

ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार - शिक्षणमहर्षी डॉ. बापूजी साठुंबे
Shri Swami Vivekanand Shikshan Sanstha, Kolhapur.



VIVEKANAND COLLEGE, KOLHAPUR

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Department of Computer Studies

NOTICE

Date: 10th December 2025

Open Book Test – Database Management System

All MCA I Year students are hereby informed that **Open Book Test** for the subject **Database Management System** will be conducted as per the details below. Students are requested to be present on time with proper preparation.

Test Details:

- ◆ Date: 12/12/2025
- ◆ Time: 11:00 PM to 12:00 PM
- ◆ Venue Room No. 512

Students have to report to the venue before the scheduled time.



Mr. V. B. Pujari



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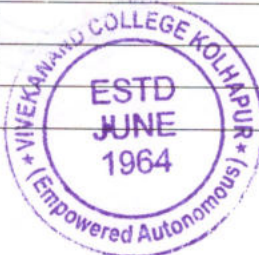
Department of Computer Studies

Date 12/12/2025

Subject-DBMS

OPEN BOOK TEST

SR. NO.	NAME	SIGN
1	AMBOLE SWAPNIL AMAR	AB
2	ATIGRE PRATHMESH UMESH	AB
3	BABAR MINAL SACHIN	AB
4	BABAR SANJANA SURESH	AB
5	SHRIRAM TUKARAM BATE	Shriram
6	CHOUTHE NIKITA SAMBHAJI	Chauthi
7	CHOUGALE MANALI BHIMRAO	Chougale
8	CHOUGULE TIRTHA AMIT	Tirtha
9	DAHOTRE ADITYA DIVAKAR	AB
10	DALVI SAKSHI VISHWAS	Dalvi
11	DAVANG PRANALI PANDURANG	Davang
12	DESAI KHUSHI MAINUDDIN	Khushi Desai
13	DESAI SANDESH SUDHIR	AB
14	DESAI MAYURI RAVINDRA	Desai
15	DESAI ADITYA VILAS	Aditya
16	DHONUKSHE ROHAN NAMDEV	Rohan
17	DIVASE PRACHI PANDHARINATH	Prachi
18	DIXIT VAISHNAVI UMESH	AB
19	DUBALE PRATHMESH DADASO	Dubale
20	EKAL PRUTHVIRAJ VISHWANATH	
21	GADKARI NAWAZ SALIM	Gadkari
22	GAIKWAD SHREYA SHIVAJI	Gaikwad
23	GAWADE VINAYAK AMRUT	Gawade
24	GOKHALE NEEL MAKARAND	Gokhale
25	GURAV VAISHNAVI SAMBHAJI	Gurav
26	HASABE SUSHANT VIKRAM	AB
27	HIREMATH ROHINI MANTESH	Hiremath
28	JADHAV MADHAV DHANAJI	Jadhav
29	JADHAV SUDESHA GANESH	Sudesh
30	JAGTAP TANVI NITIN	Jagtap



31	KADAM RAJ SHANKAR	<i>Raj</i>
32	KADAM HARSHADA HINDURAO	<i>Hindurao</i>
33	KADAM RUTUJA MARUTI	<i>Rutuja</i>
34	KAMBALE SOURAV KRISHNAT	<i>Sourav</i>
35	KAMBLE KRANTI VITTHAL	<i>Kranti</i>
36	KAMBLE SANDIP SADASHIV	<i>Sandip</i>
37	KAMBLE VAISHNAVI NANASO	<i>Vaishnavi</i>
38	KASHID SHRUTIKA PRAKASH	<i>AB</i>
39	KHADE PRITI SANJAY	<i>AB</i>
40	KHANDEKAR VISHAL VILAS	<i>AB</i>
41	KOTHMIRE SHIVAM KIRANRAO	<i>AB</i>
42	LOHAR PIYUSH PRAKASH	<i>AB</i>
43	MANDEKAR SOURABH VIJAY	<i>AB</i>
44	PARIT SALONI SHAHAJI	<i>Parit</i>
45	PARIT APARNA NAMDEV	<i>AB</i>
46	PATIL PRATIK NAMDEV	<i>Patil</i>
47	PATIL NANDINI SHRIKANT	<i>AB</i>
48	PATIL ABHISHEK TANAJI	<i>AB</i>
49	PATIL SANDESH SHAHAJI	<i>Patil</i>
50	PATIL MADHURA MOHAN	<i>Patil</i>
51	PATIL PAYAL NAMDEV	<i>Patil</i>
52	PATIL SHRUTIKA BALWANT	<i>Patil</i>
53	PATIL ADITYA RANJIT	<i>AB</i>
54	PATKARE DIVYANGANA SANJAY	<i>Divyanga</i>
55	POTDAR AISHWARYA VIJAY	<i>Potdar</i>
56	POWAR SAYALI JAGANNATH	<i>Powar</i>
57	POWAR SIDDHESH RUPESH	<i>AB</i>
58	PRASADE SMIT SAMIR	<i>Prasad</i>
59	SHIKALGAR ALSHIFA PARVEJ	<i>Shikalgar</i>
60	SHINDE SAKSHI PANDURANG	<i>Shinde</i>
61	SINGH ROHAN UMACHARAN	<i>AB</i>
62	SURYAVANSHI VAISHNAVI VINAYAK	<i>Suryavanshi</i>
63	SUTAR SHWETA SURESH	<i>AB</i>
64	VARUTE SAMRUDDHI BABURAO	<i>AB</i>
65	WAINGADE SONIYA VIJAY	<i>AB</i>
66	YADAV PRANALI DHONDIRAM	<i>Yadav</i>



