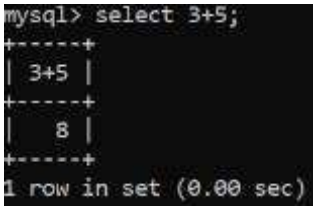
SQL

Mcq

1. Which SQL command is used to create a new table in a database?
a) INSERT
b) CREATE TABLE
c) ALTER TABLE
d) ADD TABLE
Answer: b) CREATE TABLE
2. What will be the output of the following SQL query?
sql
Copy code
SELECT ROUND(123.456, 1);
a) 123.4
b) 123.5
c) 123.46
d) 123
Answer: b) 123.5
3. Which clause in SQL is used to sort the results of a query?
a) GROUP BY
b) SORT BY
c) ORDER BY
d) HAVING
Answer: c) ORDER BY
4. In SQL, which function is used to count the number of rows in a table?
a) SUM()
b) COUNT()
c) ROWS()
d) TOTAL()
Answer: b) COUNT()
5. What is the purpose of the FOREIGN KEY in SQL?
a) To uniquely identify each row in a table
b) To connect two tables based on a common column
c) To specify a default value for a column
d) To restrict duplicate values in a column
Answer: b) To connect two tables based on a common column

- **Performing simple calculation in the query** Syntax:
  Select 2+4;
  All operation can be perform such as addition (+), subtraction (-), multiplication (*), division (/) and remainder (%)



  Number of row in result depend on total number of rows in the table

- **Performing calculation on column** Syntax:
  SELECT column1 operator value, column2…. FROM Tablename;

```
mysql> select ename, sal, sal*12 'Annual Salary' from emp;
+--------+---------+---------------+
| ename  | sal     | Annual Salary |
+--------+---------+---------------+
| SMITH  |  800.00 |       9600.00 |
| ALLEN  | 1600.00 |      19200.00 |
| WARD   | 1250.00 |      15000.00 |
| JONES  | 2975.00 |      35700.00 |
| MARTIN | 1250.00 |      15000.00 |
| BLAKE  | 2850.00 |      34200.00 |
```

- **Working with null value**

  Any operation on NULL will result into NULL, MySql provide **ifnull**() function to work with null value. If column contain null value, it is replaced by given value, otherwise display original value.

  Syntax:

  ifnull(column, value_to_replace')

```
mysql> select ename, sal, comm, ifnull(comm,'N/A') from emp;
+--------+---------+---------+---------------------+
| ename  | sal     | comm    | ifnull(comm,'N/A')  |
+--------+---------+---------+---------------------+
| SMITH  |  800.00 |    NULL | N/A                 |
| ALLEN  | 1600.00 |  300.00 | 300.00              |
| WARD   | 1250.00 |  500.00 | 500.00              |
| JONES  | 2975.00 |    NULL | N/A                 |
| MARTIN | 1250.00 | 1400.00 | 1400.00             |
| BLAKE  | 2850.00 |    NULL | N/A                 |
| CLARK  | 2450.00 |    NULL | N/A                 |
| SCOTT  | 3000.00 |    NULL | N/A                 |
| KING   | 5000.00 |    NULL | N/A                 |
| TURNER | 1500.00 |    0.00 | 0.00                |
| ADAMS  | 1100.00 |    NULL | N/A                 |
| JAMES  |  950.00 |    NULL | N/A                 |
| FORD   | 3000.00 |    NULL | N/A                 |
| MILLER | 1300.00 |    NULL | N/A                 |
+--------+---------+---------+---------------------+
14 rows in set (0.00 sec)
```

  Here, comm column contains null value which is replaced by 'N/A'.

- **Restricting rows using where clause**

  Where clause in the query will restrict number of rows in the output based on condition.

  Syntax:

  SELECT */column list
  FROM Tablename where
  condition ;

  Condition (column_name operator expression)

  Relational Operator

  > greater than
  < less than
  >= greater than equal to
  <= less than equal to
  = equal
  ! = or <> not equal to

  Logical Operator

  And – evaluated true if all the logical expression is true otherwise false.

Or - evaluated true if any the logical expression is true otherwise false.
Logical operator is used to combine two or more logical expression,

Membership Operator in
– Not in
The IN operator allows you to specify multiple values in a WHERE clause. The IN operator is a shorthand for multiple OR conditions.

- **Comparing NULL**
  is null is
  not null
  NULL (Absence of value) value cannot be compared using Relational operator. The above statement is used to check whether column contains NULL or not.

- **Range Operator**
  Between

- **Pattern Matching**
  Like
  Not Like

  Like clause is used to match pattern using two wild card characters
  _ (underscore) – single unknown character %
  (modulo) - Zero or more unknown characters e.g.
  words staring with 't' 't%' words
  ending with 't' '%t'
  words containing 't' - '%t%'
  word with 't' as second letter - '_t%'
  words with 't' as third last character – '%t_ _'
  words containing four letter and 't' as second letter – '_ t_ _'

- **Ordering data using ORDER BY clause**
  - ORDER BY clause is used to arrange data in ascending/descending order
  - Ordering can be done on more than one column, in this case data is arranged according first column and then second column and onwards.
  - By default data is arranged in ascending order, in no ordering information (asc/desc) is given.

  Syntax:

  SELECT */col_list
  FROM tablename
  ORDER BY col1 asc/desc, col2 asc/desc;

AGGREGATE FUNCTIONS

- An aggregate function performs a calculation on multiple values and returns a single value. These function work on multiple rows collectively return single value.
- List of Aggregate functions are ○ max() : return maximum value in set of value

```
mysql> select max(sal) from emp;
+----------+
| max(sal) |
+----------+
|  5000.00 |
+----------+
1 row in set (0.01 sec)
```

- min() – return minimum value from the set of values

```
mysql> select min(sal) from emp;
+----------+
| min(sal) |
+----------+
|   800.00 |
+----------+
1 row in set (0.00 sec)
```

- avg() –return average value in set of non-null values

```
mysql> select min(sal) from emp;
+----------+
| min(sal) |
+----------+
|   800.00 |
+----------+
1 row in set (0.00 sec)
```

- sum() - Return the summation of all non-NULL values of the set of values.

```
mysql> select sum(sal) from emp;
+----------+
| sum(sal) |
+----------+
| 29025.00 |
+----------+
1 row in set (0.01 sec)
```

- count() - Return the number of rows in a group
  - Count(*) – return number of rows, including rows with NULL

```
mysql> select count(*) from emp;
+----------+
| count(*) |
+----------+
|       14 |
+----------+
1 row in set (0.00 sec)
```

  - Count(column_name) - return number of rows, excluding rows with NULL for the given column

```
mysql> select count(comm) from emp;
+-------------+
| count(comm) |
+-------------+
|           4 |
+-------------+
1 row in set (0.00 sec)
```

  - Count (distinct column_name) – return number of rows with duplicate removed

```
mysql> select count(distinct job) from emp;
+--------------------+
| count(distinct job) |
+--------------------+
|                  5 |
+--------------------+
1 row in set (0.01 sec)
```

In above example there are 14 row in the EMP table, but distinct clause only consider unique value.

- **Group By Clause**
  - It is used in a SELECT statement to collect data across multiple records and group the results by one or more columns.
    Syntax:
    SELECT column_name, aggregate_function
    FROM table_name
    GROUP BY column_name

```
mysql> select job, max(Sal) from emp group by job;
+-----------+----------+
| job       | max(Sal) |
+-----------+----------+
| ANALYST   |  3000.00 |
| CLERK     |  1300.00 |
| MANAGER   |  2975.00 |
| PRESIDENT |  5000.00 |
| SALESMAN  |  1600.00 |
+-----------+----------+
```

    In above example salary is grouped on job and maximum salary from each job is displayed.
  - Select clause involving group by clause can contain column present in group by clause, aggregate function or no column. Otherwise it will return random data from other column as given below.

```
mysql> select ename, job, max(sal) from emp group by job;
+-------+-----------+----------+
| ename | job       | max(sal) |
+-------+-----------+----------+
| SCOTT | ANALYST   |  3000.00 |
| SMITH | CLERK     |  1300.00 |
| JONES | MANAGER   |  2975.00 |
| KING  | PRESIDENT |  5000.00 |
| ALLEN | SALESMAN  |  1600.00 |
+-------+-----------+----------+
```

- **Having clause** – ○ Having clause is used to place condition on aggregate function in conjunction with group by clause.
  - Having clause in placed after where clause in select statement.
    Syntax:
    SELECT columm_name, aggregate_function(col_name)
    FROM table
    WHERE condition
    GROUP BY column_name
    HAVING aggregate_function(column_name) operator expression;

```
mysql> select deptno, max(sal), count(*) from emp group by deptno;
+--------+----------+----------+
| deptno | max(sal) | count(*) |
+--------+----------+----------+
|     10 |  5000.00 |        3 |
|     20 |  3000.00 |        5 |
|     30 |  2850.00 |        6 |
+--------+----------+----------+
3 rows in set (0.00 sec)
```

The above query will display deptno, maximum salary and number of employees from each department.

The query given below display deptno, maximum salary and number of employees from those department which have maximum salary greater than equal to 3000.

```
mysql> select deptno, max(sal), count(*) from emp
    -> group by deptno having max(sal)>=3000;
+--------+----------+----------+
| deptno | max(sal) | count(*) |
+--------+----------+----------+
|     10 |  5000.00 |        3 |
|     20 |  3000.00 |        5 |
+--------+----------+----------+
```

As condition is on aggregate function max(), where clause can't be used in this case.

MATHS FUNCTIONS

Mathematical functions are also called number functions that accept numeric input and return numeric values.

Function	Description	Example	
		Function	Result
ROUND ( )	Round the column, expression or value to given decimal places.	ROUND (45.926,2)	45.93
TRUNC ( )	Truncates the column, expression or value to specified decimal places.	TRUNC (45.926,2)	45.92
MOD ( )	Returns remainder of division.	MOD (1600, 300)	100
POWER ( )	Returns the value of one expression raised to the power of another expression.	POWER (3, 2)	9

Solved Exercise :

Find the output of the following SQL statements.

