Date :

# Assignment 1

Q2 a i) select * from loan
order by amount desc, loan no Asc;

ii) Select c1.c_name as customer 1,
c2.c_name as customer 2, c1.B_city from
customer c1
Join customer c2
on c1.B_city = c2.B_city
and c1.c_no < c2.c_no;

iii) Select distinct c.c_name, C.B_city
from customer c
Join borrower BR on C.c_no = BR.c_no
Join loan L on BR.loan_no = L.loan_no
Join Depositor D on C.c_no = D.c_no
Join account A on D acc_no = A.acc_no
where L.amount > 3 * A.balance;

b

| | Relational Database | NO SQL Database |
|---|---|---|
| 1 | Structured, table based. (rows & columns) | Unstructured (semi-structured (document, key value graph) |
| 2 | fixed schema | flexible (dynamic schema |
| 3 | Vertical Scaling | Horizontal scaling |
| 4 | SQL. | No standard, depends on db |
| 5 | best for complex queries transactions | Best for large scale data high speed. |

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Q1 b Explain view and index in SQL with suitable example.

Ans

View in SQL

- A view is a virtual table that is created from the result of an SQL Query.
- It doesn't store data itself, it stores the SQL query and whenever you access the view it retrieves the data from original tables

Feature of view

1. It doesn't store physical data.
2. Can be based on one or more tables
3. Used to hide complex joins or calculations
4. Can be used to provide security by showing only required columns or rows

Syntax →

```
Create view view_name as
select column1, column2 ....
from table_name.
where condition;
```

eg suppose we have a table.

| stud_id | Name | Dept | CGPA |
|---|---|---|---|
| 1001 | Divesh | Comp | 9.5 |
| 1002 | John | Entc | 9.8 |

Q Create a view to display only comp student

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Create view comp-students as
Select stud_id, name, CGPA
from students
where Dept = "comp";

2 Index in SQL

An index is a database object that improves speed of data retrival from table by creating a stored data structure.
It is similar to index at the back of a book instead of reading every page you directly jump to page numbers.

Features of Index
1 Increases performance of select queries
2 Requires extra storage space
3 slows down insert, update delete because index also needs to be updated.

Syntax
Create Index index_name
on table_name [ col1, col2 ... ]

eg if we frequently search student by name.

Create index idx_student_name
on students (name);

c Select E. Ename.
From Employee.

