (
SELECT ProductNo FROM SalesOrderDetails
);
```

	Description
1	T-Shirts
2	1.44 drive

2--Finding the name and complete address for the customer who has placed Order number 'O19001'

```
SELECT * FROM ClientMaster WHERE ClientNo =(
SELECT ClientNo from SalesOrder where OrderNo='O19001'
);
```

	ClientNo	Name	Address1	Address2	City	State	BalDue	PhoneNo
1	C0001	abhi	13-195	kamala nagar colony	medipally	telangana	1200.00	NULL

3--Finding the clients who have placed orders before the month of May'02

```
SELECT Name FROM ClientMaster where ClientNo IN( SELECT ClientNo FROM SalesOrder
  WHERE OrderDate<'2002-05-01');
```

9)basic date time formatting commands

Display system date as Saturday, February 11, 2012

```
SELECT FORMAT(CAST('2012-02-11' AS DATE), 'dddd, MMMM dd, yyyy') AS
system_date;
```

	system_date
1	Saturday, February 11, 2012

Display Balance Due from Client master as $99,999.99

```
SELECT FORMAT(99999.99, 'C') AS balance_due;
```

	balance_due
1	$99,999.99

Display message as 'Salesman Aman sold goods of 50 while given target was 100

```
SELECT 'Salesman Aman sold goods of 50 while given target was 100' AS message;
```

	message
1	Salesman Aman sold goods of 50 while given targ...

Display your Age in Years

```
SELECT DATEDIFF(YEAR, '2004-07-03', GETDATE()) AS age_in_years;
```

	age_in_years
1	22