1. SELECT MOD(11,2);
2. SELECT MOD(41,4);
3. SELECT MOD(25,3);
4. SELECT MOD(27,7);
5. SELECT POWER(2,3);
6. SELECT POW(3,4);
7. SELECT POWER(4,.5);
8. SELECT POW(16,.5);
9. SELECT POWER(2.5,3);
10. SELECT SIGN(-20);
11. SELECT SIGN(20);
12. SELECT SIGN(0);
13. SELECT SQRT(81);
14. SELECT SQRT(25);
15. SELECT ROUND(45678.2546,3);
16. SELECT ROUND(45678.2946,2);
17. SELECT ROUND(45678.6676,1);
18. SELECT ROUND(52789.2546,-1);
19. SELECT ROUND(65874.2546,-2);
20. SELECT ROUND(95687.2546,-3);
21. SELECT ROUND(4578.24,-1);
22. SELECT ROUND(25348.1,-2);
23. SELECT ROUND(68475.21,-3);
24. SELECT TRUNCATE(45678.2546,3);
25. SELECT TRUNCATE(45678.2946,2);
26. SELECT TRUNCATE(45678.6676,1);
27. SELECT TRUNCATE(52789.2546,-1);
28. SELECT TRUNCATE(65874.2546,-2);
29. SELECT TRUNCATE(95687.2546,-3);
30. SELECT TRUNCATE(4578.24,-1);
31. SELECT TRUNCATE(25348.1,-2);
32. SELECT TRUNCATE(68475.21,-3);

Answers:

Ans.

1. 1
2. 1
3. 1
4. 6
5. 8
6. 81
7. 2
8. 4
9. 15.625
10. -1
11. 1
12. 0
13. 9
14. 5
15. 45678.255
16. 45678.29
17. 45678.7
18. 52790
19. 65900
20. 96000
21. 4580
22. 25300
23. 68000
24. 45678.254
25. 45678.29
26. 45678.6
27. 52780
28. 65800
29. 95000
30. 4570
31. 25300
32. 68000

O DATE and TIME FUNCTIONS

Date functions operate on values of the DATE data type:

Function	Description	Example	
		Function	Result
SYSDATE ( )	Returns the current database server date and time.	Select SYSDATE ( ) from Dual;	12-Jan-15
CURDATE ( )	Returns the current date.	Select CURDATE ( ) from Dual,	12-Jan-15
NOW ( )	Returns the current date and time.	Select NOW ( ) from Dual	12-Jan-15
DATE ( )	Extracts the date part of a date or datetime expression.	DATE ('2015-1-12')	12
MONTH ( )	Returns the month.	MONTH ('2015-1-12')	1
YEAR ( )	Returns the year.	YEAR ('2015-1-12')	2015
DAYNAME ( )	Returns the name of week day.	DAYNAME ('2015-1-22')	THURSDAY
DAYOFMONTH ( )	Returns the day of month.	DAYOFMONTH ('2015-1-22')	22
DAYOFWEEK ( )	Returns the week day index of the argument.	DAYOFWEEK ('2015-1-22')	5
DAYOFYEAR ( )	Returns the day of year (1-366).	DAYOFYEAR ('2015-01-07')	7

Solved Exercise :

If today"s date is 12th Apr 1995 and time is 10:50:23 AM then what will the following commands display.

1. SELECT CURDATE(); 2. SELECT SYSDATE(); 3. SELECT NOW();

Find the output of the following SQL statements.

4. SELECT DAYOFMONTH("1995-04-12");
5. SELECT DAY("1995-04-12");
6. SELECT MONTH("1995-04-12");
7. SELECT YEAR("1995-04-12");
8. SELECT DAYOFWEEK("1995-04-12");
9. SELECT DAYOFYEAR("1995-04-12");
10. SELECT DAYNAME("1995-04-12");
11. SELECT MONTHNAME("1995-04-12");
12. SELECT DATE("2022-02-02 12:15:46");

Answers:

1. 2022-02-09
2. 2022-02-09 14:22:17
3. 2022-02-09 14:22:17
4. 12
5. 12
6. 4
7. 1995
8. 4
9. 102
10. Wednesday
11. April
12. 2022-02-02

STRING FUNCTIONS

(a) Case-manipulation Functions

These functions convert case for character strings:

Function	Description	Examples	
		Function	Result
LOWER ( )	Returns the argument in lowercase.	LOWER ('SQL')	sql
UPPER ( )	Returns the argument in uppercase.	UPPER ('Sql')	SQL
INITCAP ( )	Returns the argument's first letter in uppercase and the remaining letters in lowercase.	INITCAP ('SQL')	Sql

(b) Character-manipulation Functions These functions manipulate character strings:

Function	Description	Examples	
		Function	Result
CHAR ( )	Returns the character for each integer passed.	CHAR (65)	A
CONCAT ( )	Returns concatenated string.	CONCAT ('HELLO', 'WORLD')	HELLOWORLD
SUBSTR ( )	Returns the specified substring.	SUBSTR ('HELLOWORLD', 1,5)	HELLO
INSTR ( )	Finds numeric position of a named character.	INSTR ('HELLO', 'E')	2
LENGTH ( )	Shows the length of a string as a numeric value.	LENGTH ('HELLO')	5
TRIM ( )	Trims leading or trailing characters (or both) from a character string.	TRIM ('H' FROM 'HELLO')	ELLO
LTRIM ( )	Trims leading spaces.	LTRIM (' HELLO')	HELLO
RTRIM ( )	Trims trailing spaces.	RTRIM ('HELLO ')	HELLO
MID ( )	Returns a substring starting from the specified position.	MID ('HELLO', 3)	LLO
LEFT ( )	Returns the left most number of characters as specified.	LEFT ('HELLO' , 1)	H
RIGHT ( )	Returns the right most number of characters as specified.	RIGHT ('HELLO', 2)	LO
ASCII ( )	Returns the ASCII value for each character passed.	ASCII ('A')	65

Solved Exercise :

Find the output of the following SQL statements.

1. SELECT CHAR(69);
2. SELECT CHAR(73,80);
3. SELECT CHAR(80,82,65,67); 4. SELECT CONCAT("MR","ANIL");
5. SELECT CONCAT("MS","AARTI");
6. SELECT LOWER("AAkarsh");
7. SELECT LOWER("KUMAR");
8. SELECT UPPER("AAkarsh");
9. SELECT UPPER("kumar");
10. SELECT LENGTH("KUMAR");
11. SELECT LENGTH("EDUCATION");
12. SELECT LTRIM(" EDUCATION");
13. SELECT RTRIM("EDUCATION ");
14. SELECT TRIM(" EDUCATION ");
15. SELECT INSTR("EDUCATION","CAT");
16. SELECT INSTR("SUBSTANTIAL","TAN");
17. SELECT INSTR("ALOGRITHM","LOG");
18. SELECT INSTR("BANANA","AN");
19. SELECT INSTR("MALAYALAM","LA");
20. SELECT INSTR("EDUCATION","COT");
21. SELECT INSTR("MALAYALAM","LAL");
22. SELECT LEFT("MALAYALAM",4);
23. SELECT LEFT("SUCESSFUL",5);
24. SELECT RIGHT("MALAYALAM",4);
25. SELECT RIGHT("SUCESSFUL",5);
26. SELECT MID("EDUCATION",3,4);
27. SELECT MID("SUBSTANTIAL",2,5);
28. SELECT SUBSTR("ALOGRITHM",5,3);
29. SELECT SUBSTR("BANANA",2,2);
30. SELECT SUBSTRING("MALAYALAM",6,4);
31. SELECT SUBSTRING ("APPROXIMATELY",8,5);
32. SELECT RIGHT (LEFT("APPROXIMATELY",8),5);
33. SELECT LEFT(RIGHT("APPROXIMATELY",8),5);
34. SELECT RIGHT(LEFT("MALAYALAM",5),3);
35. SELECT LEFT(RIGHT("MALAYALAM",5),3);
36. SELECT MID(LEFT("APPROXIMATELY",9),5,3);
37. SELECT MID(RIGHT("APPROXIMATELY",10),3,5);

Answers:

1. E
2. IP
3. PRAC
4. MRANIL
5. MSAARTI
6. aakarsh
7. kumar
8. AAKARSH
9. KUMAR
10. 5
11. 9
12. EDUCATION
13. EDUCATION
14. EDUCATION
15. 4 16. 5

1
8
.

2
1
9
.

3

20. 0
21. 0
22. MALA
23. SUCES
24. ALAM
25. SSFUL
26. UCAT
27. UBSTA
28. RIT
29. AN
30. ALAM
31. MATEL
32. ROXIM
33. XIMAT
34. LAY
35. YAL
36. OXI
37. XIMAT

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1. **JOINS**

- A relational database consists of multiple related tables linking together using common columns, which are known as foreign key columns.
- **It is used retrieve data from multiple tables.**
- Consider the tables below EMP, DEPT & SALGARDE that stored related information, all the examples on join will be explained with help of these following three tables

EMP Table

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
7369	SMITH	CLERK	7902	1993-06-13	800.00	0.00	20
7499	ALLEN	SALESMAN	7698	1998-08-15	1600.00	300.00	30
7521	WARD	SALESMAN	7698	1996-03-26	1250.00	500.00	30
7566	JONES	MANAGER	7839	1995-10-31	2975.00		20
7698	BLAKE	MANAGER	7839	1992-06-11	2850.00		30
7782	CLARK	MANAGER	7839	1993-05-14	2450.00		10
7788	SCOTT	ANALYST	7566	1996-03-05	3000.00		20
7839	KING	PRESIDENT		1990-06-09	5000.00	0.00	10
7844	TURNER	SALESMAN	7698	1995-06-04	1500.00	0.00	30
7876	ADAMS	CLERK	7788	1999-06-04	1100.00		20
7900	JAMES	CLERK	7698	2000-06-23	950.00		30
7934	MILLER	CLERK	7782	2000-01-21	1300.00		10
7902	FORD	ANALYST	7566	1997-12-05	3000.00		20
7654	MARTIN	SALESMAN	7698	1998-12-05	1250.00	1400.00	30

DEPT TABLE

DEPTNO	DNAME	LOCATION
10	Accounting	New York
20	Research	Dallas
30	Sales	Chicago
40	Operations	Boston

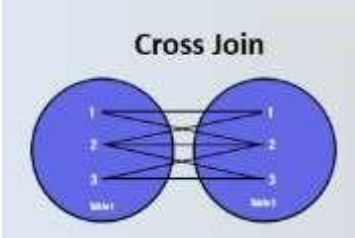
SALGRADE TABLE

GRADE	LOSAL	HISAL
1	700.00	1200.00
2	1201.00	1400.00
4	2001.00	3000.00
5	3001.00	99999.00

3	1401.00	2000.00

- Types of Join
  - Cartesian Product or Cross join
  - Equi Join
  - Natural Join
  - Non-Equi Join
  - Self Join
  - Left Outer Join
  - Right Outer Join

- **Cartesian Product or Cross join**
  - The cross join makes a Cartesian product of rows from the joined tables.
  - The cross join combines each row from the first table with every row from the right table to make the result set.
  - If Table1 has degree d1 and cardinality c1 and table2 has degree d2 and cardinality c2, their Cartesian Product has degree d=d1+d2 and cardinality c=c1*c2;



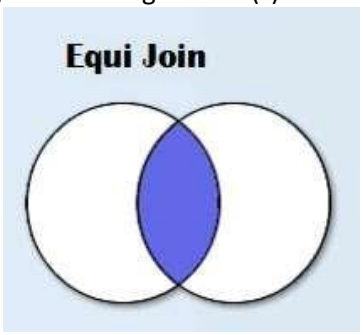
Ven Diagram Syntax:

SELECT * FROM table1, table2; OR
SELECT * FROM table1 CROSS JOIN table2; OR
SELECT * FROM table1 JOIN table2;

e.g. SELECT * FROM emp, dept; SELECT * FROM emp
CROSS JOIN dept;
SELECT * FROM emp JOIN DEPT;

Equi Join-

- It performs a JOIN against equality or matching column(s) values of the associated tables.



