End Sem exam.

sub.:- DBMS (CS 310).

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1.) ⇒ Using empname as a clustered index is possible only when every employee will have a unique name. If this is ensured, the tupless will be organized according emp.name alphabetically.

Using empid as a clustered index is definitely possible considering everyone already has a unique id assigned to them. The tuples will be organized according to empid.

Using both empname and empid as a clustered indexes may not be possible but it is possible two have one clustered index and one non-clustered index.

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2.) ⇒

- DDL is important in representing information in DBMS because it is used to describe external and logical schemas.

- DML is used to update and access data; It is not important for representing data.

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3.) ⇒ True.

∵ A DBMS is typically shared among many users. Transactions from these users can be interleaved to improve the execution time of users queries. By interleaving queries, users do not have to wait for other user's transactions to complete fully before their own transaction begins. Without interleaving, if user A begins a transaction that will take 10 sec to complete, and user B wants to begin a transaction, user B would have to ~~begin~~ wait an additional 10 sec. for user A's transaction to complete before the database would begin processing user B's request.

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4.) (a) ⇒ A user must guarantee that his or her transaction does not corrupt data or insert nonsense in the database. for ex. :- in a banking database, a user must guarantee that a cash withdraw transaction accurately models the amount a person removes from his or her account.
A database application would be worthless if a person removed 20 dollars from an ATM but the transaction set their balance to zero.

(b) ⇒ A DBMS must guarantee that transactions are executed fully and independently of other transactions An essential property of a DBMS is that a transction should execute atomically or as if it is the only transaction running. Also, transactions will either complete fully or will be aborted and the database returned to it's initial state. This ensures that the database remains consistent.

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5.) ⇒ Yes, we can determine the key of relation with the help of instance.

eg.: In a one to many relation we can consider the column/attribute with unique values as a primary key.

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7.) => P(R1, Catalog)
P(R2, Catalog)

$\pi_{R1.pid}\ \sigma_{R1.pid = R2.pid \wedge R1.sid != R2.sid}(R1 \times R2)$

Using the following.

SID	PID	Cost
1	1	$ 10.00
2	1	$ 9.00
2	3	$ 34.00
3	1	$ 11.00

R1 x R2 gives us:

SID	PID	Cost	SID	PID	Cost
1	1	$ 10.00	1	1	$ 10.00
1	1	$ 10.00	2	1	$ 9.00
1	1	$ 10.00	2	3	$ 34.00
1	1	$ 10.00	3	1	$ 11.00
2	1	$ 9.00	1	1	$ 10.00
2	1	$ 9.00	2	1	$ 9.00
2	1	$ 9.00	2	3	$ 34.00
2	1	$ 9.00	3	1	$ 11.00
2	3	$ 34.00	1	1	$ 10.00
2	3	$ 34.00	2	1	$ 9.00
2	3	$ 34.00	2	3	$ 34.00
2	3	$ 34.00	3	1	$ 11.00
3	1	$ 11.00	1	1	$ 10.00
3	1	$ 11.00	2	1	$ 9.00
3	1	$ 11.00	2	3	$ 34.00
3	1	$ 11.00	3	1	$ 11.00

[illegible]
[illegible]

σ R1.pid = R2.pid gives us:

SID	PID	Cost	SID	PID	Cost
1	1	$10.00	1	1	$10.00
1	1	$10.00	2	1	$9.00
1	1	$10.00	3	1	$11.00
2	1	$9.00	1	1	$10.00
2	1	$9.00	2	1	$9.00
2	1	$9.00	3	1	$11.00
2	3	$24.00	2	3	$24.00
3	1	$11.00	1	1	$10.00
3	1	$11.00	2	1	$9.00
3	1	$11.00	3	1	$11.00

σ R1.pid = R2.pid ∧ R1.sid != R2.sid gives us:

SID	PID	Cost	SID	PID	Cost
1	1	$10.00	2	1	$9.00
1	1	$10.00	3	1	$11.00
2	1	$9.00	1	1	$10.00
2	1	$9.00	3	1	$11.00
3	1	$11.00	1	1	$10.00
3	1	$11.00	2	1	$9.00

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SQL query :-

```
SELECT C.sid.
FROM Catalog C
WHERE EXISTS ( SELECT C1.sid
               FROM catalog C1
               WHERE C1.pid = C.pid AND
                     C1.sid ≠ C.sid ).
```

8.) ⇒ Invalid query.

Explanation :- This relational algebra statement does not return anything because of the sequence of projection operators. Once the sid is projected, it is the only field in the set. Therefore, projecting on some will not return anything.

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9.) => The following view on Emp can be updated automatically by updating Emp:

```
CREATE VIEW seniorEmp (eid, name, age, salary).
As SELECT E.eid, E.ename, E.age, E.salary
FROM Emp E
WHERE E.age > 50.
```