Dr. Shil

Faculty Sign

Vijay

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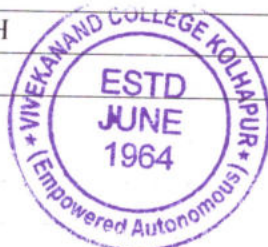
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Date- 12/12/2025

Subject-DBMS

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4	BABAR SANJANA SURESH	16
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7	CHOUGALE MANALI BHIMRAO	17
8	CHOUGULE TIRTHA AMIT	18
9	DAHOTRE ADITYA DIVAKAR	AB
10	DALVI SAKSHI VISHWAS	16
11	DAVANG PRANALI PANDURANG	18
12	DESAI KHUSHI MAINUDDIN	18
13	DESAI SANDESH SUDHIR	AB
14	DESAI MAYURI RAVINDRA	19
15	DESAI ADITYA VILAS	16
16	DHONUKSHE ROHAN NAMDEV	17
17	DIVASE PRACHI PANDHARINATH	19
18	DIXIT VAISHNAVI UMESH	AB
19	DUBALE PRATHMESH DADASO	17
20	EKAL PRUTHVIRAJ VISHWANATH	AB
21	GADKARI NAWAZ SALIM	17
22	GAIKWAD SHREYA SHIVAJI	16
23	GAWADE VINAYAK AMRUT	18
24	GOKHALE NEEL MAKARAND	19
25	GURAV VAISHNAVI SAMBHAJI	17
26	HASABE SUSHANT VIKRAM	AB
27	HIEMATH ROHINI MANTESH	16
28	JADHAV MADHAV DHANAJI	17
29	JADHAV SUDESHA GANESH	18
30	JAGTAP TANVI NITIN	19





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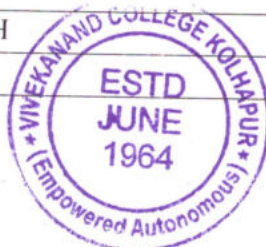
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Name - Prathamesh Dadasa Dubale.

Roll No - 19

Subject - DBMS

class - MCA-I

Q 1 Explain Relational Algebra.

→ Relational Algebra -

Relational algebra is a procedural query language and a foundational mathematical framework for relational database that use a set of operations to define how data should be retrieved and manipulated. Its operations take one or more relations (tables) as input and produce a new relation as output, a property called Closure, which allows operations to be nested to form complex queries.

Structured Query Language (SQL) is based on relational algebra concepts.

The operations in relational algebra are divided into basic and derived operations.

Basic operations -

* Selection (σ) -

Filters rows (tuples) from a relation based on a specified condition or predicate.

EX - $\sigma_{\text{Salary} > 50000}(\text{Employee})$ selects all employee records with a salary greater than 50,000.

* Projection (π) -

Selects specific columns (attributes) from a relation, effectively creating a vertical subset of the table. It automatically eliminates duplicate rows from the result.

EX - $\pi_{\text{Name, Salary}}(\text{Employee})$ returns only the name and salary attributes of the employee table.

* Union ($\cup$) :-

Combines the tuples from two union-compatible relations (relations with the same number of attributes and compatible domain) into a single relation automatically removing duplicate.

* Set Difference ($-$) :

Returns the tuples present in the first relation but not in the second, requiring the relations to be union-compatible.

* Cartesian Product ($\times$) -

Combines every tuple of one relation. The result contains all possible combinations of rows from both tables and forms the basis for join operations.

* Rename (ρ) :-

Gives a new temporary name to a relation or its attributes, which is useful for avoiding ambiguity in complex queries.

* Derived Operations -

* join ($\Join$) - Combines data from two or more relations based on a related attributes or condition types included.

* Inner join $\leftarrow$ Returns only the rows where there is a match in both relations based on a condition.

* Intersection ($\cap$) : Return only the tuples that are present in both union-compatible relations.

* Division ($\div$) : used for queries that involve a "for all" condition, such as finding employees who are assigned to every department.

Q 2 Explain Relational Calculus ?

→ Relational Calculus is a non-procedural declarative query language for database that specifies what data to retrieve, not how to retrieve it.

It uses logical predicates and quantifiers, similar to mathematical logic, to define queries and is based on predicate calculus. This allows users to express queries in a more intuitive, "what you want" format letting the system handle the execution details.

* Key Characteristics.

* Declarative and Non-procedural - Unlike procedural language like relational algebra, relational calculus focuses on the desired result without providing a step-by-step procedure for obtaining it.