Ven Diagram

Syntax
SELECT * / Column_list
FROM Table1, Table 2
WHERE table1.column=Table2.column; OR
SELECT * / Column_list
FROM Table1 join Table2 on Table1.Column=Table2.Column;

Example: SELECT * FROM emp JOIN dept ON emp.deptno=dept.deptno; OR SELECT *
FROM emp, dept
WHERE emp.deptno=dept.deptno;

Example 1: Display the employee name, sal and name of department name

Ans: In the above query ename and sal belong to emp table whereas dname belongs to DEPT table. So, to retrieve data in this we will use join

```
SELECT emp.ename, emp.sal, dept.dname
FROM emp, dept WHERE emp.deptno=dept.deptno;
```

Output:

```
+--------+---------+------------+ | ename  | sal     | dname      | +--------+---------+------------+ | SMITH  |
800.00 | RESEARCH   | | ALLEN  | 1600.00 | SALES      | | WARD   | 1250.00 | SALES      | | JONES  |
2975.00 | RESEARCH   | | MARTIN | 1250.00 | SALES      | | BLAKE  | 2850.00 | SALES      | | CLARK  |
2450.00 | ACCOUNTING | | SCOTT  | 3000.00 | RESEARCH   | | KING   | 5000.00 | ACCOUNTING | |
TURNER | 1500.00 | SALES      | | ADAMS  | 1100.00 | RESEARCH   | | JAMES  |  950.00 | SALES      | |
FORD   | 3000.00 | RESEARCH   | | MILLER | 1300.00 | ACCOUNTING | +--------+---------+------------+
```

Note:

- In case of join **full qualified (table_name.column_name)** name is used to avoid ambiguity as both table contains common columns as PRIMARY KEY and FOREIGN KEY.
- Table Alias – Like column alias table alias can be used in case of join as given below. SELECT e.ename, e.sal FROM emp e, dept d WHERE emp.deptno=dept.deptno;
- Here 'e' & 'd' are table alias for EMP & DEPT table respectively.

Natural Join

- A natural join is a type of join operation that creates an implicit join by combining tables based on columns with the same name and data type.
- It makes the SELECT query simpler with minimal use of conditions.
- There is no need to specify the name of common column in the SELECT statement. Common column is present only once in the output.

Syntax:

```
SELECT */column_list
FROM Table1 NATURAL JOIN TABLE2; OR
SELECT * / column_list
FROM TABLE1 join on common_column_name;
```

Example :

```
SELECT * FROM emp JOIN dept USING(deptno); OR
SELECT * FROM emp NATURAL JOIN DEPT;
```

Question and answer

SALESMAN TABLE:

SALESMAN_ID	NAME	CITY	COMMISSION
5001	James Hoog	New York	0.15
5002	Nail Knite	Paris	0.13
5005	Pit Alex	London	0.11
5006	Mc Lyon	Paris	0.14
5007	Paul Adam	Rome	0.13

CUSTOMER TABLE:

CUSTOMER_ID	CUST_NAME	CITY	GRADE	SALESMAN_ID
3002	Nick Rimando	New York	100	5001
3007	Brad Davis	New York	200	5001
3005	Graham Zusi	California	200	5002
3008	Julian Green	London	300	5002
3004	Fabian Johnson	Paris	300	5006
3009	Geoff Cameron	Berlin	100	5003

3003	Jozy Altidor	Moscow	200	5007

Q1. Write a SQL query to display Salesman, cust_name and city from above table where the salesperson and customer belongs to same city.
Ans:

```
SELECT s.name AS "Salesman", c.cust_name, c.city
FROM salesman s, customer c WHERE s.city=c.city; OR
SELECT salesman.name AS "Salesman", customer.cust_name, customer.city FROM
salesman,customer WHERE salesman.city=customer.city;
```

Q2. write a SQL query to display ord_no, purch_amt, cust_name, city of those orders where order amount exists between 500 and 2000.
Ans:

```
SELECT  o.ord_no,o.purch_amt, c.cust_name,c.city
FROM orders o,customer c
WHERE o.customer_id=c.customer_id AND o.purch_amt BETWEEN 500 AND 2000;
```

Q3. Write a SQL query to display Customer Name, city, Salesman, commission the all salesperson(s) and their respective the customer(s).
Ans:

```
SELECT c.cust_name AS "Customer Name", c.city, s.name AS "Salesman", s.commission FROM customer c,
salesman s WHERE c.salesman_id=s.salesman_id;
```

Q4. What are Joins in SQL?
Ans. Joins in SQL are the statements or clauses using which we can combine two or more tables, based on some common fields present among the tables.

Q5.Explain the different types of Joins in SQL?
Ans: Some of the major joins in SQL are-

- Equi Join – Inner join is used to return the records which are having matching values in both the tables.
- Left Join – Left join is used to concatenate all the rows of the left table and the matching rows in the right table.
- Right Join-Right join is used to concatenate all the rows of the right table and the matching rows in the left table.
- Full Join-Full join is used to return all the records of both the tables as long as there is a matching record in either table.
- Self Join-Self join is a join that is used to join a table to itself. In a self-join, a table is considered as if it were two tables.
- Cartesian Join-Cartesian join is used to return the number of rows in the first table multiplied by the number of rows in the second table. It is also referred to as cross join.

Q6. What is Natural Join?
Ans: Natural join is used to create an implicit join clause based on the value of common attributes in the two tables. Common attributes are the attributes that have the same name in both tables. Natural join does not need any comparison operator as in the case of equi join.

Q7. What is an Equi Join?
Ans: An Equi Join is a type of join that combines tables based on matching values in the specified columns.

- The column names do not need to be the same.
- The resultant table can contain repeated columns.
- It is possible to perform an equi join on more than two tables.

Q 8. What is the difference between cross join and natural join?
Ans: A cross join produces a cross product or cartesian product of two tables whereas the natural join is based on all the columns having the same name and data types in both the tables.

UNSOLVED EXERCISE ON JOIN:

1. Consider the tables PARTICIPANT and ACTIVITY and answer questions that follow :

Table : PARTICIPANT

ADMNO	NAME	HOUSE	ACTIVITYCODE
6473	Kapil Shah	Gandhi	A105
7134	Joy Mathew	Bose	A101
8786	Saba Arora	Gandhi	A102
6477	Kapil Shah	Bose	A101
7658	Faizal Ahmed	Bhagat	A104

Table : ACTIVITY

ACTIVITYCODE	ACTIVITYNAME	POINTS
A101	Running	200
A102	Hopping bag	300
A103	Skipping	200
A104	Bean bag	250
A105	Obstacle	350

To display Names of Participants, Activity Code, Activity Name in alphabetic ascending order of names of participants. Also write your output. How many records were found when the above tables were used in an equi-join?

2. In a database there are two tables 'LOAN' and 'BORROWER' as shown below: Table: LOAN

LOAN_NO	BRANCH_NAME	AMOUNT
K-70	Downtown	5000
K-230	Redwood	6000
K-260	Perryridge	3700

