1) Discuss these functions with Example SQL Queries (Single Row Function)

a) CEIL (): This function returns largest integer greater than or equal to n.
Syntax: CEIL(n)
```
select ceil(18.23) from dual;
```
Output: 19

b) MONTHS_BETWEEN (): This function returns difference between given two dates.
Syntax: MONTHS_BETWEEN (DATE1, DATE2)
```
Select months_between('19-SEP-16','17-MAY-16') from dual;
```
Output: 4.064516

c) SQRT (): This function gives the square root of the given value n.
Syntax: SQRT(n)
```
Select sqrt(576) from dual;
```
Output: 24

d) LAST_DAY (): This function returns the date of the last day of the month.
Syntax: LAST_DAY (DATE)
Select last_day('15-aug-1947') from dual;
Output: 31-AUG-47

e) SYSDATE: This function returns current date of system.
Syntax: SYSDATE
```
Select sysdate from dual;
```
Output: 10-JUN-22

f) GREATEST (): This function returns GREATEST integer from a set of integers.
Syntax: GREATEST(n1,n2,n3,…)
```
select greatest(5,8,1,95,72,48,22,8958,2) from dual
```
Output: 8958

g) INITCAP (): This function returns the string with first letter of each word in uppercase.
Syntax: INITCAP (string1)
```
Select initcap('andhra pradesh') from dual;
```
Output: Andhra Pradesh

h) ADD_MONTHS (): This function returns date d plus n months, i.e adds n months to the given date d.
Syntax: ADD_MONTHS (DATE, NO_OF_MONTHS)
```
Select add_months('15-aug-1947',12) from dual;
```
Output: 15-AUG-48

i) CONCAT (): This function returns a string by appending string1 with string2.
Syntax: CONCAT (string1, string2)
```
Select concat('hello','every one') from dual;
```
Output: helloevery one

j) NEXT_DAY (): This function returns the date of the next weekday from the date specified.
Syntax: NEXT_DAY (DATE, 'WEEKDAY')
```
Select next_day('15-aug-1947','sun') from dual;
```
Output: 17-AUG-47

k) **RPAD ():** This function returns a string as output after padding string2 to the right side of string1 to n length.
Syntax: RPAD (STRING1, N, STRING2)
```
Select rpad('india',20,'&') from dual;
```
Output: india&&&&&&&&&&&&&&&&

Queries

1. **Find the names of the employee whose names is exactly five Characters in length.**
```
SELECT ename
FROM employee
WHERE ename LIKE '_____'
```

2. **Employees working under either Pradeep or Srinivas**
```
select ename
from employee
where mgr_no = any(select empno
                   from employee
                   where ename in('Pradeep','Srinivas'))
```

3. **Display the name of the employee who earns highest salary.**
```
SELECT ename
FROM employee
WHERE salary = (SELECT MAX(salary)
              FROM employee)
```

4. **Find all sids who have a rating of 10 or have reserved boat 104**
```
select sid
from sailors
where rating = 10 or
      sid in (select sid
              from reserves
              where bid = 104)
```

5. **Display the names of employees whose names have second alphabet A in their names.**
```
SELECT ename
FROM employee
WHERE ename LIKE '_a%'
```

6. **All the employees reporting to the PRESIDENT**
```
select empno,ename
from employee
where mgr_no = (select empno
                from employee
                where job = (select jcode
                             from job
                             where name = 'President'))
```

7. **Display the names of employees who are working as Clerks, Salesman or Analyst and drawing a salary more than 250000.**
```
SELECT ename
FROM employee
WHERE job in (SELECT jcode
              FROM job
```

```
                WHERE name in ('Clerk' ,'Salesman','Analyst'))and
      salary > 250000
```

8. **Find the names of sailors who have reserved a red or a green boat**

```
select sname
from sailors
where sid in (select sid
              from reserves
              where bid in (select bid
                            from boats
                            where color = 'red'))
union
select sname
from sailors
where sid in (select sid
              from reserves
              where bid in (select bid
                            from boats
                            where color = 'green'))
```

9. **Display the Employee names for employees whose name ends with Alphabet S.**

```
SELECT ename
FROM employee
WHERE ename LIKE '%s'
```

10. **Employees in ACCOUNTING department**

```
select ename
from employee
where deptno in (select deptno
                 from dept
                 where name = 'Accounting')
```

11. **Display the names of employees working in depart number 10 or 20 or40 or employees working as CLERKS, SALESMAN or ANALYST**

```
SELECT ename
FROM employee
WHERE deptno =ANY(10,20,40)
      OR job =ANY(SELECT jcode
                  FROM job
                  WHERE name in ('Clerk','Salesman','Analyst'))
```

12. **Find the colors of boats reserved by a sailor named Rusty**

```
select color
from boats
where bid in (select bid
              from reserves
              where sid = (select sid
                           from sailors
                           where sname = 'Rusty'))
```