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* Logic-based : It uses logical operators ($\wedge$, $\vee$, $\neg$) and quantifiers ($\exists$ for "exists" and $\forall$ for "for all") to formulate queries.

* What it's how: The user defines the conditions that must be met, and the database management system figures out the most efficient way to find the matching data.

* Theoretical Foundation - It's a fundamental concept in database theory, forming the basis for many modern database query languages and is closely related to the expressive power of relational algebra.

* Types of Relational Calculus.

* TRC (Tuple Relational Calculus) —

Queries are defined by focusing on tuple (rows) and using tuple variable to represent them. It is often considered more intuitive and is more commonly used than DRC.

* Domain Relational Calculus (DRC) —

Queries are defined by focusing domain variable which represent the attribute values (column) within a relation.

product Id	product Category	product Name	product Unit price
8	New	Tv unit 1	200
10	New	Tv unit	120
12	Existing	Tv cabinet	77

Ques

Name: Sayali Jagannath Pawar

Roll.No: 56

Subject: DBMS

Q.1) Explain Relational algebra in brief

Q.2) Explain Relational Calculus in brief

Q.3) Explain three level architecture.

Q.1) Relational Algebra:-

→ Relational algebra is procedural language. It gives a step by step process to obtain the result of the query. It uses operators to perform queries.

* Types of Relational operation :-

Relational Operation

Select Operation	Project Operation	Union Operation	Set operation	Set Difference	Cartesian product	Rename operation
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① Select Operation :-

- The select operation selects tuples that satisfy a given predicate.
- It denoted by sigma (σ)

1. Notation : $\sigma_p(r)$

where

σ is used to selection prediction.

r is used for relation

p is used as a propositional logic formula which may use connectors like AND OR & NOT. These relation can use as relational operators like $=, \neq, \geq, <, >, \leq$.

② Project Operation :-

- This operation shows the list of attributes that we wish to appear in the result. Rest of the attributes are eliminated from the data.

- It is denoted by (Π) .

1. Notation $\Pi A_1, A_2, A_n (r)$.

where

A_1, A_2, A_3 is used to as an attribute name of relation r

③ Union Operation :-

- Suppose there are two tuples R & S . The union operation contain all the tuples that are either in R or S both in R & S .

- It eliminates the duplicate tuples.

- It is denoted by $\cup$.

A union operation must hold the following condition:

- R & S must have the attributes of the same numbers.

- Duplicate tuples are eliminated automatically.

④ Set Intersection :-

- Suppose there are two tuples R & S . The set intersection operation contains all tuples that are in both R & S .

- It denoted by intersection $\cap$

1. Notation $R \cap S$.

⑤ Set Difference:

- Suppose there are two tuples R & S . The set intersection operation contains all tuples that are in R but not in S .
- It is denoted by intersection minus (-).
- Notation: $R - S$.

⑥ Cartesian product :-

- The Cartesian product is used to combine each row in one table with each row in the other table. It is also known as cross product.
- It is denoted by $\times$.
- Notation $E \times D$.

⑦ Rename Operation:

The rename operation is used to rename the output relation. It is denoted by $\rho(p)$.

Q.2) Relational Calculus :-

→ There is an alternate way of formulating queries known as Relation Calculus. Relational calculus is a non-procedural query language. In the non-procedural query language the user is not concerned with the detail of how to obtain the end result. The relational calculus tells what to do but never explain how to do. Most commercial relational language are based on aspects of relational calculus including SQL - QBE & QUEL.

Why it is called Relation calculus?

- It is based on predicate calculus, a name derived from branch of symbolic language. A predicate is a truth-

valued function with arguments. On substituting value for the arguments, the function result is an expression called as proposition. It can be either true or false. It is a tailored version of a subject of the predicate calculus to communicate with the relational database.

Many of the calculus expression involves the use of Quantifiers. There are two types of quantifiers.

- Universal Quantifiers: The universal quantifier denoted by $\forall$ is read as for all which means that in given set of tuples is at least one occurred whose values satisfy a given condition.

- Existential Quantifiers: The existential quantifier denoted by $\exists$ is read as for all which means that in a given set of tuples there is at least one occurrence whose value satisfy a given condition.

* Types of Relational Calculus :-

① Tuple Relational Calculus :- (TRC)

It is a non-procedural query language which is based on finding a number of tuple variables also known as range variable for which predicate holds true.

It describes information without giving a specific procedure for obtaining that information.

- The tuple relational calculus is specified to select the tuples in a relation.

- In TRC, filtering variable uses the tuples of a relation. The result of the relation can have one or more tuples.

② Domain Relational Calculus (DRC)

- The second form of relation is known as Domain relation calculus.
- In domain relation calculus filtering variables uses that domain of attributes.
- Domain relational calculus uses the same operators as tuple calculus.
- It uses logical connectives $\wedge$ (and), $\vee$ (or) & $\neg$ (not)
- It uses existential ($\exists$) & Universal quantifier ($\forall$) to bind of variable.
- The QBE or Query by Example is query language related domain relational calculus.

Pliz