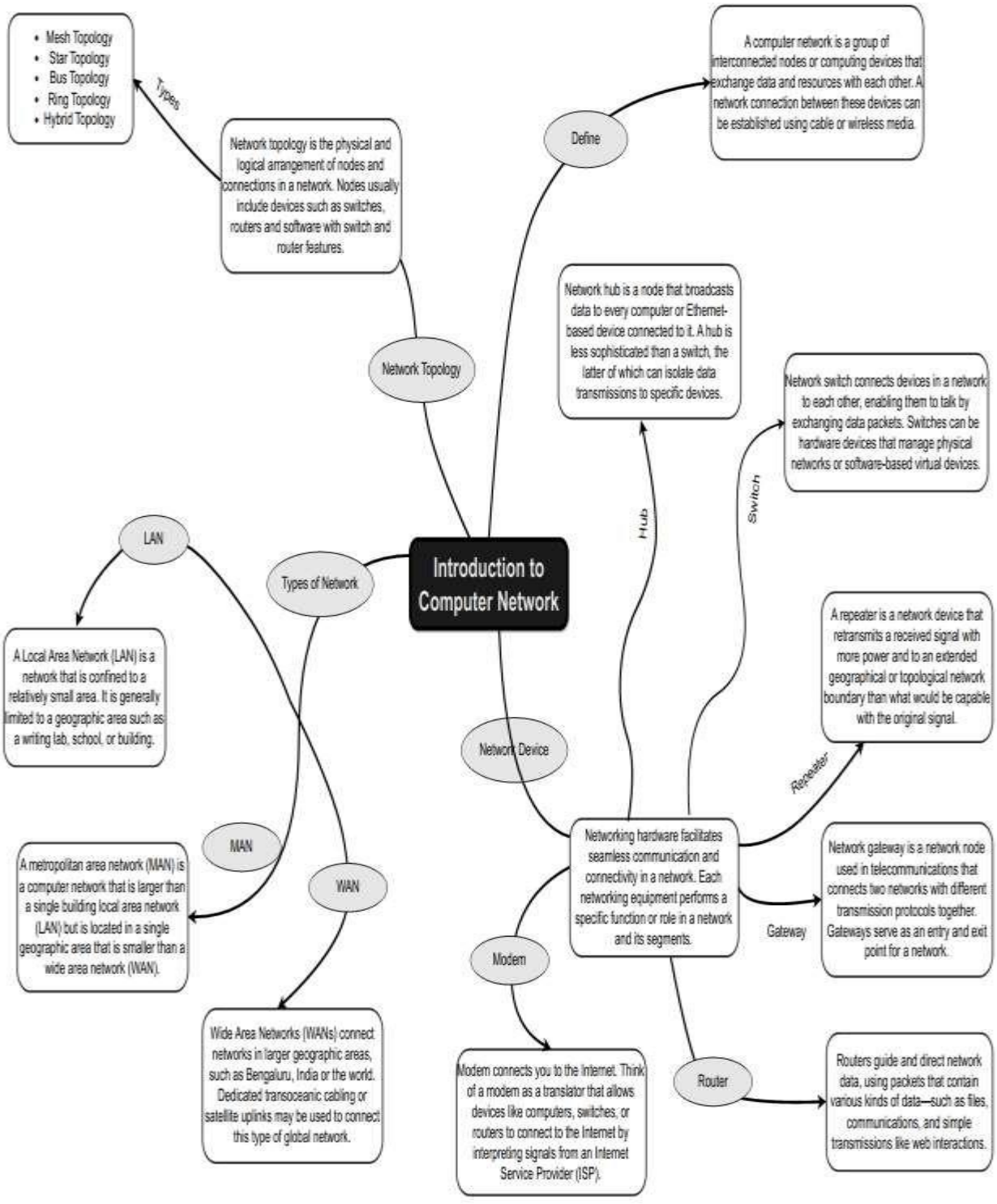
Table : BORROWER

CUSTOMER_NAME	LOAN_NO
Jones	K-170
Smith	K-230
Hayes	K-155

(iii) How many rows and columns will be there in the cross join of these two tables?

Write sql query to display customer smith's loan record with their Name, Loan _no, Branch _name and Loan amount.

Computer Networks



Mcq

1. Which of the following is the full form of URL?

a) Universal Resource Locator
b) Uniform Resource Locator
c) Unique Resource Locator
d) Universal Reference Link

Answer: b) Uniform Resource Locator

2. What is the primary function of a web browser?

a) To store files on the cloud
b) To access and display web pages from the internet
c) To manage email communication
d) To protect computers from viruses

Answer: b) To access and display web pages from the internet

3. Which protocol is used to transfer web pages over the internet?

a) HTTP b) FTP c) SMTP d) SNMP

Answer: a) HTTP

4. What does DNS stand for in the context of the internet?

a) Digital Network System c) Data Network Server

b) Domain Name System d) Distributed Name Service

Answer: b) Domain Name System

5. Which of the following is NOT a web browser?

a) Google Chrome b) Mozilla Firefox c) Microsoft Edge d) Google Drive

Answer: d) Google Drive

Evolution of Networking:

Network: - To connect the more than one device via a medium, is called network.

Why do we need network?

1. Fast and Secure Communication
2. Resource sharing
3. Reduce Cost Evolution of Network:

- **ARPANET:** The Advanced Research Projects Agency Network (**ARPANET**) was an early packet switching network and the first network to implement the protocol suite TCP/IP. Both technologies became the technical foundation of the Internet.
- **NSFNET**:
  - The **N**ational **S**cience **F**oundation **Net**work (NSFNET) was a program created and funded by the National Science Foundation to coordinate and promote advanced research and education in networking in the United States.
  - NSFNET was founded in 1985. NSFNET was a general purpose research network wherein the connection is not limited to the super computer centers, it was to serve as a backbone connection for regional networks at every supercomputing site and use ARPANET's TCP/IP protocol.
  - In 1986, the super computer centers were officially connected and it became open to all academic networks.
  - The NSF decided to transfer the operations of NSFNET to the private sector in the midst of the rapid growth of the network. NSFNET was officially dissolved on October 30, 1995.
- **Internet:** A network of networks.
- **WWW**: World Wide Web started on 6th August 1991, started by ' ***Berners Lee'*** .
- **Interspace:** Interspace is a client/server software program that allows multiple users to communicate online with real-time audio, video and text chat in dynamic 3D environments. Interspace provides the most advanced form of communication available on the Internet today.
- **Communication Terminologies:**

- **Channel**: A channel is a separate path through which signals can flow. A channel has a certain capacity for transmitting information, often measured by its bandwidth in Hz or its data rate in bits per second.
- **Bandwidth**: Bandwidth refers to the amount of information that can be transmitted over a network in a given amount of time, usually expressed in bits per second or bps.
- **Data Transfer Rate:** The data transfer rate of a computer network connection is normally measured in units of bits per second (bps).

  Larger units are *Kbps*, *Mbps* and *Gbps*, KBps, MBps,GBps

  bps means bits per second.
  Bps means Byte per second
  1 kilobit per second (Kbps) = 1000 bits per second (bps).
  1 megabit per second (Mbps) = 1000 Kbps or 1000^2 bps.
  1 gigabit per second (Gbps) = 1000 Mbps
  1 Terabit per second (Tbps) = 1000 Gbps

- **Types of Networks:**
  - Local Area Network (LAN)
  - Metropolitan Area Network (MAN)
  - Wide Area Network (WAN) Personal Area Network (PAN) **LAN**:
  - Use in small local area, like in an institute or an organization.
  - Devices are connected via physical medium.
  - Limited distance, up to 150 Meter.
  - Example – **Intranet MAN**:
  - Larger than LAN.
  - Used in Metropolitan cities.
  - Range up to 50 KM.
- **WAN**:
  - It connects device across globe.
  - It uses public network
  - Internet
  - BSNL VSNL **PAN**:
  - For very small distance
  - Private Communication
  - Example: **Bluetooth**

- **Network Devices:**
  - Modem
  - Hub
  - Switch
  - Gateway
  - Bridge
  - Router
  - Repeater

- **Modem**:
  - The full form of modem is Modulator and demodulator**.**
  - A modem is a device or program that enables a computer to transmit data over telephone or cable lines.
  - A modem converts analog signal to digital signal and vice- versa.
  - Modem connects computer to internet.
  - There are two types of modems:
    - Internal Modem
    - External Modem

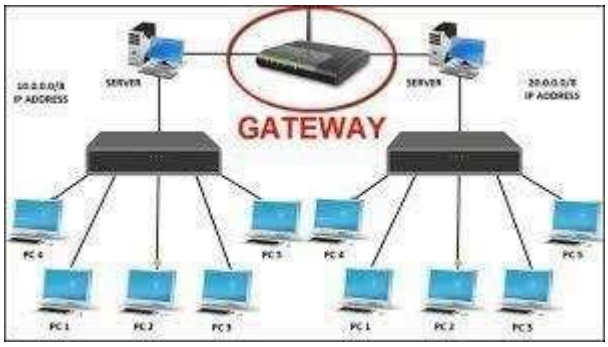
Class 12 IP Notes

- **Hub**:
  - A network device that contains multiple ports.
  - Provides multiple connections.
  - When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets.
  - There are two types of hubs:
    a. Active Hub:
       - It strengthens the signal may boost noise too.
       - It needs electricity.
    b. Passive Hub
       - It repeat/copy signals.
       - It does not need electricity

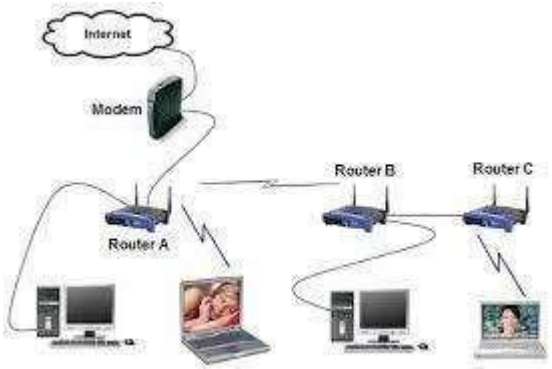
Switch:

  - A switch is called *smart hub.*
  - Provides multiple connections
  - A device that filters and forwards packets between LAN segments.

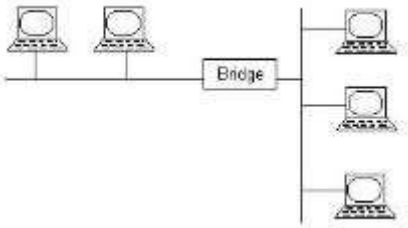
- **Gateway**:
  - A gateway is a network point that acts as an entrance to another network.
  - Used to connect two dissimilar networks



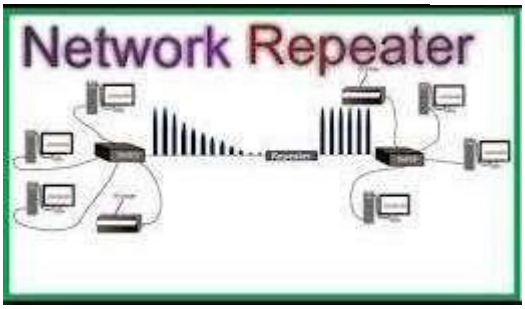
- **Router**:
  - A router is a device that forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs. Routers are located at gateways, the places where two or more networks connect.
  - A router acts as a dispatcher, choosing the best path for information to travel so it's received quickly.



- **Repeater:**
  Network repeaters regenerate and amplify the weak signals to transmit the information for long distance.



- ✞ It stands for Registered Jack.
- ✞ It is common interface to connect Twisted Pair Cable.
- ✞ It is used for Ethernet and Token Ring Network.



- **Bridge**:
  - ✞ It connects multiple network segments having same protocol ✞ It works at Data Link Layer (Layer 2).
  - ✞ Bridge does not simply broadcast traffic from one network.
  - ✞ Bridges use bridge table to send frames across network segments.
  - ✞ It also improves the overall network performance.
- **RJ45**

- **Ethernet Card**
  - ✞ It also known as NIC card.
  - ✞ It enables a computer to access an Ethernet network (LAN)

- It has MAC id which gives it unique identity in the network.