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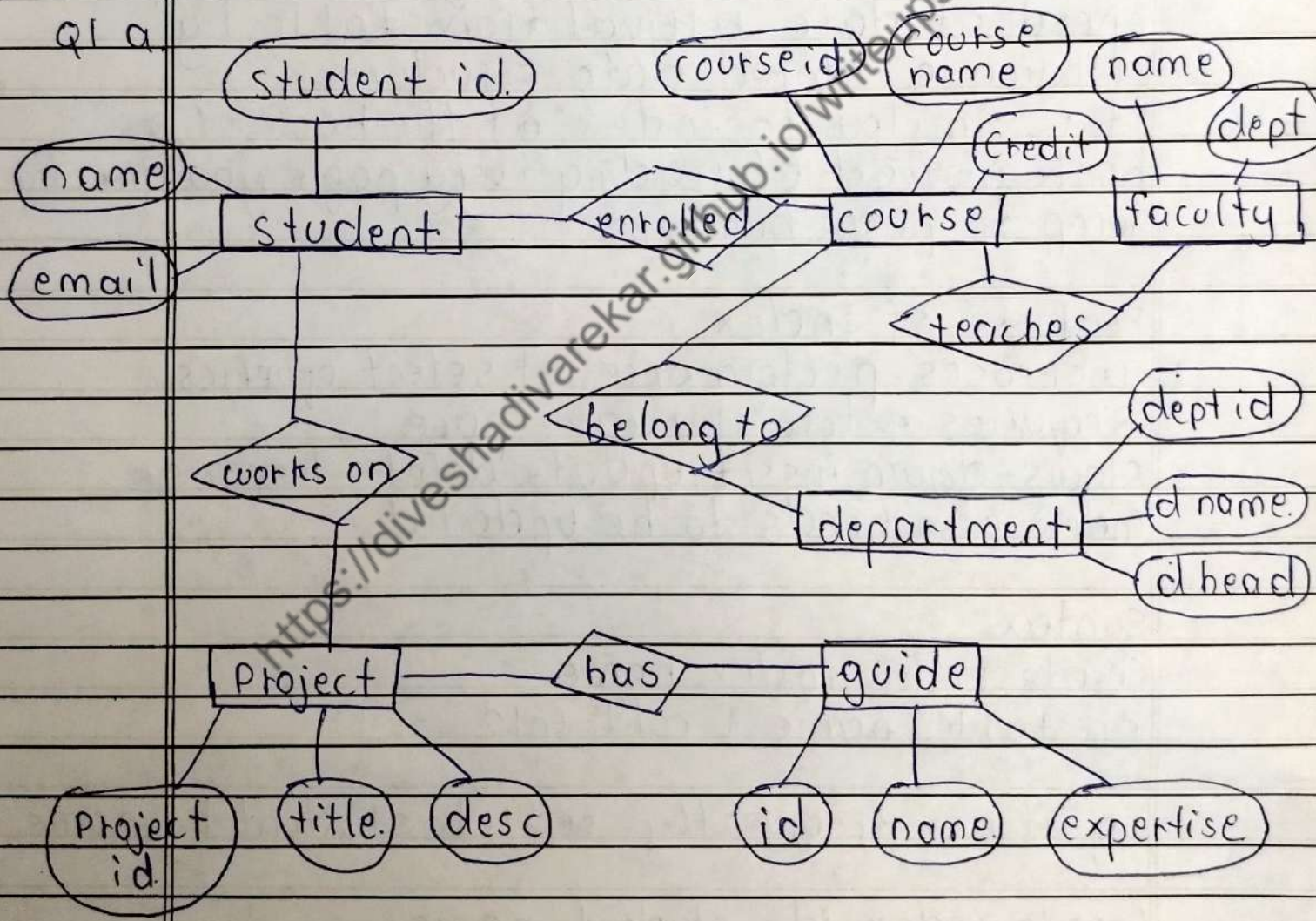
Join department D on E.dept_no = D.dept_no
where D.D_name = comp

2) Select D.D_name, avg(E.salary) as Avg_salary
from employee E
Join department D on E.Dept_no = D.dept_NO &
group by D.D_name;

Q1 a.



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# Assignment 2

Q1 Applications of Active and deductive databases

Ans

## Active Databases

Active databases use event-condition-Action (ECA) rules to automatically respond to events

### Applications

- Banking : Trigger alert or auto transfer when balance is low.
- Inventory : Auto reorder when stock is below limit
- Healthcare : Send alerts for abnormal access
- Security : Detects and log unauthorized access
- Workflow : Auto reminders or task escalation.
- E-commerce : Personalized offers based on user activity.

## Deductive databases

Deductive databases combine relational data with logic-based rules to infer new facts

### Applications

- Expert systems : Medical or legal advice systems
- Decision Support : Infer trends and patterns
- Semantic web : Represent knowledge and relationship
- AI reasoning : Derive intelligent insights.

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Q2 Applications of spatial databases

Ans

Spatial databases are designed to store manage and analyze spatial or geographic data such as maps, coordinates and geometrical objects They use specialized spatial indexes like R-trees for faster querying and analysis

Applications

1 Geographic information System (GIS)
store and analyze maps, city layouts, roads and administrative boundaries

2 Navigation and transportation.
Used in GPS systems for finding shortest routes traffic monitoring and logistic tracking.

3 Urban Planning.
manage land use, zoning and infrastructure data for smart city development.

4 Environmental monitoring
Track changes in forest cover, pollution levels, water bodies and climate zones

5 Disaster management.
Identify high risk areas, plan evacuation routes and analyze natural disaster impact zones