

8.2 Database Management Systems (DBMS)

Name: _____ Class: _____ Date: _____

Total: 15 marks

KEY WORDS database management system (dbms) 数据库管理系统 • data dictionary 数据字典 • logical schema 逻辑模式 • integrity 完整性 • query 查询

Objective

Build the skills to answer exam questions on the **Database Management System (DBMS)** 数据库管理系统 — the features it provides and the tools it gives users.

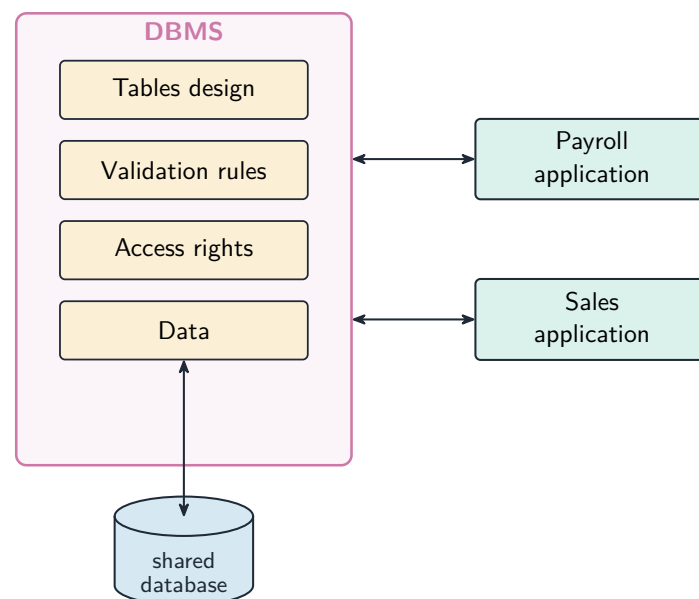
You must be able to:

- describe the features of a DBMS that fix the problems of a file-based approach
- describe how the software tools in a DBMS are used in practice

1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

■ Why a DBMS



A DBMS replaces the older file-based approach to data

A **DBMS** is the software that manages the database centrally for all programs, so the

structure, rules and security live in one place — not hard-coded into each program.

■ Features that fix file-based problems

Feature	What it does
data dictionary	describes every table, field, type and key
logical schema 逻辑模式	the overall logical design: the tables, fields, keys and relationships
redundancy control	each fact stored once (no inconsistency)
concurrent access control	locks/transactions let many users work safely
integrity rules	keys, unique and range constraints enforced centrally
transactions	a group of operations that all succeed or all fail
views	virtual tables showing each user only their slice
security & backup	per-user permissions; backup and recovery

■ The DBMS tools

A query builder, a forms designer, a report generator, a data-dictionary editor, user management, and an **SQL** editor — so designers, programmers and end-users each work at the right level.

2 Practice

Now apply the methods above.

2.1 State what a **data dictionary** holds. [1]

2.2 State what a **transaction** is. [1]

2.3 State **two** features a DBMS provides that a file-based system does not. [2]

2.4 State what a **view** is. [1]

3 Exam-style questions

3.1 Describe **two** features of a DBMS that solve problems of the file-based approach. [4]

3.2 Explain how a DBMS allows many users to work on the data at the same time **safely**. [2]

3.3 State **two** software tools found in a DBMS and what each is used for. [2]

3.4 Describe what is meant by the DBMS feature **data dictionary** and the DBMS feature **logical schema**. [2]

Solutions

2.1 A description of every table, field, data type and key in the database (its structure).

2.2 A group of operations treated as one unit — they **all succeed or all fail**.

2.3 Any two of: data dictionary; concurrency control; transactions; central integrity rules; views; per-user security; backup/recovery.

2.4 A **virtual table** that shows a user a chosen slice of the data (selected rows/columns).

3.1 Any two, described, e.g.: **central integrity rules** — keys and constraints enforced for all programs, so data stays valid; **concurrency control** — locks/transactions let many users edit without corrupting data.

3.2 The DBMS uses **locks** and **transactions** so two users cannot change the same data at once and each transaction completes fully or not at all.

3.3 Any two with a use, e.g.: query builder (build queries without writing SQL); forms designer (build data-entry screens); report generator (produce formatted output).

3.4 Data dictionary: data about the data — a description of every table, field, data type and key. **Logical schema:** the overall logical design of the database — its tables, fields, keys and relationships.