- **Wi-Fi card**
  - It is also known wireless network adaptor.
  - It is a wireless network technology that allows devices to communicate over wireless signals.
  - It uses radio waves for the communication

- **Difference between Router and Switch**
  - A network switch forwards data packets between groups of devices in the same network, whereas a router forwards data between different networks**.**

- **Difference between a Router and a Modem**
  - A router forms networks and manages the flow of data within and between those networks, while a modem connects those networks to the Internet.
- **Difference between a Router and Gateway**
  - A gateway is a concept while a router is a device that implements a gateway.

Router	Gateway
It ensures that data packets are switched to the right address with the best route.	To connect two networks of different protocols as a translator
It routes the data packets via similar networks	It connects two dissimilar networks
It supports dynamic Routing.	It does not support dynamic Routing.

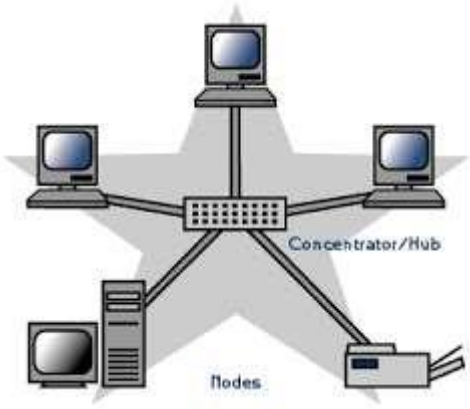
- **Network Topologies:**

The term Topology refers to the way/layout in which the various nodes or computers of a network are linked together.

The following factors are considered while selecting a topology:

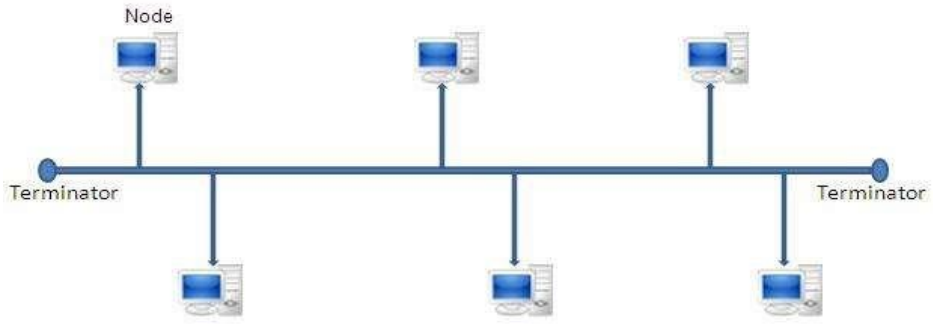
- Cost
- Reliability
- Bandwidth Capacity
- Ease of installation
- Ease of Troubleshooting
- **Star Topology**

- The physical star Topology uses a central controlling hub with dedicated legs pointing in all directions – like points of a star.
- Each network device has a dedicated point-to-oint link to the central hub.
- There is no direct link between these computers and the computers can communicate via central controller only.



Advantages	Disadvantages
Reliable Robust Failure of node does not affect the working of the network. Fault detection and isolation is easy. Maintenance of the network is easy. It doesn't create bottlenecks where data collisions occur.	Central node dependency. If the central controller or hub fails, entire system collapses. Cabling cost is more Difficult to install

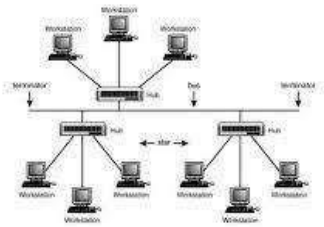
- **Bus Topology**
  - It consists of one continuous length of cable (trunk) that is shared by all the nodes in the network and a terminating resistor (terminator) at each end that absorbs the signal when it reaches the end of line.
  - Without a terminator the electrical signal would reach the end of copper wire and bounce back, causing errors on the network.
  - Data communication message travels along the bus in both directions until it is picked up by a workstation or server NIC.
  - If the message is missed or not recognized, it reaches the end of the cabling and dissipates at the terminator. Bus Network Topology requires a multipoint connection.



Advantages	Disadvantages

Easy to install and the use for small networks. Requires less cable Failure of one node does not affect the network functioning. Cost is less New node can be easily added	If the main cable fails the entire network collapses. Difficult to reconfigure, due to more connections. Difficult to troubleshoot Slow, due to traffic on single cable Only one device transmits at a time, other devices wait for their turn.

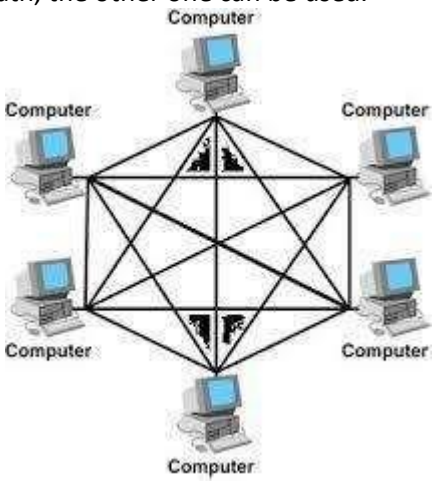
- **Tree Topology**
  - This topology has Hierarchical structure.
  - This topology connects the node via hubs. Hub, which is present at top level, is called **root hub** or **active hub**.
  - Another hub is called secondary hub or passive hub.



TREE TOPOLOGY

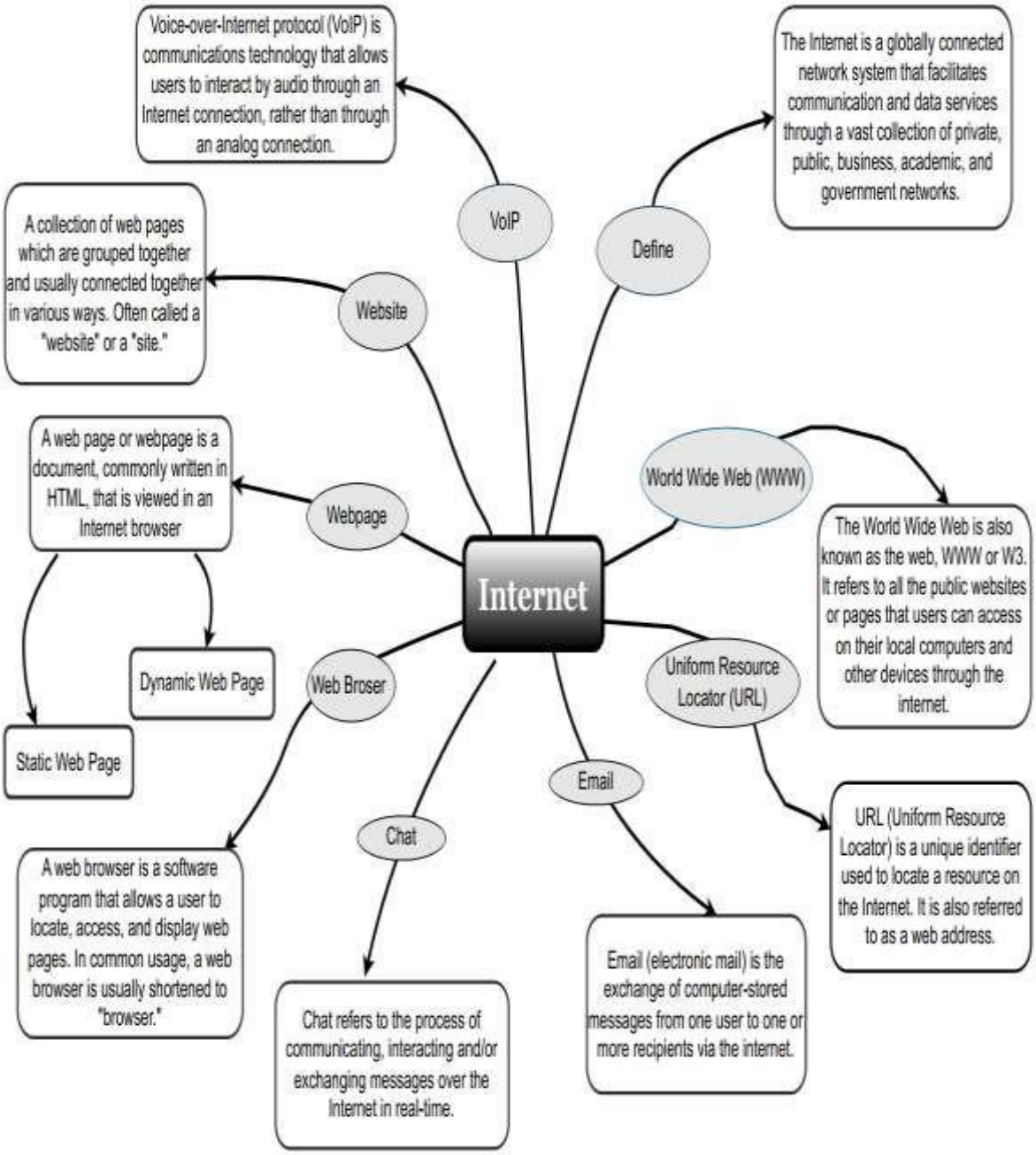
Advantages	Disadvantages
New node can be added easily. Signal can travel for long distance. Isolate and prioritize communication.	If the backbone line breaks, the entire segment goes down. More difficult to configure Higher cabling cost

- **Mesh Topology:**
  - In mesh each node is connected to every other node in the network i.e. each node has a dedicated point to point link to every other node as shown.
  - Dedicated means that the link carries the traffic only between two devices it connects.
  - In this way there exist multiple paths between two nodes of the network.
  - In case of failure of one path, the other one can be used.



Advantages	Disadvantages
• It is robust. Failure of one node does not collapse the entire system. • No traffic congestion • Dedicated links ensure faster transmission • Point to point links makes fault identification and isolation easier.	• Network installation and reconfiguration difficult. • High cabling cost. If there are n nodes in the network then each node has (n-1) connections.

INTERNET



- **The Internet**: it is the global network of computing devices including desktop, laptop, servers, tablets, mobile phones, other handheld devices as well as peripheral devices such as printers, scanners, etc.

- **URL**:
  - URL stands for Uniform Resource Locator. It is a unique identifier used to locate a resource on the internet. It is also referred to as web address.
  - The URL contains: -
    - the name of the protocol to be used to access the file resource
    - a domain name that identifies a specific computer on the internet
    - a pathname with hierarchical description that specifies the location of a file on that computer.