13. **Display the maximum salary being paid to depart number 20.**

```
SELECT max(salary)
FROM employee
WHERE deptno = 20
```

14. **Find the minimum salary in the ACCOUNTING department**

```
select min(salary)
from employee
where deptno in (select deptno
                 from dept
                 where name = 'Accounting')
```

15. **Display the names of the employee who are not working as SALESMAN OR CLERK OR ANALYST**

```
SELECT ename
FROM employee
WHERE job NOT IN (SELECT jcode
                  FROM job
                  WHERE name in ('Clerk' ,'Salesman','Analyst'))
```

16. **Find the names of sailors who have reserved boat no 120**

```
select sname
from sailors
where sid in (select sid
              from reserves
              where bid = 120)
```

17. **Display the employee number and name who do not earn any comm.**

```
SELECT empno,ename
FROM employee
WHERE commission is null
```

18. **The job ids of all the employees who are managers of other employees**

```
select job
from employee
where empno in (select mgr_no
                from employee
                where mgr_no is not null)
```

19. **Display the employee names who are working in Kakinada**

```
SELECT ename
FROM employee
WHERE deptno in (SELECT deptno
                 FROM dept
                 WHERE location = (SELECT lcode
                                   FROM location
                                   WHERE name = 'Kakinada'))
```

20. **Find the average age of sailor for each rating level that has at least 2 sailors**

```
SELECT avg(age)
FROM sailors
GROUP BY rating
HAVING count(*) >= 2
```

21. **Display the names of all the employees who are working in dept. number 10.**

```
select ename
from employee
where deptno = 10
```

22. **Names of employees who do not have a manager**

```
select ename
from employee
where mgr_no is null
```

23. **Display the names of the employees from department number 30 with salary greater than that of all employee working in other departments**

```
SELECT ename
FROM employee
WHERE deptno = 30 AND
      salary > ALL (SELECT salary
                    FROM employee
                    WHERE deptno != 30)
```

24. **Find the names of sailors who have reserved at least one boat**

```
select sname
from sailors
where sid in (select sid
              from reserves)
```

PL/SQL Programs

1. **Write PL/SQL code to find specific Employee salary for given Empno from EMPLOYEE table**

```
declare
       var_salary number(16);
       var_empno number(16):= :empno;
begin
       select salary into var_salary from employee where empno = var_empno;
       dbms_output.put_line('the employee of '||var_empno||' has salary '||var_salary);
end
```

2. **Write a PL/SQL program to display a sailor details with sid=31**

```
Declare
       v_sid sailors.sid%type:=31;
       v_sname sailors.sname%type;
       v_rating sailors.rating%type;
       v_age sailors.age%type;
begin
       select sname,rating,age into v_sname,v_rating,v_age from sailors where
       sid=v_sid;
       dbms_output.put_line('Sailor name is: '||v_sname);
       dbms_output.put_line('Sailor rating is: '||v_rating);
       dbms_output.put_line('Sailor age is: '||v_age);
end
```

3. **Write PL/SQL program to display all information about a sailor using % rowtype data type**

```
Declare
       v_id sailors.sid%type;
       srow sailors%rowtype;
begin
       v_id:= &v_id;
       select * into srow from sailors where sid=v_id;
       dbms_output.put_line('Sailors name is:'||srow.sname);
       dbms_output.put_line('Sailors rating is:'||srow.rating);
       dbms_output.put_line('Sailors age is:'||srow.age);
       exception when no_data_found then
           dbms_output.put_line('No sailors with given sid');
end
```

4. Write PL/SQL program to print welcome message after insertion for each row in sailors table using trigger

```
create or replace trigger trg1 after insert on sailors for each row
begin
	dbms_output.put_line('---Welcome to new sailors---');
end


Once Trigger Created successfully
Add a Sailor to the database (Later Delete it Also)
insert into sailors values(27, 'Smith', 6, 24)
```

5. **Write a PL/SQL program to find factorial of a given number by using function**

```
Declare
	a number;
	function fact(n in number)
	return number
	is
	z number;
		Begin
			if n<0 then
				z:=-1;
			elsif n=1 or n=0 then
				z:=1;
			else
				z:=1;
				for i in 1..n loop
					z:=(z*i);
				end loop;
			end if;
			return z;
		end;
begin
	a:=&a;
	dbms_output.put_line(a||' factorial is: '||fact(a));
end;
```

6. Write a PL/SQL program to handle divide by zero exception

```
Declare
	a number:=&a;
	b number:=0;
	c number;
begin
	c:=a/b;
Exception
	When zero_divide then
		dbms_output.put_line('Attempt to divide by zero');
	when others then
		dbms_output.put_line('An Exception is raised in program');
end
```