

Unit V — Security, Authorization & Advanced Topics

Database Management System | BMB IT 03 / KMBN IT 03

Unit V: Security, Authorization and Advanced Topics

Exam Blueprint (2022–2025 papers)

Topic	Years asked	Marks
Data mining	2022, 2023, 2025	2 & 10
Data warehousing (+ link with mining)	2023	10
Distributed database — problems & concepts	2023	2 & 10
Client-server architecture (two-tier)	2022	10
Database security, authorization, privileges	2025 (constraints), general	7 & 10
Object-oriented database (OODB) & drawbacks	2022, 2023	2
Data visualization	2024	2
XML	2022	2

YE QUESTION BAAR-BAAR AAYA HAI

Data mining is the single most repeated topic in this unit — 2022, 2023 and 2025. 2023 me ek statement-based question tha: *"Data Mining is the backbone of Data Warehousing. Explain."* Section 5.5 me uska answer structure hai.

1. Database Security

DEFINITION - RATTA MAARO

Database security is the protection of the database against **intentional or accidental threats** that compromise its **confidentiality, integrity and availability** (the **CIA triad**).

1.1 The CIA Triad

Goal	Meaning	Example threat
Confidentiality	Only authorised users can see the data	Unauthorised read of salary data
Integrity	Data is accurate and can be modified only in authorised ways	Tampering with account balances

Goal	Meaning	Example threat
Availability	Authorised users can access data when needed	Denial-of-service, disk crash

1.2 Threats to a Database

- **Unauthorised access** — hacking, stolen credentials, privilege escalation
- **SQL injection** — malicious SQL inserted through an application input field
- **Insider threats** — misuse by employees or a disgruntled DBA
- **Malware and ransomware**
- **Theft or physical damage** of hardware and media
- **Accidental loss** — human error, faulty software, wrong
- **Denial of service** — overloading so genuine users are blocked
- **Data interception** — eavesdropping on network traffic
- **Inference** — deducing sensitive values from allowed aggregate queries

1.3 Authentication vs Authorization

YAHAN 90% STUDENTS GALTİ KARTE HAIN

Ye do alag cheezein hain aur exam me farak poocha jaata hai. **Authentication** = "Tum ho kaun?" — verifying the identity of the user (password, biometrics, OTP, two-factor). **Authorization** = "Tumhe kya karne ki ijaazat hai?" — determining which operations an authenticated user may perform.

Authentication comes first, authorization second.

1.4 Privileges and Access Control in SQL

Types of privilege:

Privilege	Allows
	Read data
	Add new rows
	Modify existing rows
	Remove rows
	Create a foreign key referring to the table
	Run a procedure or function
	Everything

```
GRANT SELECT, INSERT ON STUDENT TO ravi;
GRANT SELECT ON STUDENT TO sita WITH GRANT OPTION; -- sita can pass it on
REVOKE INSERT ON STUDENT FROM ravi;
```

Roles — a named group of privileges granted to many users at once, simplifying administration:

```
CREATE ROLE clerk;
GRANT SELECT, INSERT ON STUDENT TO clerk;
GRANT clerk TO ravi, sita;
```