- **Applications of Internet:**

  Following are some of the broad areas or services provided through Internet:
  - World Wide Web (WWW)

- Electronic mail (Email)
- Chat
- Voice Over Internet Protocol (VoIP)

- **World Wide Web**:
  - It is a way of exchanging information between computers on the internet, tying them together into vast collection of interactive multimedia resources.
  - its development began in 1989 by Tim Berners Lee and his colleagues at CERN

- **Differences between internet and www**

Internet	www
It is a global network of networks	It is a way of accessing information over the medium of internet
It connects millions of computers together globally	It is information sharing model that is built on the top of internet
It does not utilize web browsers. It is the structure on which www is based	It utilizes web browsers
It does not use any protocols	The web uses http protocol to transmit data.

- **Advantages of World Wide Web are**:
  - Information can be accessed from anywhere.
  - It provides rapid interaction communication which can be used for different services.
- **E-mail (Electronic Mail)** :
  - It is a paperless method of sending messages, notes, pictures and even sound files from one place to another using the internet as a medium.
  - E-mail address is an individual name which is used to send and receive email on the internet.
  - E-mail address is used to identify source and destination of an email message. the format of email address is:

    username@domainname

    where username is a unique username and domain name identifies the mail server. eg xyz@gmail.com

- **Components of email message**:
  - To field used to provide the email address of the receiver
  - from field to specify address of the sender
  - subject specifies the purpose of the email
  - Cc stands for carbon copy, this field is optional
  - Bcc stands for blind carbon copy. Here the recipients do not get to know who the other recipients are.
  - Message Body
- **Most commonly used email protocols on internet** are:
  - POP3(Post Office Protocol):
    - It is a standard mail protocol used to receive emails from remote server to a local client
  - IMAP (Internet Message Access Protocol):
    - It is a mail protocol for accessing email on a remote web server from a local client.
  - SMTP (Simple Mail Transfer Protocol):
    - Protocol for sending emails across internet

- **Chat**:
  - Chatting or instant messaging over the Internet means communicating to people at different geographic locations in real time through text message(s).

- Applications such as WhatsApp, Snapchat, Skype, Yahoo Messenger, Google Talk, Facebook Messenger, Google Hangout, etc., are examples of instant messengers.

- **VoIP (Voice over Internet Protocol):**
  - It is a technology that allows you to make voice calls using a broadband internet connection instead of a regular phone line.
  - VoIP works on the simple principle of converting the analogue voice signals into digital and then transmitting them over the broadband line. These services are either free or very economical
  -

- **Website**: Collection of web pages which are interlinked to one another. These pages are hypertext pages and link between pages is known as hyperlink.

- **Webpages**:

  - It is a document written in HTML) viewed on internet browser
  - It is used show information to viewers. It may contain text, graphics, hyperlinks to other web pages and files.
  - First main page of a website is called as Home Page.
  - Types of web pages:
    - Static Web Page
    - Dynamic Web Page

- **Difference between Static and Dynamic webpage:**

Static Web Page	Dynamic Web Page
The static web pages display the same content each time when someone visits it.	In the dynamic Web pages, the page content changes according to the user.
It takes less time to load over internet.	Dynamic web pages take more time while loading
No Database used.	A database is used in at the server end in a dynamic webpage.
Changes very rarely	Changes very frequently

- **Difference between website and webpage:**

Website	Webpage
It is a cluster of related webpages addressed to a typical URL	It is a part of website which comprises links to other web pages
There is no extension used in the URL of a website	The webpage URL has an extension.

- **Web Hosting:**

  - online service that enables user to publish website or web application on the internet.
  - When user sign up for a hosting service, basically rent some space on a server on which user can store all the files and data necessary for website to work properly.
  - A server is a physical computer that runs without any interruption so that website is available all the time for anyone who wants to see it.

- **Web Browser:**

  - it is a special software that enables the user to read/view the web page and jump from one web page to another.
  - Mosaic was the first web browser developed by the National Centre for Supercomputing Application (NCSA).

- eg. Microsoft Edge,Mozilla Firefox, Google Chrome,Opera etc.

- **Browser Setting:**

  - Every web browser has got certain settings that define the manner in which the browser will behave.
  - These settings may be with respect to privacy, search engine preferences, download options, auto signature, autofill and autocomplete feature, theme and much more.

- **Add-ons, Plug-in:**

  - Add-ons and plug-ins are the tools that help to extend and modify the functionality of the browser.
  - Both the tools boost the performance of the browser, but are different from each other.
  - A plug-in is **a complete program** or may be a third-party software. For example, Flash and Java are plug-ins.
  - A Flash player is required to play a video in the browser.
  - A plug-in is a software that is installed on the host computer and can be used by the browser for multiple functionalities and can even be used by other applications as well.
  - An add-on is **not a complete program** and so is used to add only a particular functionality to the browser. An add-on is also referred to as extension in some browsers **Cookies:**
  - A cookie is a text file, containing a string of information, which is transferred by the website to the browser when we browse it.
  - This string of information gets stored in the form of a text file in the browser.
  - The information stored is retransmitted to the server to recognize the user, by identifying pages that were visited, choices that were made while browsing various menu(s) on a particular website.

QUESTIONS FROM COMPUTER NETWORKS:

Section A: Multiple Choice Questions

1. For web pages where the information is changed frequently, for example, stock prices, weather information which out of the following options would you advise.
   a. static webpage b. dynamic webpage
   c. both a and b d. none of the above

Answer: (b) dynamic webpage

2. which among the following is not an example of browser.
   a. Chrome b. Firefox
   c. Avast d. edge

Answer: (c) Avast

3. _____ is a networking device that forwards the data packets between computer network
   a. Repeater b. Hub
   c. Switch d. Router

Answer: (d) router

4. Which transmission media provides highest transmission speed in a network?
   a. Twisted Pair Cable b. Coaxial cable
   c. Optical Fiber d. All of these

Answer: (c) Optical Fiber

5. NSFNET stands for _____
   a. National Science Foundation Network
   b. National Science fundamental network
   c. neuro Science Foundation Network
   d. National Search Foundation Network

Answer: (a) National Science Foundation Network

6. Physical or logical arrangement of network refers to as _____
   a. Routing b. Looping
   c. Topology d. Networking

Answer: (c) Topology

7. Which network topology has a central device, which brings all signals together
   a. Bus b. Star
   c. Ring d. Hybrid

Answer: (b) Star

8. Bluetooth is an example of _____
   a. Personal Area Network b. Local Area Network
   c. Virtual Private Network d. wide area network

Answer: (a) Personal Area Network

9. Which networking device is used to transfer communication signal to long directions?
   a. Amplifier b. Repeater
   c. Router d. all of the above

Answer(b)

10. Which is called as smart hub?
   a. Hub with high-speed ports b. Switch
   c. Router d. All of the above

Answer(b)

11. Which topology in general uses less wire length compare to other?
   a. Star topology b. Ring topology
   c. Bus topology d. All use same length of wire

Answer(c)

12. A collection of hyperlinked documents on the internet forms the
   a. World Wide Web (WWW) b. Email system
   c. Mailing list d. Hypertext Markup Language

Answer (a)

13. HTML is used to create:
   a. Machine Language program b. High level program
   c. web page d. web server

Answer(c)

14. Which term identifies a specific computer on the web and the main page of the entire site?
   a. WWW b. link
   c. SQL d.URL

Answer (d)

15. How is a domain name different from URL?

Answer: Domain names are used in URLs to identify particular web servers. for example in the URL **http ://www.cbse.nic.in/welcome.htm** , the domain name is www.cbse.nic.in

16. Rashmi has to send an email to Raees. She also wants to send the same email to Anjali but does not want Raees to know about it. Which option out of Cc and Bcc should Rashmi use to enter the email address of Anjali?

Answer: Bcc(Blind Carbon Copy)

17. When a user browses a website the web server sends a text file to the web browser. What is the name of the file.

Answer: cookies

ASSERTION AND REASONING QUESTIONS:

Directions:

In the following questions a statement of assertion (A) is followed by a statement of Reason(R)Mark the correct choice as:

a. Both assertion (A) and reason(R) are true and reason(R) is the correct explanation of assertion(A)
b. Both assertion (A) and reason(R) are true and reason(R) is not the correct explanation of assertion(A)
c. Assertion (A) is true but reason(R) is false

d. Assertion (A) is false but reason(R) is true

18. **Assertion** (A) Browser is the software to access internet-based webpages in the computer.
Reason (R) Local Area Network (LAN) is a network where two or more computers are connected within 1 km.

Answer: (b)

19. **Assertion**(A): Cookies are plain text files
Reason (R): Cookies store the profile picture on social media.

Answer: (c)

20. **Assertion**(A): Static webpage contains content that do not change
Reason(R): They may only change if the actual HTML file is manually edited.

Answer: (a)

21. **Assertion**(A): the Personal Area Network (PAN) is established within a very small area (20 to 30 sq. ft.) for sharing information among computers
Reason (R): the Campus Area network is used to interconnect computers located with within a campus such as university campus, corporate campus, hospital campus etc.

Answer: (b)

22. **Assertion**(A): A repeater is a device that amplifies network over geographical distance **Reason** (R): A hub is a device which is used to connect more than one device in the network.

Answer: (b)

23. **Assertion**(A): VoIP stands for Voice over Internet Protocol.
Reason (R): It is a technology that allows you to make voice calls using a broadband internet connection in stead of a regular phone line.

Answer (A)

Short Answer type questions (2 marks)

24. Aman a freelance website developer has been assigned a task to design a few web pages for a book shop. Help Aman in deciding out of static page and dynamic webpage, what kind of web pages should be designed by clearly differentiating between static and dynamic web pages on at least two points.

Answer:

Static web page	Dynamic web page
content of this type of webpage cannot be changed at run time.	content of this type of webpages can be changed at run time.
no interaction with server in case of static web pages.	interaction with server database is possible in case of dynamic web pages.

25. Priyanka a beginner in IT field has just started learning web technologies. Help her in understanding the difference between website and web pages with the help of a suitable general example of each.

Answer:

The difference between a website and a web page is that a website is a collection of different web pages containing information on a particular topic.
A web page is an individual page of a big website usually containing more specific information.

