

3.2 SQL queries and transactions

Name: _____ Class: _____ Date: _____ **Total: 22 marks**

KEY WORDS join • aggregate function • transaction

Objective

Build the skills to answer exam questions on **SQL** – selecting, filtering, sorting, joining and grouping, changing data, and transactions.

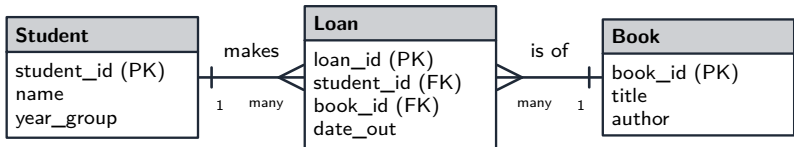
You must be able to:

- write **SELECT** queries with **WHERE**, **ORDER BY**, **LIKE** and Boolean conditions
- **join** two or three tables on matching keys
- use **aggregate functions** with **GROUP BY** and **HAVING**
- write **INSERT**, **UPDATE** and **DELETE** statements
- explain a **transaction** and the **ACID** properties

1 Key knowledge and worked examples

Study these first. Each one shows the method for a question type used later.

■ **Key knowledge: the tables**



Student		
student_id	name	year_group
1	Ana	11
2	Ben	12
3	Chen	11

Book		
book_id	title	author
10	Dune	Herbert
11	Emma	Austen
12	Holes	Sachar

Loan			
loan_id	student_id	book_id	date_out
100	1	10	2026-09-01
101	1	12	2026-09-05
102	3	11	2026-09-06

■ **Worked example: a join with grouping**

List each student's name and number of loans, most loans first.

```
SELECT Student.name, COUNT(*) AS loans
FROM Student
JOIN Loan ON Student.student_id = Loan.student_id
GROUP BY Student.name
ORDER BY loans DESC;
```

1. **JOIN ... ON** matches each loan to its student: three joined rows.
2. **GROUP BY** makes one group per name; **COUNT(*)** counts its rows.
3. Result: (Ana, 2), (Chen, 1). Ben has no loans, so he has no joined row.

■ **Key knowledge: changing data and ACID**

- **INSERT INTO t (a, b) VALUES (1, 'x');** **UPDATE t SET a = 2 WHERE ...;**
 DELETE FROM t WHERE ...;
- Without **WHERE**, **UPDATE** and **DELETE** affect every row.
- **ACID:** **atomicity** (all or nothing), **consistency** (valid to valid), **isolation** (no interference), **durability** (survives a crash).

2 Practice

2.1 Write a query to list the names of students in year 12. [2]

2.2 Write a query to list book titles that start with the letter H, in alphabetical order. [3]

2.3 State the result of `SELECT title FROM Book WHERE book_id <> 11;`. [1]

2.4 Write a statement to add the book 13, 'Wonder', by Palacio. [2]

3 Exam-style questions

3.1 Which clause filters **groups** after `GROUP BY`? [1]

- ☐ **A** WHERE
☐ **B** HAVING
☐ **C** ORDER BY
☐ **D** SELECT

3.2 What does `DELETE FROM Loan;` do? [1]

- ☐ **A** deletes the Loan table's design
☐ **B** deletes every row of Loan
☐ **C** deletes nothing without `WHERE`
☐ **D** deletes the last row

3.3 Which ACID property ensures a committed change survives a power cut? [1]

- ☐ **A** atomicity
☐ **B** consistency
☐ **C** isolation
☐ **D** durability

3.4 Use the Student, Book and Loan tables.

(a) Write a query to list the title of every book borrowed by Ana. [4]

(b) State the output of your query. [1]

(c) Book 10 is returned. Write a statement to remove its loan record. [2]

(d) Chen moves to year 12. Write a statement to record this. [2]

(e) A transfer between two library accounts is processed as a transaction. Explain why atomicity matters. [2]