26. Sahil a class X student has just started understanding the basics of internet and web technologies. He is a bit confused in between the terms World Wide Web and Internet. Help him in understanding both the terms with the help of suitable examples of each.

Answers:

INTERNET	WWW
It is a global network of networks.	It stands for world wide web
it is a means of connecting a computer to any other computer anywhere in the world.	it is a collection of information which is accessed via internet

it can be viewed as a big book store.	it can be viewed as collection of books on that store.

27. Murugan wants to send a report on his trip to the North East to his mentor. The report contains images and videos. How can he accomplish his task through internet?

Answer:

He can accomplish task by uploading files to a Cloud Storage Services like Google Drive, Drop Box, OneDrive and sharing them or email them. Murugan can send his report to his mentor through internet.

28. Explain VoIP.

Answer:

VoIP allows us to have voice call over internet. i.e., the voice transmission over a computer network rather than through the regular telephone network.

29. What is the difference between Hub, Switch and Router?

Answer:

- Hub is least expensive, least intelligent and least complicated of the three and it broadcasts data to every port which may cause serious security and reliability concern.
- Switch works similarly like hub but in a more efficient manner. It creates connections dynamically and provides information only to the requesting port.
- Router is smartest and most complicated out of the three. It comes in all shapes and sizes. Routers are located at gateway and forwards packets in a network.

LONG QUESTIONS(4 MARKS)

30. You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (v), keeping in mind the distances between the buildings and other given parameters.

Shortest distances between various buildings

MUMBAI CAMPUS: ADMIN TO ACCOUNTS	55 m
ADMIN TO EXAMINATION	90 m
ADMIN TO RESULT	50 m
ACCOUNTS TO EXAMINATION	55 m
ACCOUNTS TO RESULT	50 m
EXAMINATION TO RESULT	45 m
DELHI Head Office to MUMBAI campus	2150 m

Number of computers installed at various buildings are as follows:

ADMIN	110
ACCOUNTS	75
EXAMINATION	40
RESULT	12
DELHI HEAD OFFICE	20

(i) Suggest the most appropriate location of the server inside the MUMBAI campus (out of the four buildings) to get the best connectivity for maximum number of computers. Justify your answer.

(ii) Suggest and draw cable layout to efficiently connect various buildings within the MUMBAI campus for a wired connectivity.

(iii) Which networking device will you suggest to be procured by the company to interconnect all the computers of various buildings of MUMBAI campus?

(iv) Company is planning to get its website designed which will allow students to see their results after registering themselves on its server. Out of the static or dynamic, which type of website will you suggest?

(v) Which of the following will you suggest to establish the online face to face communication between the people in the ADMIN office of Mumbai campus and Delhi head office? a) Cable TV b) Email c) Video conferencing d) Text chat

Ans.

Ans.

i. Server Location: **ADMIN building**.
ii. Cable Layout: **ADMIN → RESULT → EXAMINATION → ACCOUNTS → ADMIN**.
iii. Networking Devices: **Switches and a Router**.
iv. Website Type: **Dynamic Website**.
v. Communication Method: **Video Conferencing**.

31. Multipurpose Public School, Bengaluru is setting up the network between its different wings of school campus. There are 4 wings named as: - SENIOR(S), JUNIOR(J), ADMIN(A) and HOSTEL(H)

Distance between various buildings is as follows:

Hostel to Admin	55m
Admin to Senior	150m
Senior to Junior	160m
Junior to hostel	60m admin to junior 125m
senior to hostel	180m

Number of Computers in each unit:

Admin	25
Junior	100
Senior	15
Hostel	60

(i) Suggest and draw the cable layout to efficiently connect various wings of Multipurpose Public School, Bengaluru.

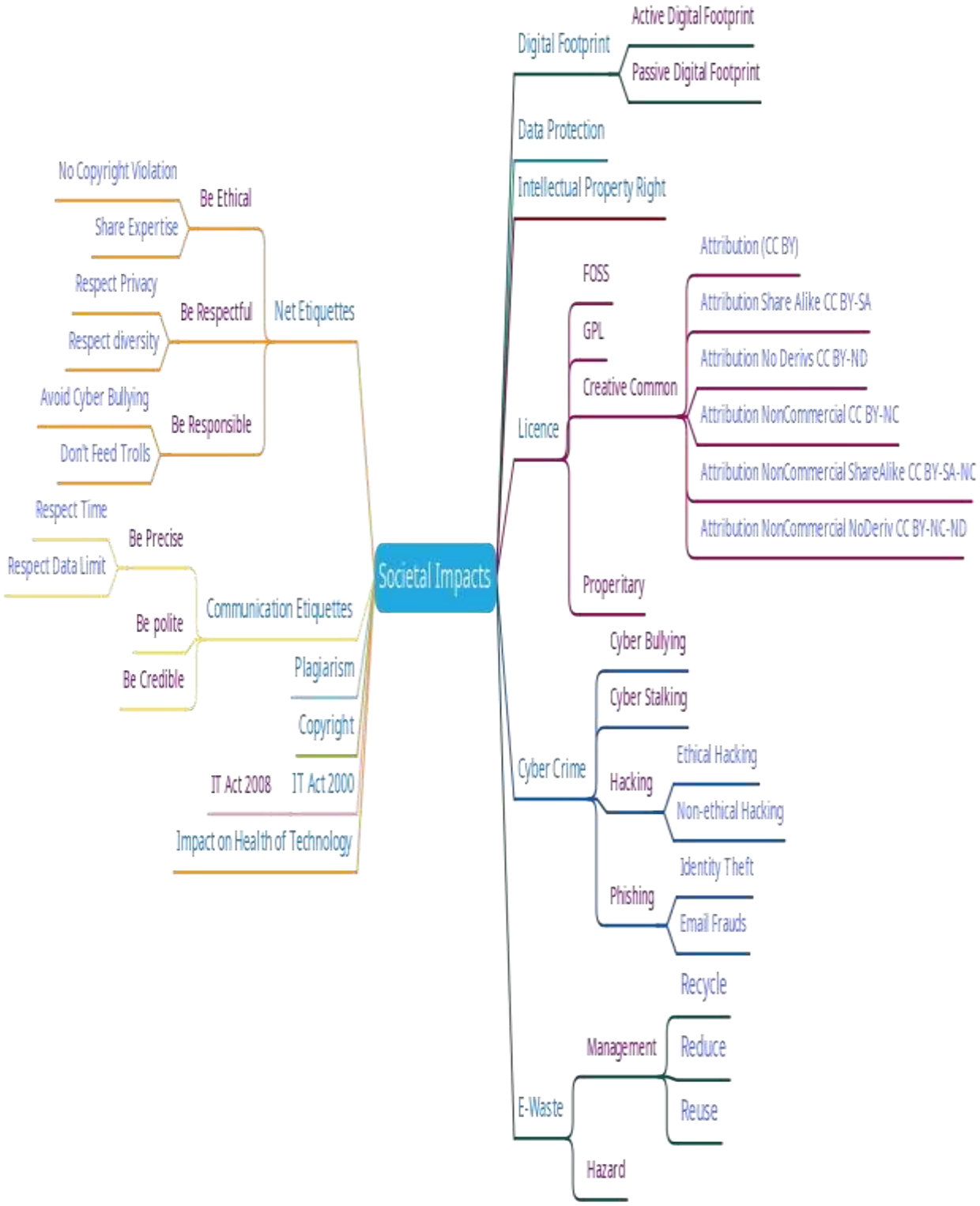
(ii) Name the most suitable wing where the servers should be installed. Justify your answer.

(iii) Suggest a device/software and its placement that would provide data security for the entire network of the school

(iv) Suggest a device and a protocol that shall be needed to provide wireless internet access to all smartphone/laptop users in the campus of Multipurpose Public School, Bengaluru.

(v) Suggest the placement of repeater with justification

Societal Impact



What is a Digital Footprint?

- A digital footprint is an impact you create on the Web through your online activity, which incorporates browsing, interactions with others, and publication of content.
- In other words, it can be considered as the data trail – intentional and unintentional - you leave behind while you surf the Web or Internet.

- Digital footprint or digital shadow refers to the trail of data left behind through the utilization of the Web or on digital devices.
- The digital footprint of any person can have a positive as well as a negative impact on him.

How Digital Footprints are created?

Find some of the examples of digital footprints:

- Visiting Websites and Online Shopping
- Online Searching
- Posting on social media, blogs, etc.
- Online Image and Video Upload
- Communicating Online (Ex: - Chat, Email, etc.) Any activity you perform Online etc.

Types of Digital Footprints:

Active and Passive Digital Footprints.

- **Active digital footprints**: -Active digital footprints are those data trails that a person leaves intentionally on the Web.
  Ex: - Twitter, blog posts, Facebook, social network connections, image and video uploaded on Internet, phone calls, email, and chats are among the ways people create active digital footprints.
- **Passive digital footprints**: - This suggests that a passive footprint would be defined as the unintentional traces of data that an individual creates on the Web.
  Ex: -Website visits and actions, searches, and online purchases are among the activities that add passive data traces to a digital footprint.

Positive and Negative Digital Footprints.

Positive digital Footprints: -That reflects your Positive Personality.

- Increased opportunity
- Higher profits
- Less risk
- Gentler treatment

Negative digital footprints: - Things that reflect your Negative Personality sort of a drunken photo, a silly comment, logging on to an inappropriate website.

- Fewer Opportunities (like Admission, Job, etc.)
- Negative Personal Image

How Digital Footprints can affect you?

- **Privacy Issues**: Digital footprints are a privacy concern because they're a group of traceable actions, contributions, and concepts shared by users. They are often tracked and may allow internet users to find out about human actions.
- **Cyber Vetting**: where interviewers could research about the applicants before the interview based on their online activities on the Web.
- **Target advertisement**: It is used by marketers so as to seek out what products a user is curious about or to inspire ones' interest during a certain product that supported similar interests.
- Less/More Opportunities depends upon your Positive/Negative Digital Footprints. **How can you manage your Digital Footprint?**

- Though it is not possible to fully hide your digital footprints, you can follow some of the given techniques to manage your digital footprints.
- You can search your name on different search engines and they provide you facilities where you can set up an alert for future notifications when your name searched online
- Have different email addresses, so professional and private accounts aren't automatically related to each other
- You can change privacy settings on social media accounts where you do not make more things public. But you should not trust them completely because your data is still with those platforms.
- Exercise caution altogether our activities, and refrain from oversharing

Net Etiquettes

- Etiquette means the general behaviour you must follow in your daily life. Net Etiquette are rules that you must be obeyed when you are online

- Online etiquette or 'netiquette' refers to the dos and don'ts of online communication.
- You can do Online Communication using Snapchat, Instagram, WhatsApp, etc. These are the most popular online mediums available online.

Net Etiquettes you should follow.

- **Be Ethical**
  - **No copyright violation**: we should not use copyrighted materials without the permission of the creator or owner
  - **Share the expertise**: it is good to share information and knowledge on internet so that others can access it.
- **Be Respectful**
  - **Respect privacy**: We should respect this privacy of other as we care for our privacy and should not share that such information without each other's consent.
  - **Respect diversity**: We should respect the diversity of the people in terms of knowledge, experience, culture, beliefs and other aspects.
- **Be Responsible**
  - **Avoid cyber bullying**:
    - **Cyber Bullying** implies repeatedly targeting someone with intentions to hurt or embarrass.
    - It includes insulting, degrading or intimidating online behaviour such as posting of rumours, giving threats online, posting the victim's personal information, sexual harassment or comments aimed to publicly ridicule a victim.
  - **Don't feed the troll**:
    - **Cyber Trolling** is a form of online harassment that involves intentionally posting provocative, offensive, or inflammatory comments on social media platforms, discussion forums, or blogs with the intention of causing emotional distress or anger.
    - The best way to discourage trolls is not to pay any attention to their comments.

Communication Etiquettes

- Digital communication includes email, texting, instant messaging, talking on the cell phone, audio or video conferencing, posting on forums, social networking sites.
- Being a good digital citizen (netizen), we must abide by following Communication Etiquettes.
- **Be Precise**
  - **Respect time**:
    - Don't waste stime in responding to unnecessary emails.
    - Don't expect an instant response as the recipient may have other priorities. **Respect data limits**:
    - Avoid large attachment
    - Send data through storage such as Google Drive, Microsoft OneDrive, DropBox etc.
- **Be Polite**: We should be polite, non-aggressive and non-abusing in our communication even if we don't agree with their point of view.
- **Be Credible**: We should be cautious while making a comment, replying or writing an email or forum post as such acts decide our credibility over a period of time.

Data Protection

- To protect these data from substantial harm, embarrassment, inconvenience and unfairness to an individual.
- Sensitive data like biometrics information such as fingerprint, health information, financial information, or other personal data like documents, photos, audio clips, videos are required to be protected.

The data protection can be implemented by using one of the following methods:

1. **Encryption:** It is a method of representing in such a way that only authorized parties or systems can understand the data patterns. In this technique, the text data will be converted into ciphertext. Ciphertext refers to converting user-readable data into incomprehensible data.
2. **Authentication**: Authentication involves the user's identity using different credentials like username and password, security keys, different sensor locking systems, OTP and other verification methods.

Intellectual Property Right (IPR)

- Intellectual Property refers to inventions, literary and artistic expressions, designs and symbols, names and logos.
- The Intellectual Property Right gives ownership to the creator of the Intellectual Property holder.
- By this, they can get recognition and financial benefits from their property.
- These intellectual properties are legally protected by copyrights, patents, trademarks, etc.

Copyrights

- Copyrights refers to the legal rights to use a material like writing, articles, photographs, audios, videos, software or any other literacy or artistic work.
- Copyrights are **automatically** granted to the creators or the owners.
- The right includes the right to copy, reproduce, distribution of the work or content.
- If a person needs to use copyrighted materials, then the needs to obtain a license or written permission of the creators.
- There are some CC (Creative Common) license and GNU GPL license. They allow to use their creation as loyalty free materials

Patents

- The patents are given for the inventions.
- The creator needs to apply for the invention.
- When the patent is granted, the owner gets rights to prevent others from using, selling or distributing the protected invention.
- Patent gives full control to the patentee to decide how others can use the invention. A patent protects an invention for 20 years, after that public can use it freely.

Trademark

- Trademark is applicable for the visual symbol, word, name, design, slogan, label, etc for the product.
- It provides uniqueness for the other brands and commercial enterprise.
- It also gives recognition to the company.
- The trademark product denoted by ® or ™ symbols. There is no expiry time for the trademark.

Licensing

- A license refers to a contract or permission or agreement given to any party by a creator to use their product or service or creation.
- A license can be purchased by paying money. License is the term that gives special rights to the user to use the copyrighted material.
- Similarly, a software license is an agreement that provides legal rights to the authorised use of digital material.
- All the software, digital documents or games you are downloading from the internet provides the license agreement to use the material. If anyone is not following will be considered a criminal offence.

Violation of IPR.

Class 12 IP Notes

Knowingly or unknowingly, people are violating IPR while doing work. So, the violation of IPR done in following ways:

1. Plagiarism
2. Copyright Infringement
3. Trademark Infringement

Plagiarism

- Plagiarism refers to copy or share the intellectual property of someone without giving any credit or any mention of the creator.
- Sometimes if you derived an idea or product which is already available, then also it is considered plagiarism. Sometimes it is also considered fraud.
- Whenever you are using any online material for your personal use or for any purpose, always cite the author and source to avoid plagiarism.

Copyright Infringement

- When you use the work of others without taking their written permission or don't pay for that using that is considered as copyright infringement.
- If you download an image from google and use in your work even after giving the credit or reference you are violating copyright.
- So before downloading any content check it for copyright violation.

Trademark Infringement

- The unauthorized use of trademark product is known as trademark infringement. - The trademark owner can take a legal action for trademark infringement.

Public Access and Open Source

- Open source allows using the material without any special permission.
- Some software is there which are available for free of cost and allows redistribution. User can use them, copy them and redistribute them.
- They are available with modifiable source code. Free and Open-Source Software (FOSS) is a large community of users and developers who are contributing towards open-source software.
- These tools are Linux, Ubuntu, open office, Firefox are examples of open-source software.

CC and GPL

You have a creative commons license and General Public License to use such material.

- The CC is commonly used for some creative resources like websites, music, film, or literature etc.
- GPL is designed for the software, add-on, plugin or themes.
- It allows the end-user to use, run, study, share and modify the software.
- GPL license do not provide the regular updates and support.
- The CC is a non-profit organization that provides a wide range of resources like images. videos, and other libraries. Some them offers proper attribution and credit to use them.
- CC license offer a copyright license to use someone's materials to share, use and extend the work done by them.
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01 Mark Questions

1. From which year did the IT Amendment Act, 2008 come into force?
i. 2009 ii. 2008 iii. 2000 iv. 20004

2.Online _____ is a theft of personal information in order to commit a fraud.
i. Phishing ii. Prank iii. Identity theft iv. All of these

3 _____ is a specific type of disorder where a person can't strike a balance between their online and offline time?
i. Phishing ii. Tech savvy iii. Internet Addiction iv. None of these 4. Any fraudulent business practice that extract money from an ignorant person is called.
i. Phishing ii. Scam iii. Both iv. None of these

5. Any information about you created by you that exists in digital form is referred to as.
i. Intellectual property ii. Digital property iii. Both iv. None of these

6. Which of the following come under cybercrime?
   a. The theft of brand-new sealed laptop.
   b. Access to a bank account for an unauthorized money transaction
   c. Modification in a company's data with unauthorized access
   d. Photocopy of a print report

i. a and b ii. a and c iii. b and c iv. D

7. Using someone else's twitter handle to post something will be termed as.
i. Fraud ii. Identity Theft iii. Online stealing iv. Violation

8. Standard security protocol that establish encrypted link between web server and browser is called.
i. Web encryption Technology ii. STD Technology iii. Online safety Technology iv. Security socket Technology

9. Intellectual property right protect the use of information and idea that are of.
i. Ethical value ii. Moral value iii. Commercial value iv. Social value

10. Credit Card fraud may include.
i. Stealing for credit card ii. Unauthorized and illegal use of credit card iii. Stealing of information iv. Phishing

11. Which of the following is an open-source software?
i. Microsoft Windows ii. Adobe Photoshop iii. My SQL iv. MS power point

12. The term intellectual property right covers.
i. Copyrights ii. Trademark iii. Patent iv. All of these

13. What is the term used for entering someone's account without their consent?
i. Hacking ii. Phishing
iii. Cybercrime vi. Copyright infringement

14.Online personal account, personal websites are example of.
i. Digital Wallet ii. Digital property iii Digital Certificate iv. Digital signature

15. Unsolicited commercial email is known as.

i. Spam ii. Malware iii. Virus iv. Spyware

16. Which of the following is not a type of cybercrime?

i. Data Theft ii. Forgery
iii. Damage of Data iv. Installation antivirus for protection

17. Which of the following is not covered under IPR?

i. Music ii. Insurance iii. Logo Designed iv. Invention

18. Which of the following is one of the impacts of e-waste on the environment?

i. Global Warming ii. Deforestation iii. Soil Erosion iv. Emission of Gases

19. When the e-waste dumped or thrown in landfills, the chemicals seep into the _____ and pollutes it.

i. Sea ii. Drain iii. Soil iv. All of these

20. When circuits burnt for disposals, it creates which of the following harmful chemical?

i. Beryllium ii. Lead iii. Copper iv. Mercury

21. Which of the following reduce e-waste?

i. Purchasing more and more gadgets. ii. Using them for a short time and then discarded.
iii. Good maintenance. iv. All of these.

22. The process of re-selling old electronic goods at lower prices is called.

i. Recycling ii. Refurbishing ii. Reusing iv. All of these

23. _____ refers to the process of conversion of electronic devices into something else which can be used again and again.

i. Recycling ii. Refurbishing iii. Reusing iv. All of these

24. The _____ has issued guidelines for the proper handling and disposal of e-waste.

i. State Pollution Control Board ii. Central Pollution Control Board iii. Both
iv. None of these.

25. _____ deals with designing and arranging such furniture, equipment and systems to make the work comfortable on computer.

i. Economic ii. Micro-economic iii. Ergonomics iv. None of these

Answer

01 Mark Answers

1 i	6 iii	11 iii	16 iv	21 iii
2 iii	7 ii	12 iv	17 iii	22 ii
3 iii	8 iv	13 i	18 iv	23 i
4 ii	9 iii	14 ii	19 iii	24 ii
5 ii	10 ii	15 i	20 i	25 iii

best of luck